

**GENETIC ANALYSIS OF OIL QUALITY, YIELD AND ITS
COMPONENTS IN RECOMBINANT INBRED LINES OF
GROUNDNUT (*Arachis hypogaea* L.)**

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INTRODUCTION

Groundnut or peanut (*Arachis hypogaea* L.), is a four foliate legume with orange to light yellow flowers and underground fruits. This annual legume is a native of South America (Brazil), originated between southern Bolivia and northern Argentina from where it spreads throughout the New world, as spanish explorers discovered its versatility, but now grown throughout the tropical and warm temperate regions of the globe between latitudes 40° N to 40° S.

India is the second largest producer of the groundnut in the world next to china. World area of 26.62 m ha and production of 35.66 m t and productivity of 1041 kg per hectare. In India groundnut is cultivated in an area of 4.19 m ha and 5.62 m t with productivity of 1341 kg per ha and in Karnataka it is grown in an area of 0.82 m ha, production of 0.51 m t and productivity of 626 kg per ha (Anon, 2012). The major producers are China, India, Indonesia, and the USA which together account for two-thirds of the world output. Developing countries, account for 82 per cent of total groundnut area and 79 per cent of production of the world. Among the developing countries, production is mainly concentrated in Asia and Africa with Asia accounting for 51 per cent of global area and 60 per cent of production. India occupies 19 per cent of global area (4.19 m ha) and contributes 21 per cent (5.62 m t) of total groundnut production. (FAO, 2012).

It is a major oil seed crop that ranks 12th position among the food crops of the world and is a chief source of vegetable oil sources in India. The groundnut seed is of value as a dessert nut and in the production of confectionary nut flour, peanut protein and peanut milk (Woodroof, 1966). About two third of the world production of groundnut seed serves for the extraction of oil, which is used for the cooking, salad oil and margarine and lower grades of oil are used in soap manufacture.

Oilseeds occupy a pride place in the Indian economy and groundnut is a kingpin among oilseeds grown in India. Groundnut seeds contain high quality edible oil (35-55 %) that varies depending upon variety (Nelson *et al.*, 1995), season and maturity (Hashim *et al* 1993), Groundnut oil is considered as stable and nutritive as it contains right proportions of saturated and unsaturated fatty acids. Since fatty acids make up the major portion of the weight of an oil molecule, the physical and chemical properties of the oil tend to be determined by the properties of the fatty acids which predominate in their makeup. Oleic acid, a monounsaturated fatty acid, and linoleic acid, a polyunsaturated fatty acid both accounts for 75-80 per cent of the total fatty acids in the groundnut oil, The higher ratio of oleic/linoleic acid in groundnut oil, which ranges from 0.75 to 5.5 imparts stability and improves its shelf life by delaying the development of rancidity (O'Keefe *et al.*, 1993, Mozingo *et al.*, 2004) and thus improves cooking quality.

Groundnut is an important source of easily digestible protein (22-36%) which is the second important constituent of kernel after oil. Therefore groundnut crop can play a crucial role in alleviating protein malnutrition in the developing countries and carbohydrates (18%). More than 80 per cent of groundnut production in the country is used for extraction of oil and about two per cent is exported for confectionary purposes. Commercially, groundnut is the world's fourth most important source of edible oil and third most important source of vegetable protein.

One of the most profound multifaceted challenges facing humankind into the next millennium is the need to ensure not only adequate quantity but also of high quality food. This is rightly summed up by the German proverb, 'A man is what he eats'. Oilseed production research has primarily emphasized on increased crop yields and higher oil contents. Until very recently, there has been little encouragement for research emphasis on improved oil quality from consumers and industries/traders

Groundnut productivity level (1341 kg per ha) of our country is less than the world productivity level (1401 kg per ha). Several reasons are attributed for low yield levels *viz.*, poor adaptation of improved high yielding cultivars, cultivation under shallow soils of low fertility, uneven rainfall distribution, continuous cropping without rotation of crop, low plant population and incidence of foliar diseases and insect pests are cited as the major limiting factors in most of the groundnut growing regions. This is an indication of the incomplete utilization of the genetic potential of the crop in our country without proper crop management practices.

Availability of wide genetic variability with broad genetic base is prerequisite for the development of improved varieties with wide adoption. There are three major sources of genetic variability *viz.*, already available hereditary differences among wild relatives or the cultivated species, a genetic variability recombined through hybridization and the genetic differences created artificially by use of mutagens (Gregory, 1961).

The exploitation of genetic resources from wild species is extremely difficult because of ploidy differences between cultivated and wild species and compatibility barriers except within the *Arachis* section. Even the crosses made within the section *Arachis* and between different botanical varieties of two sub-species have yielded unsatisfactory results because of complex nature of inheritance due to its allo-polyploid nature. In India, early maturing Spanish Bunch varieties occupy more (>70 %) area but they are poor in oil quality (O/L ratio 1.0), while late maturing Virginia varieties that occupy less area (~30 %) are marginally superior (O/L ratio ~1.5) in oil quality. However screening of available germplasm and breeding lines indicated very limited genetic variability for oil quality with very limited range of (1-3) O/L ratio.

The natural variability available in this crop is negligible due to limited natural out crossing. In such cases, creation of new variability through hybridization could be an effective means of crop improvement. Crossing and hybridization will be of specific significance in crops like groundnut that lacks genetic variability even between the botanical groups of groundnut as evidenced by molecular analysis (Halward *et al.*, 1990) which limits the improvement of the crop. So wide hybridization between genera have been used to exploit genetic variability.

Most of the economic characters including yield are polygenically inherited that needs greater attention of the plant breeder. Polygenic mutations have small but cumulative effects and are difficult to discern reliably as these are sensitive to environmental influence. Hence, they need to be carefully selected. For these reasons, it becomes necessary to know the extent of genetic variability for various desirable qualitative and quantitative traits.

Hybridization offers opportunities to improve the locally adopted varieties with regard to specific traits. By looking into these things two genotypes of groundnut, GPBD-4 and GM 4-3 were used in the study for improvement of oleic acid and O/L ratio with other desirable traits like yield and resistance to foliar diseases viz., rust and leaf spot diseases. As breeding efforts so far were targeted towards enhancing the oil production either by increasing the oil content or by increasing the production *per se*, breeding programmes for high oil quality, high protein with low oil content are required for confectionary purpose. Since it is not possible to bring together all the desirable traits in a single cultivar, the present study concentrated on identification of RILs of the cross GPBD-4 x GM4-3 that are in F₇ generation for high protein content, low and high oil content and high O/L ratio.

Rust and late leaf spot (LLS) are the two most widely distributed and economically important foliar diseases of groundnut causing severe damage to the crop (Mc Donald *et al.*, 1985 and Kokalis-Burette *et al.*, 1997). They are commonly present wherever groundnut is grown but their incidence and severity vary between localities and seasons. Each disease alone is capable of causing substantial yield loss but when they occur together losses are further increased. These foliar diseases besides reducing the yield also have an adverse influence on seed quality and grade characteristics, deteriorate the quality of plant biomass and thus render the fodder unsuitable as animal feed. Further, control of these diseases through the application of plant protection measures will not only increase the cost of cultivation but also lead to environmental and health hazards. The seeds harvested from unsprayed plots will have significantly better quality than those treated with a fungicide used to control rust and LLS in groundnut (Hammonds *et al.*, 1976). That is why, though chemical control is possible, development of resistant cultivars is considered to be the best strategy for reducing crop losses due to these diseases.

It is also essential to have knowledge regarding the amount of genetic variability created through hybridization in these derived recombinant inbred lines (RILs) for various economic characters, since information on nature and magnitude of variability present for traits of interest is prerequisite for crop improvement. The phenotypic expression of the plant character is mainly controlled by the genetic makeup of the plant and also environment. So it is necessary to partition the observed phenotypic variability into its heritable and non-heritable components with suitable parameter such as phenotypic and genotypic coefficient of variation, heritability and genetic advance.

The selection of one character leads to correlated response in other trait as a result of this complex relationship existing among different traits is well known. Many characters including yield are complex and polygenically inherited traits are highly influenced by a large number of factors and their interactions. Hence information on association of component characters with yield and among themselves and extent to which they are influenced by environment is necessary to bring desirable genetic changes.

By taking these things into consideration in the present investigation, attempts have been made to know the extent of genetic variability generated in RILs (Recombinant Inbred Lines) of the cross GPBD-4 x GM4-3 and tried to identify the potential lines for pod yield and its components, oil quality traits viz., oleic acid and O/L Ratio besides protein content and disease resistance .Thus genetic analysis of yield and its components ,oil quality and foliar disease resistance traits was attempted in RILs of GPBD-4 x GM4-3 cross with the following objectives.

Objectives

1. To assess the extent of genetic variability for quantitative traits like yield, yield components and oil quality traits (oleic acid and O/L Ratio).
2. To assess the nature of association between yield, yield components and oil quality traits.
3. To identify the potential lines for pod yield and its components, oil quality traits and disease resistance.

REVIEW OF LITERATURE

Groundnut is an important oilseed crop grown under diverse climatic conditions. It is consumed in different ways. It is used as an edible oil and confectionary purpose due to presence of 44-45 per cent oil, 22-32 per cent protein and 8-14 per cent carbohydrate. As pod yield and quality parameters like protein and oil are quantitatively inherited, direct selection would not be a reliable approach without giving due importance to genetic parameters. So, there is a need to broaden the initial genetic base to stabilize yield. Genetic improvement of any crop depends on the magnitude of genetic variability and the extent of heritability. In self pollinated crop, hybridization stands as one of the methodology by which favourable genes available in different genotypes could be combined into a genotype through genetic recombination.

Taking these thing into consideration in the present study a cross is made between GPBD-4 which is a high yielding variety, low in oleic acid which improves oil stability and resistance to diseases and GM4-3 a medium yielding, high in oleic acid and tolerant to diseases to transfer the desired character into GPBD-4 and identification of the variety with high yielding with high oleic and disease resistance.

The review of literature pertaining to the present investigation is presented in the following headings:

2.1 Genetic variability for quantitative traits

2.2. Correlation studies for fatty acid and quantitative characters in groundnut

2.3. Genetic variability for oil quality and disease resistance

2.1 Genetic variability for quantitative traits

2.1.1 Days to 50 per cent flowering

A wide range of genetic variability for days to 50 per cent flowering in advanced generations of spanish strains of groundnut with high PCV and GCV was reported by Singh *et al.* (1996) and higher PCV than GCV with significant difference between them indicates there is a much effect of environment.

A high heritability estimate for days to 50 per cent flowering in the spanish bunch genotypes was reported by Quadri and Khunthi (1982), Khurram-Bashir *et al.* (1998) and suggested mass selection for improvement of such characters.

As only heritability poorly provide no indication of the amount of genetic variability that would result from selection of the best genotypes but heritability with genetic advance provide a reliable tool for phenotypic selection of the character by Johnson *et al.* (1955)

A high heritability with low genetic advance for days to 50 per cent flowering in a study involving 32 germplasm lines was reported by Abhay Darshora *et al.* (2002), Yogendra Prasad *et al.* (2002), Vishnuvardhan *et al.* (2012) and Zaman *et al.* (2011) indicating that the trait is governed by non additive gene effects so individual selection is not reliable.

In contrast to this a low GCV for days to 50 per cent flowering in F₂ population of groundnut varieties was reported by Vishnuvardhan *et al.* (2012).

2.1.2 Pod yield per plant

A high PCV and GCV for pod yield per plant which indicates large extent of genetic variability present in F₄ families of two single crosses was reported by Rudra swamy *et al.* (1999), Patil and Bhapkar (1987), Gowda *et al.* (1996), Bansal *et al.* (1992). Khurram Bashir *et al.* (1998), Ramesh kumar *et al.* (1998), Yadav *et al.* (1998), Abhay-Darshora *et al.* (2002), Vaddoria and Patel (1990), Manoharan *et al.* (1990b) Reddy and Gupta (1992), Mishra and Yadav (1992) and in advanced generations of spanish bunch varieties by Singh *et al.* (1996), Manoharan *et al.* (1990b), in 50 elite genotypes of Virginia bunch groundnut Shinde *et al.* (2010).

But there were also reports showing low genetic variability for pod yield in segregation generations of spreading, semi-spreading and erect type of groundnut by Badwal *et al.* (1967) Wynnne and Rawling (1978). A high genetic heritability for pod yield in the F₂ population was observed by Labana *et al.* (1980), Qudri and Khunthi (1982), Singh and Singh (1999), Prakash *et al.* (2000) and Yogendra Prasad *et al.* (2002).

However high heritability accompanied by high genetic advance was observed by Reddy *et al.* (1987) in F₂ generations of diallel set, Khurram-Bashir *et al.* (1998), Prakash *et al.* (2000) in a set of spreading types, Venkataraman *et al.* (2001) in five segregating populations, Jayalakshmi *et al.* (1998) and Abhay-Darshora *et al.* (2002), Shinde *et al.* (2010).

A moderate estimate of heritability for pod yield in segregating population of spanish groundnut and in gamma irradiated Spanish groundnut was reported by Sumathi and Ramanathan (1995a), Singh (1998).

On other hand low heritability for pod yield per plant have been observed by Manoharan *et al.* (1990) in 15 F₂ populations of interspecific hybrid and Bhat *et al.* (1996) in F₂ generations of different crosses.

2.1.3 Kernel yield per plant

A high genetic variability for kernel yield per plant in 40 groundnut lines forwarded up to F₄ generations observed by Yogendra Prasad *et al.* (2002) and Similar results were also reported by Mishra and Yadav (1992) in 20 summer genotypes, Bansal *et al.* (1992) in 90 genotypes belonging to spreading, semi spreading and bunch types, Sumati and Ramanathan (1995a) in 33 hybrid progenies advanced to F₄ generation, Uddin *et al.* (1995), Khurram-Bashir *et al.* (1998), Islam and Rasul (1998), Ramesh kumar *et al.* (1998), Venkataramana *et al.* (2001), Zaman *et al.* (2011). But a high difference between PCV and GCV reported by Abhay Darshora *et al.* (2002), Pathirana (1993) indicates that these significant differences were due to high environmental variability than genotypic variability.

A moderate GCV was reported for kernel yield per plant in 28 F₂ populations in 8 x 8 diallel cross without reciprocals in groundnut varieties by Vishnuvardhan *et al.* (2012) indicating that additive and non additive gene action have a role in inheritance and phenotypic selection would be effective.

A high heritability of (95.08%) for kernel yield per plant was reported by Zaman *et al.* (2011). Greater heritability combined with greater genetic advance was reported by Swamy *et al.* (1998), Nazar-Ali *et al.* (1999) and Abhay-Darshora *et al.* (2002), Naazar-Ali *et al.* (2000), Zaman *et al.* (2011) and high heritability along with high genetic advance over mean by Ramesh Kumar *et al.* (1998) indicating that this trait is governed by additive gene effects so we can go for selection for the individual plant.

But few reports also indicate moderate amount of heritability for kernel yield per plant in F₂ populations by Vishnuvardhan *et al.* (2012), Sumati and Ramanathan (1995a and 1995b). While, a moderate to high heritability accompanied with high genetic advance was observed by Uddin *et al.* (1995).

2.1.4 Shelling percent

A high value of PCV and GCV for shelling per cent which indicated a greater amount of variability in the population higher genetic variability was reported by Bhat (1995), Rudra swamy *et al.* (1999), Reddy and Gupta (1992), Reddy (1994) in parents, F₁, F₂ and F₃ generations of crosses and in segregating generations of mutagen treated seeds by Mathur and Manivel (2000) and in advanced generation of spanish groundnut by Singh *et al.* (1996) and reported a narrow difference between PCV and GCV for shelling per cent indicating less amount of environmental effect. In contrast to this a higher difference between PCV and GCV was reported by Abhay Darshora (2002).

On the other hand, low genetic variability for shelling percentage was noticed in the studies of Nadaf and Habib (1987), Manoharan *et al.* (1990), Gowda *et al.* (1996), Yogendra Prasad *et al.* (2002) and by Sarala and Gowda (1998) in F₂ population of interspecific crosses.

A high heritability for shelling per cent was reported (Upadhyaya *et al.*, 2005 and Vasanthi *et al.* (1998).

But a low shelling out-turn for all genetic parameters in F₂ population was reported by Vishnuvardhan *et al.* (2012) indicating larger role of non-additive gene action and selection would be effective in later segregating generations

2.1.5 Hundred seed weight

A wide genetic variability for 100 kernel weight was reported by Vaddoria and Patel (1990), Mishra and Yadav (1992), Reddy (1994), Vasanthi *et al.* (1998), Bhat (1995), Yadav (1998), Venkataramana (2001). Kuria Kose and Joseph (1986), Zaman *et al.* (2011) in a study of Spanish bunch type observed high genetic variability for 100-kernel weight.

A high heritability for 100 kernel weight in F_2 population of a cross M145 x U2-47-3 by Labana *et al.* (1980) and also similar results were reported by Qudri and Khunthi (1982), Vasanthi *et al.* (1998), Prakash *et al.* (2000), Venkataramana (2001). Yogendra Prasad *et al.* (2002), Singh and Singh (1999), Zaman *et al.* (2011) in Spanish genotypes and also a high genetic advance were reported. However, studies made by Vasanthi *et al.* (1998) indicated high heritability with moderate genetic advance for 100-kernel weight.

But a low heritability and genetic advance over mean was observed by Swamy Rao *et al.* (1988) and indicated less suitability of 100-kernel weight for direct selection.

For the 100 seed mass a supported gene action of additive, dominance and epistatic effects was reported by Sandhu and Khera, 1976; Layrisse *et al.*, 1980; Arunachalam *et al.*, 1984; Upadhaya and Nigam 1998).

2.2 Genetic variability for oil content, oil quality and disease resistance

2.2.1 Oil content

The oil content of groundnut produced in India may vary from 42 to 55 per cent. A wide range of variability of (42.3 to 56.5 per cent) oil content was reported by Rao *et al.* (1965), a variation of (46.50 to 63.10 per cent) for wild species and (43.6 to 55.50 per cent) for the cultivars was reported by Cherry (1977) and (35.80 to 54.20 per cent) and average near 45 per cent (Jambunathan *et al.*, 1985 and Dwivedi *et al.*, 1990), similar reports of high genetic variability was observed by Naazar-Ali *et al.* (2000), Rudraswamy *et al.* (1999), Venkataramana *et al.* (2001). A narrow difference between PCV and GCV values for oil content was observed in bunch and spreading types of groundnut by Velu and Gopalkrishna (1985)

However, a low variability for oil content in parents and progeny lines was reported by Chow and Wynne (1983), Nadaf and Habib (1987) and Prakash *et al.* (2000), and in F_9 generation of cross TG-26 x GPBD-4 by Sarvamangala *et al.* (2011)

Tai *et al.* (1975) reported that oil content is quantitatively inherited, while Martin (1967) estimated that only two pairs of major genes control oil content in peanut seeds. Martin (1967) and Patil (1973) obtained high heritability estimates for oil content.

Similarly a high estimate of heritability with high genetic advance for oil percentage indicating the presence of additive gene action by Venkataramana *et al.* (2001), Varman and Raveendran (1996)

Oil content influenced by maturity i.e. increases (Nagaraj *et al.*, 1987), season i.e. higher oil content in summer than in rainy season (Nagaraj and Chauhan, 1987).

2.2.2 Oil quality

A total of 75 to 80 per cent of total fatty acid content was oleic and linoleic acid in groundnut seeds reported by (Cobb and Johnson, 1973; Bruner *et al.*, 2001; Lopez *et al.*, 2001) and 55-65 per cent of monounsaturated fatty acids (MUFA), 26-28 per cent polyunsaturated fatty acids (PUFA) and 17-18 per cent saturated fatty acids (SFA) in groundnut oil by Ory *et al.*, 1992.

In a study conducted by stalker *et al.* (1989) who surveyed 75 *Arachis* species accessions, representing 5 and 7 sections of genus and compared with 4 cultivars for fatty acid composition found an average ratio of (0.35 - 0.45) oleic to linoleic acid ratio in sections *Extranervosae* and *Triseminalae* respectively, to 1.32 in diploid species of section *Arachis*.

Hammond *et al.* (1997) observed a variation in fatty acid composition when Groundnut plant introductions were analyzed and found that Palmitate ranged from 8.2 to 15.1 per cent, stearate from 1.1 to 7.2 per cent, oleate from 31.5 to 60.2 per cent, linoleate from 19.9 to 45.4 per cent, arachidate from 0.8 to 3.2 per cent, eicosenoate from 0.6 to 2.6 per cent, behenate from 1.8 to 5.4 per cent and lignocerate 0.5 to 2.5 per cent.

Similarly Treadwell *et al.* (1983) observed a variation in fatty acid composition ranged from palmitic acid (7.54%-11.90%), stearic acid (1.46%-3.26%), oleic acid (39.29%-56.56%), linoleic acid (25.95%-38.90%), arachidic acid (1.02%-1.63%), eicosenoic acid (0.89% -1.74%), behenic acid (2.39%-4.04%) and lignoceric acid (1.21%-2.52%) in 40 groundnut cultivars. The O/L ratio ranged from 1.24-1.78 among four varieties of groundnut (Sadhanakumari and Snehalatha, 1998). The majority of groundnut cultivars average 55 per cent oleic acid and 25 per cent linoleic acid (Knauff *et al.*, 1993).

In India, early maturing Spanish Bunch varieties cover major area (70 %) but they have poor oil quality with O/L ratio of ~ 1.0 (Raheja *et al.*, 1987; Bandyopadhyaya and Desai, (2000). Motagi *et al.* (2005) reported fatty acid composition in seven Spanish Bunch ruling cultivars in India and O/L ratio varied from 0.97 to 1.65.

Wide range in fatty acid composition, especially in oleic and linoleic acid, was found among groundnut genotypes in the Florida breeding programme. Two closely related spontaneous mutants (435-2-1 and 435-2-2) had 80 per cent oleic acid and 2 per cent linoleic acid, with O/L ratio of 10:1 and iodine value of 74 per cent (Norden *et al.*, 1987). The oleic acid content of the different experimental lines ranged from 37 to 80 per cent, and the linoleic acid content from 2 per cent to 43 per cent. These two high oleic acid genotypes were derived from a Florispan parental stock. In seven years (1968-1974) of oil quality tests, the parental stock had 50.8 ± 1.3 per cent oleic acid and 26.2 ± 1.2 per cent linoleic acid in its oil composition with iodine value of 91.3 ± 1.3 . The high oleic and low linoleic levels in these two 435 groundnut lines may have occurred as a result of natural mutation. Groundnut mutant derivatives TG-8, TG-9, TG-17 and TG-18 induced by gamma- irradiation differed in fatty acid composition from their parent Spanish Improved.

A broad range of variation for oleic acid (29-65%), linoleic acid (16-47%) and O/L ratio (0.63-3.93) for oil quality by Sarvamangala *et al.* (2011) and oleic acid (33.6-73.54%) in the mini core collections of ICRISAT found that *A.hypogaea ssp hypogaea* had more oleic acid (54.16%) and O/L ratio of (2.75-6.93) than *A.hypogaea ssp fastigiata* (45.70%) and O/L ratio (1.51-3.80) by Ganapathi *et al.* (2012) and a range of oleic acid (35%-56%); linoleic acid (27.8%-42.47%) by Ajay *et al.* (2012) and in mutant ranged from 48.9 per cent to 61.4 per cent with O/L ratio of 1.74-3.16 in spanish bunch types by (Sharma *et al.*, 1985), an oleic acid (40-48%) and O/L ratio (1.50-1.70) with high unsaturated fatty acid content (78.80%) in GPBD-4 reported by Motagi *et al.* (2005), and the improvement in oleic acid and corresponding decrease in linoleic ranged for 14.66 per cent from gamma rays treatment in GPBD-4 and TPG 41 mutant population by Kavera (2008).

2.2.3 Protein content

The groundnut kernels contain high quality protein than meat, eggs and most of other vegetables. Hence, it is important for children, women and people eating more meatless meals (Mishra, *et al.*, 1992). In absence of adequate carbohydrate and fat in diets, dietary proteins are broken down to provide energy (4 Kcal/g). The development of nutritionally balanced foods to feed the growing population of dietary deficiencies of proteins is receiving increasing attention of the food scientist and nutritionists, oilseeds are used to manufacture and market high protein foods at reasonably low prices (Bookwaltes *et al.*, 1979).

A large variation of 22 per cent to 30 per cent and 16.10 per cent to 34.0 per cent of crude protein content was reported by (Pancholy *et al.*, 1978; Singh *et al.*, 1998 respectively) in spanish bunch groundnuts which is generally influenced by genotype and environment and a higher variation of 21 per cent to 37 per cent in kharif and 24 per cent to 36 percent in summer but pooled analysis showed less variation in a study conducted by Sarvamangala *et al.* (2011) indicate there is significant effect of environment on the genotype.

Ajay *et al.* (2008) reported that GPBD-4 has a high protein content (30.33%) which is a desirable trait for the confectionary food items among the 17 groundnut varieties.

A very high heritability (>80%) was observed in both summer and kharif environments but the pooled data heritability was lower (<50%) indicate that significant effect of environment on trait by Sarvamangala *et al.* (2011).

2.2.4 Resistance to foliar disease

A high PCV of (21.71%-33.55%) at different stages and environments revealed substantial variation for LLS and Rust was reported by Khedikar *et al.*, 2008 and similar reports of high variability reported by Anderson *et al.* (1991), Bhat (1995), and a significantly higher difference between PCV and GCV was reported by Quesraogo *et al.* (1995) indicating that there is much effect of environment and in contrast to this a narrow difference between PCV and GCV for late leaf spot and rust severity reported that disease severity was largely controlled by additive gene action by Vasanthi *et al.* (1998).

Genetic studies on LLS and rust resistance suggest that resistance to these fungal diseases is complex and polygenic in nature and probably controlled by several recessive genes (Sharief *et al.*, 1978; Nevill *et al.*, 1982; Green, 1986; Motagi, 2001; Dwivedi *et al.*, 2002).

Furthermore, additive genetic variance seems to contribute predominantly to the resistance (Kornegay *et al.*, 1980; Hamid *et al.*, 1981; Anderson *et al.* 1986; Jogloy *et al.*, 1987)

A high heritability was observed for both late leaf spot and rust in RIL population by Khedikar *et al.*, 2008 and a high heritability coupled with high GAM for late leaf spot severity and rust severity observed by Vishnuvardhan *et al.* (2012) in F₂ population are in conformity with the reports of Venkataravana *et al.* (2008), Venkataravana and Injeti (2008) and Giri *et al.* (2009).

2.3 Correlation studies for fatty acid and quantitative character in groundnut

Positive correlation of oil content with oleic and linoleic acid was observed by Emirglu and Mortuary *et al.* (1984) similar results were obtained by Mollers and Schierholt (2002). In contrast to this a negative correlation was reported by (Raheja *et al.* (1987) for oleic and linoleic acid with oil content in a mutant population of 4 genotypes. Positive correlation of oil content with pod yield reported by Nadaf and Habib *et al.* (1989), Parmar *et al.* (2002) and Layrisse *et al.* (1980), in F₂ population of interspecific cross. Significant negative correlation with oil content with protein has reported in 7 genotypes of the spanish groundnut by Kale *et al.* (1998) Similar report was also reported by Parmar *et al.* (2002), Sadhanakumari and Snehalatha Reddy (1998) and Dwivedi *et al.* (1990) Sarvamangala *et al.* (2011)

Significant negative correlation between protein content and pod yield. Similar result was reported by Parmar *et al.* (2002), Layrisse *et al.* (1980), Sangha and Sandhu (1970), Tai *et al.* (1975) and Holley and Hammons (1968). A significant negative correlation between oleic and linoleic acid content and linoleic acid and O/L ratio in 146 RILs of cross TG-26 x GPBD-4 in F₉ generation by Sarvamangala *et al.* (2011) and there was no relationship reported between protein and fatty acid profile by (Anderson *et al.* (1998), Tai *et al.* (1975) in F₂ populations of spanish genotypes but Sarvamangala *et al.* (2011) observed protein content and oil quality are were negatively correlation and negative correlation between protein content with oleic acid and O/L ratio and positively correlated with linoleic acid (0.316) but the correlation pattern between oil content and oil quality was exactly inverse to that of protein content and oil quality.

2.3.1 Correlation studies for protein content with quantitative traits

Association studies revealed significant inverse correlation between protein and oil content (Holley and Hammons, 1968; Tai *et al.*, 1975; Dwivedi *et al.*, 1990) which is used for confectionary purpose like low oil, high protein and sugar, so yashoda *et al.*, 2005 and 2007 evaluated the genotypes DCG-24 (TG49 x R 9227, 8), DCH 26 (TG 49 x R9227, 19) and TKG 19A and found a negative correlation for oil content and protein content.

Similar results of significant negative correlation is found between oil content and protein content was observed by Noubissie *et al.* (2012) in 12 promising groundnut genotypes

2.4 Genetic variability, heritability and genetic advance

2.4.1 Genetic variability

A review of literature on variability for quantitative characters in groundnut indicates the existence of high degree of variability for most of characters studied. Though there were reports of high genetic variability for plant height, shelling per cent, pod yield per plant, reports contradicting the above and quoting low or medium variability for these characters were also available which are listed in Table 1.

2.4.2 Heritability

High heritability for plant height, pod yield per plant, shelling per cent, number of primary branches, kernel yield, 100-seed weight were reported. However, for plant height, pod yield per plant, shelling per cent, contradicting reports stating moderate to low heritability were also indicated by many workers (Table 2).

2.4.3 Genetic advance

High genetic advance was reported for plant height, number of primary branches, and pod yield per plant, kernel yield, sound mature kernels, and 100-kernel weight. However, for shelling per cent and 100-kernel weight contrasting reports stating medium to low heritability were also available and are presented in Table 3.

2.5 Correlation studies for qualitative and quantitative characters in groundnut

Correlation coefficient analysis helps to determine the nature and degree of relationship between any two measurable characters. It resolves the complex relations between the events in to simple form of association. The reports on these aspects are presented in Tables 6 and 7.

2.5.1 Correlations between pod yield and other component traits in groundnut

Plant height, number of primary branches, pod yield per plant, shelling per cent, kernel yield, sound matured kernels, 100-kernel weight, seed size, protein Content, number of developed pods, harvest index and days to 50 per cent flowering showed positive correlation with yield. However, low positive correlation has been recorded for plant height with yield by (Shobhakruparani, 1999) (Table 4).

2.5.2 Inter-correlations between characters

Number of primary branches showed positive correlation with number of Secondary branches but negative correlation with 100-kernel weight, length of primary branches, shelling percentage. Number of mature pods had positive correlations with length and number of secondary branches and shelling per cent and total number of nodes and inversely related with number of secondary branches. A contradicting report was also found to report a negative correlation between 100-kernel weight, shelling percentage and relation with number of secondary branches by Shettar, 1974. (Table 5)

Table 1: Literature showing the variability studies of various quantitative characters in groundnut

Sl.No.	Character	Status of variability	References
1	Days to 50%Flowering	High Low	Singh <i>et al.</i> (1996) Vishnuvardhan <i>et al.</i> (2012), Korat <i>et al.</i> (2009)
2	Pod yield/plant	High Moderate low	Alam <i>et al.</i> (1985), Manoharan <i>et al.</i> (1990b), Reddy and Gupta (1992), Mishra and Yadav (1992), Pathirana (1993), Sumathi and Ramanathan (1995b), Reddy (1995), Ganesan and Sudhakar (1995), Sarala and Gowda (1998) Shinde <i>et al.</i> (2010) Uddin <i>et al.</i> (1995), Naik <i>et al.</i> (2000), Korat <i>et al.</i> (2009), Mothilal (2004) Badwal <i>et al.</i> (1967), Wynne and Rawling (1978)
3	Kernel yield	High Medium	Mishra and Yadav (1992), Reddy and Gupta (1992), Sumathi and Ramanathan (1995b), Uddin <i>et al.</i> (1995), Khurram Bashir <i>et al.</i> (1998), Ramesh kumar <i>et al.</i> (1998), Venkataramana <i>et al.</i> (2001), Abhay-Darshora <i>et al.</i> (2002) , Zaman <i>et al.</i> (2011) Shinde <i>et al.</i> (2010), John <i>et al.</i> (2005) Sharma and Gupta (2011), Shoba <i>et al.</i> (2009)
4	100 seed mass	High Moderate	Zaman <i>et al.</i> (2011) Korat <i>et al.</i> (2009), Mothilal (2004)
5	Shelling per cent	High	Mohinder Singh <i>et al.</i> (1984), Varman and Paramasivan (1992), Reddy and Gupta (1992), Mathur and Manivel (2000)
6	Shelling per cent	Moderate Low	Reddy (1994) Reddy <i>et al.</i> (1986), Nadaf and Habib (1987), Manoharan <i>et al.</i> (1990b), Sumathi and Ramanathan (1995b), Gowda <i>et al.</i> (1996), Yogendraprasad <i>et al.</i> (2002), Sharma and Gupta (2011), Korat <i>et al.</i> (2009)
7	Oil content	low High	Sarvamangala <i>et al.</i> (2011), koarat <i>et al.</i> (2009), Yogendraprasad <i>et al.</i> (2002) Bovi <i>et al.</i> (1983), Norden <i>et al.</i> (1987), Dwivedi <i>et al.</i> (1990)
8	protein content	High	Mishra <i>et al.</i> (1992) Sarvamangala <i>et al.</i> (2011) Sharma and Gupta (2011), Dwivedi <i>et al.</i> (1993), Singh (1998)
9	fatty acid profile	High Low	Sarvamangala <i>et al.</i> (2011) Bovi <i>et al.</i> (1983), Branch <i>et al.</i> (1990), Hammond <i>et al.</i> (1997), Sekhon <i>et al.</i> (1980)
10	LLS and Rust	High Moderate	Khedikar <i>et al.</i> (2010), Sawargaonkar <i>et al.</i> (2010), Reddy and Gupta (1992), Khurram <i>et al.</i> (1998), Salara and Gowda (1998), Venkataramana <i>et al.</i> (2008) Vishnuvardhan <i>et al.</i> (2012)

Table 2: Reports on degree of heritability for some quantitative characters in groundnut

Sl. No.	Character	Status of variability	References
1	50 % flowering	High	Vishnuvardhan <i>et al.</i> (2012)
2	Pod yield/plant	High	Labana <i>et al.</i> (1980), Singh and Singh (1999), Prakash <i>et al.</i> (2000), Yogendraprasad <i>et al.</i> (2002) Shinde <i>et al.</i> (2010), Korat <i>et al.</i> (2009)
		Moderate	Sumathi and Ramanathan (1995b), Singh (1998), John <i>et al.</i> (2005)
		Low	Manoharan <i>et al.</i> (1990a), Patra <i>et al.</i> (1975)
3	Kernel yield	High	Mohammed <i>et al.</i> (1979), Prashanthi <i>et al.</i> (1990), Mishra and Yadav (1992), Nazar Ali <i>et al.</i> (1999) , Zaman <i>et al.</i> (2011)
		Moderate	Vishnuvardhan <i>et al.</i> (2012), Lakshmidevamma <i>et al.</i> (2002)
		Low	Sumathi and Ramanathan (1995b)
4	100-kernel weight	High	Kandaswamy <i>et al.</i> (1986), Vaddorai and Patel (1990), Mishra and Yadav (1992), Uddin <i>et al.</i> (1995), Vasanthi <i>et al.</i> (1998), Upadhaya <i>et al.</i> (2005), Zaman <i>et al.</i> (2011)
		Moderate	John <i>et al.</i> (2005)
		Low	Swamy Rao <i>et al.</i> (1988)
5	Shelling per cent	High Moderate	Labana <i>et al.</i> (1980), Vasanthi <i>et al.</i> (1998), Yogendraprasad <i>et al.</i> (2002), Upadhyaya <i>et al.</i> (2005) John <i>et al.</i> (2005)
		Low	Swamy Rao <i>et al.</i> (1988), Manoharan <i>et al.</i> (1990b)
6	Oil content	High	Khangura and Sandhu (1972), Sarvamangala <i>et al.</i> (2011), Noubissie <i>et al.</i> (2012), Korat <i>et al.</i> (2009)
		Moderate	Sharma and Gupta (2011)
7	Protein content	high	Mollers and Schierhold (2002) Sarvamangala <i>et al.</i> (2011), Noubissie <i>et al.</i> (2012), Sharma and Gupta (2011)
8	Oil quality	High	Sarvamangala <i>et al.</i> (2011)
9	LLS and rust	High	Khedikar <i>et al.</i> (2008), Vishnuvardhan <i>et al.</i> (2012), Sawargaonkar <i>et al.</i> (2010), Venkataravana <i>et al.</i> (2008), Venkataravana and Injethi (2008), Giri <i>et al.</i> (2009), Narshimulu <i>et al.</i> (2012)

Table 3: Review of reports on genetic advance for some quantitative characters in groundnut

Sl. No	Characters	Status of variability	References
1	50% flowering	Moderate low	Lakshmiddevamma <i>et al.</i> (2002) Vishnuvardhan <i>et al.</i> (2012) , Zaman <i>et al.</i> (2011) , Korat <i>et al.</i> (2009)
2	Pod yield/plant	High Moderate	Sivasubramanian <i>et al.</i> (1977), Deshmukh <i>et al.</i> (1986), Reddy <i>et al.</i> (1987), Manoharan <i>et al.</i> (1990b), Kandaswamy <i>et al.</i> (1986) Shinde <i>et al.</i> (2010), John <i>et al.</i> (2005) Deshmuk <i>et al.</i> (1986), verma <i>et al.</i> (2002), Basu <i>et al.</i> (1969), Patra <i>et al.</i> (1975)
3	Kernel yield	High	Sivasubramanian <i>et al.</i> (1977), Reddy <i>et al.</i> (1987), Sumathi and Ramanathan (1995b).
		Moderate	Vishnuvardhan <i>et al.</i> (2012), Lakshmiddevamma <i>et al.</i> (2002)
4	100-kernel weight	High	Reddy <i>et al.</i> (1986), Prashanthi <i>et al.</i> (1990), Vaddorai and Patel (1990), Vasanthi <i>et al.</i> (1998), Singh and Singh (1999), Prakash <i>et al.</i> (2000), Venkataramana <i>et al.</i> (2001), Dixit <i>et al.</i> (1970), Majundar <i>et al.</i> (1969)
5	Shelling per cent	Moderate	Reddy <i>et al.</i> (1986)
		Low	Uddin <i>et al.</i> (1995), Alam <i>et al.</i> (1985), Prashanthi <i>et al.</i> (1990), Vaddorai and Patel (1990), Sumathi and Ramanathan (1995b), Shoba <i>et al.</i> (2008), Korat <i>et al.</i> (2009)
6	Oil content	Moderate Low	Lakshmiddevamma <i>et al.</i> (2002) Noubissie <i>et al.</i> (2012), Sharma and Gupta (2011)
7	Protein content	low	Noubissie <i>et al.</i> (2012), Sharma and Gupta (2011)
8	LLS and rust	high	Vishnuvardhan <i>et al.</i> (2012) Sawargaonkar <i>et al.</i> (2010), Venkataravana <i>et al.</i> (2008), Venkataravana and Injethi (2008), Giri <i>et al.</i> (2009)

Table 4: Nature of correlations reported between pod yield and other component characters in groundnut

Sl. No.	Characters	Status of Correlations	References
1	Days to 50 per cent flowering	Positive	Shobhakruparani (1999), Nagda <i>et al.</i> (2001), Francis and Ramalingam (1997) , Zaman <i>et al.</i> (2011), Sawargaonkar <i>et al.</i> (2010)
		Negative	Vasanthi <i>et al.</i> (1998)
2	Shelling per cent	Positive	Sangha and Sandhu (1970), Khangura and Sandhu (1972), Sharma and Varshney (1990), Hajichristodolous (1990), Abraham (1990), Prashanthi <i>et al.</i> (1990), Reddy and Gupta (1992), Sharma <i>et al.</i> (1995), Mishra <i>et al.</i> (1992), Pushkaran and Nair (1993), Shobhakurparani (1999) and Nazar Ali <i>et al.</i> (1999), John <i>et al.</i> (2005), Narshimulu <i>et al.</i> (2012)
3	Kernel yield	Positive	Hijichristodolous (1990), Prashanthi <i>et al.</i> (1990), Mishra and Yadav (1992), Nagabhushanam and Prasad (1992), Pathirana (1993), Baydar and Bayraktar (1994), Reddy and Gupta (1992), Rosemary Francis and Ramalingam (1997) and Nazar Ali <i>et al.</i> (1999), Rameshkumar <i>et al.</i> (1998), Venkataramana <i>et al.</i> (2001), and Abhay Darshora <i>et al.</i> (1999), Sawargaonkar <i>et al.</i> (2010), John <i>et al.</i> (2005), Narshimul <i>et al.</i> (2012)
4	100 kernel weight	Positive	Mohinder Singh <i>et al.</i> (1984), Alam <i>et al.</i> (1985), Sahu and Roy (1989), Abraham (1990), Bhagat <i>et al.</i> (1993), Misra <i>et al.</i> (1992), Uddin <i>et al.</i> (1995), Sarala and Gowda (1998), Shobhakruparani (1999) and Nagade <i>et al.</i> (2001), Lakshmiddevamma <i>et al.</i> (2004), Mallikarjun swami (2001), Venkatarama (2001), Ajay <i>et al.</i> (2012), Sawargaonkar <i>et al.</i> (2010)
5	Seed size	Positive	Lin (1954), Dorairaj (1962)
6	Oil content	Positive	Rameshkumar <i>et al.</i> (1998), Sangha and Sandhu (1970), Khangura and Sandhu (1972), Jaswal and Gupta (1966), Bandwal and Gupta (1967), Ajay <i>et al.</i> (2012) Sawargaonkar <i>et al.</i> (2010)
		Negative	Chow and Wynne (1983), Nadaf and Habib (1987a) and Francis and Ramalingam (1997), Sawargaonkar <i>et al.</i> (2010)
7	Protein content	Positive	Hajichristodolous (1990), Sangha and Sandhu (1970), Khangura and Sandhu (1972), Jaswal and Gupta (1966), Badwal <i>et al.</i> (1967), Ajay <i>et al.</i> (2012)
8	LLS and Rust	Negative	John <i>et al.</i> (2005)
9	Days to maturity	Positive	Sawargaonkar <i>et al.</i> (2010)

Table 5: Inter-correlation between characters in groundnut

S.No	Characters	Nature of correlation	Characters	References
1	Days to 50% flowering	Positive	Number of secondary branches	Shettar (1974)
		Positive	Number of mature pods	Shettar (1974)
		Negative	Plant height	Shettar (1974)
		Negative	100 kernel weight	Shettar (1974)
		Negative	LLS and Rust	Lakshimidevamma(2002)
3	Kernel yield /plant	Positive	Pod yield Nut size Number of nuts per plant Kernel size Days to 50% flowering Test weight Days to maturity Shelling per cent	Sawargaonkar <i>et al.</i> (2010) Zaman <i>et al.</i> (2011) Zaman <i>et al.</i> (2011) Zaman <i>et al.</i> (2011) Zaman <i>et al.</i> (2011), Sawargaonkar <i>et al.</i> (2010) Sawargaonkar <i>et al.</i> (2010) Sawargaonkar <i>et al.</i> (2010) John <i>et al.</i> (2005)
4	Shelling percentage	Positive	Sound mature kernels	Ramanathan and Raman (1968), Vasanthi <i>et al.</i> (1998)
5	Seed size	Positive	Leaflet length, leaflet breadth, leaf length breadth ratio	Mittal and Mehta (1954)
		Negative	Oil content	Mittal and Mehta (1954)
6	100 kernel weight	Positive	Shelling percentage	Ramanathan and Raman (1968)
		Positive	Total number of nodes	Shettar (1974)
		Positive	Number of secondary branches	Shettar (1974)
		Negative	Shelling percentage	Shettar (1974)
		Negative	Number of secondary branches	Sangha and Sandhu (1970), Sangha (1973)
		Negative Negative	Number of mature Pods LLS and Rust	Sangha (1973), Sangha and Sandhu (1970) Lakshimidevanna <i>et al.</i> (2002)
7	Oil content	Positive	Oil ratio	Dwivedi <i>et al.</i> (1990)
		Positive	100-kernel weight	Venkataramana <i>et al.</i> (2001), Noubissie <i>et al.</i> (2012), Dwivedi <i>et al.</i> (1990), Badigannavar <i>et al.</i> (2002)
		Positive	SMK percentage	Venkataramana <i>et al.</i> (2001)
		Negative	Protein	Dwivedi <i>et al.</i> (1990), Noubissie <i>et al.</i> (2012), Kale <i>et al.</i> (1998)
		Negative	Kernel yield	Jayalakshmi <i>et al.</i> (2000)
8	Protein content	Negative	Oleic acid , O/L ratio	Sarvamangala <i>et al.</i> (2011)
		Negative	100 kernel weight	Dwivedi <i>et al.</i> (1990), Badigannavar <i>et al.</i> (2002)
		Positive	Linoleic acid	Sarvamangala <i>et al.</i> (2011)

Table 6: Summary of the review on the direction and magnitude of correlation between different fatty acids in groundnut

S. No	Character	Nature of correlation	Characters	References
1	Palmitic acid	Positive Significant negative	SFA, Linoleic Eicosenoic U/S oleate eicosenoate lignoceroate acids	Lukonge <i>et al.</i> (2007), Raheja <i>et al.</i> (1987), Kavera <i>et al.</i> (2008), Kavera (2008), Hammond <i>et al.</i> (1997), Kavera <i>et al.</i> (2008)
2	Stearic acid	Significant Positive Negative	Oleic, SFA Oleic	Lukonge <i>et al.</i> (2007), Anderson <i>et al.</i> (1998), Anderson and Gorbet, (2002) Lajara <i>et al.</i> (1990)
3	Oleic acid	Significant negative	Palmitic, Linoleic	Bovi (1983), Sekhon <i>et al.</i> (1980), Raheja <i>et al.</i> (1987), Anderson <i>et al.</i> (1998), Anderson and Gorbet, (2002), Worthington <i>et al.</i> (1972), Rathar <i>et al.</i> (1998), Badwal <i>et al.</i> (1993) Sarvamangala <i>et al.</i> (2011), Kavera <i>et al.</i> (2008)
4	Linoleic acid	Positive Negative	Eicosenoic O/L ratio	Anderson <i>et al.</i> (1998) Sarvamangala <i>et al.</i> (2011)
5	Arachidic acid	Negative Positive	Eicosenoic	Hammond <i>et al.</i> (1997), Worthington <i>et al.</i> (1972) Brown <i>et al.</i> (1975)
6	Eicosenoic acid	Positive	Lignoceric	Hammond <i>et al.</i> (1997)
7	Behenic acid	Positive	Lignoceric	Hammond <i>et al.</i> (1997), Worthington <i>et al.</i> (1972), Holley and Hammons (1968)
8	Increased O/L ratio	Significant Positive negative	Oil stability Iodine value, P/S, LCS	Fore <i>et al.</i> (1953), O'Keefe <i>et al.</i> (1993), Young <i>et al.</i> (1974), Sharma <i>et al.</i> (1985), Jambunathan <i>et al.</i> (1993) Mercer <i>et al.</i> (1990), Anderson and Gorbet (2002)

Table 7: Summary of the review on the direction and magnitude of correlation between oil content, fatty acid profile and other quantitative traits in groundnut

S.No	Character	Nature of correlation	Characters	References
1	Oil content	Positive Negative Significant negative Significant positive	Oleic acid, linoleic acid Oleic, Linoleic Protein Pod yield	Emiroglu and Mortuary (1984), Mollers and Schierholt (2002), Raheja <i>et al.</i> (1987), Parmar <i>et al.</i> (2002), Kale <i>et al.</i> (1998), Sadhana Kumari and Snehalatha Reddy (1998), Dwivedi <i>et al.</i> (1990) Manke and Bhale (1987) Sarvamangala <i>et al.</i> (2011) Noubissie <i>et al.</i> (2012), Ajay <i>et al.</i> (2012) Parmar <i>et al.</i> (2002), Layrisse <i>et al.</i> (1980), Nadaf and Habib (1989)
2	Protein	No relationship Significant positive Significant negative	Fatty acid Profile Pod yield	Anderson (1998), Tai <i>et al.</i> (1975) Parmar <i>et al.</i> (2002), Layrisse <i>et al.</i> (1980), Sangha and Sandhu (1970) Holley and Hammons (1968), Tai <i>et al.</i> (1975)
3	Kernel size	Positive Negative Negative Positive	Oleic Palmitic, Linoleic Protein Oil content	Mozingo <i>et al.</i> (1988) Wang <i>et al.</i> (2006). Manoharn and Sethupathiramalingam (1990), Vaddoria and Patel (1992) Kale <i>et al.</i> (1998), Gadgil and Mitra (1983).

MATERIAL AND METHODS

A low productivity of groundnut in India compared to world due to poor adaptation of high yielding varieties, low plant count, incidence of biotic stress *viz.*, disease and insect pests which are the major limiting factors. In addition to this nature of the variability is negligible due to limited natural out crossing. Hybridization offers a potential means to increase the genetic variability. By taking these things into consideration in the present study an attempt was made to identify the superior RILs based on the high yield, oil quality *viz.*, oleic acid and O/L ratio besides protein and disease that were derived from a cross GPBD-4 x GM4-3.

3.1 Experimental material

The experimental material for the present study consists of recombinant inbred lines in F₇ generation derived from the GPBD-4 X GM4-3 cross. A total number of 816 RILs were available for present study which was evaluated with the parents and five checks. GPBD-4 is resistant to late leaf spot and rust with O/L ratio of 1.66 and GM4-3, a mutant with high oleic acid and high O/L ratio of 4.9.

3.2 Experimental site

The experiments were carried out during *kharif* 2011 and *kharif* 2012 at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad to evaluate RILs for yield, yield components, oil quality and disease resistance.

3.3 Climate and weather

Geographically, Main Agricultural Research Station, Dharwad is located at latitude of 15°26'N latitude, 75°07'E altitude at 678 m above mean sea level. It received an average rainfall of 922.7 mm in the year 2011 and 539.30 mm in 2012 with two peaks one in June-July and another in Sept-Oct. About 532 mm of total rain fall received in 2011 *kharif* (June to September) while it received 334.5 mm during 2012 *kharif* (June to September). The mean temperature varied from 26.2°C to 34.70°C in 2011 and 27.0°C to 35.80°C in 2012. The relative humidity recorded in 2011 was highest with 85 per cent during the month of August and the lowest of 43 per cent during the month of March. It was recorded 44-87 per cent in the year 2012. Appendix I

3.4 Methods

The experiment was laid out in a Randomized Complete Block Design (RCBD) with two replications. The entries (RILs, Parents and Checks) are sown in one row of 2 m length with a spacing of 30 cm between rows and 10 cm between the plants on 12 July 2011 and 15 July 2012. Further 86 RILs selected from 816 RILs evaluated in 2011 *kharif* based on oleic acid, O/L ratio, yield and disease resistance were further evaluated in 2012 *kharif* season in RCBD design with two replications. The entries (86 RILs, two parents and five checks) were sown in four rows of 1.5 m length with a spacing of 30 cm between rows and 10 cm between the plants on 15th July 2012 (Plate 3). The recommended packages of practices were followed for raising a good crop.

3.5 Recording of observations

Observations were recorded on five randomly tagged plants for different characters in each entry in both the replications. The mean value for the treatment was computed by taking average of five plants. The characters studied and techniques adopted to record the observations are given below.

3.5.1 Days to 50 per cent flowering

Number of days taken from the date of sowing to the date on which 50 per cent of plants in each treatment flowered was recorded as days to 50 per cent flowering.

3.5.2 Days to maturity

Number of days taken from date of sowing to physiological maturity of the plant was recorded as days to maturity.

3.5.3 Pod yield per plant (g)

Dry pod weight of five random plants was recorded in gram and mean pod yield per plant was recorded in grams.



Plate 1: Field view of recombinant inbred lines



Plate 2: Field view showing foliar disease infestation

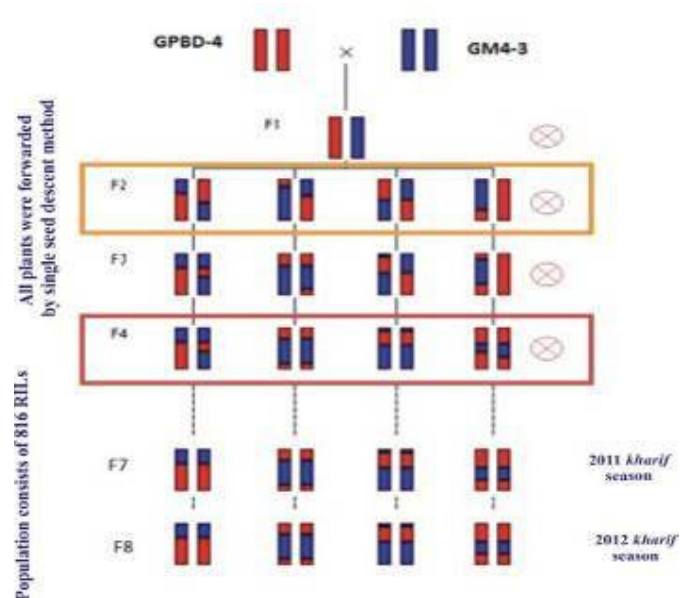


Plate 3: Development of GPBD-4 X GM4-3 cross mapping population

3.5.4 Pod yield (kg/ha)

Pod yield per hectare was computed from pod yield obtained from each plot (1.8 sq.m) of treatments by multiplying with conversion factor (5555.6) for 86 RILs in 2012 *kharif* and (0.45sq.m) for each treatment by multiplying with conversion factor (22222.23) for 816 RILs and 2011 *kharif* and 2012 *kharif* season.

3.5.5 Hundred kernel weight (g)

Hundred kernel weight was computed by weighing random 100 kernels taken from each genotypes and weight was recorded in grams.

3.5.6 Shelling percentage

Shelling percentage was determined by shelling 100 g dried cleaned pods from each treatments and the ratio of weight of kernels to weight of pods was expressed as

$$\text{Shelling (\%)} = \frac{\text{Kernel weight (g)}}{\text{Pod weight (g)}} \times 100$$

3.5.17 Kernel yield (q/ha)

Kernel yield was calculated by using the following formula

$$\text{Kernel yield (q/ha)} = \frac{\text{Pod yield (q/ha)} \times \text{shelling (\%)}}{100}$$

3.5.8 Oil content (%)

Oil content of recombinant inbred lines and checks were estimated by using Near Infrared Reflectance Spectrometer (NIRS) (Model 6500 Foss NIR systems, France)

3.5.9 Protein content (%)

Protein content of recombinant inbred lines and checks were estimated by using NIRS.

3.5.10 Oil yield (kg/ha)

Oil yield was calculated by using the following formula

$$\text{Oil yield (kg/ha)} = \frac{\text{Kernel yield (kg/ha)} \times \text{Oil content (\%)}}{100}$$

3.5.11 Foliar disease resistance

Rust and Late leaf spot

The modified 9-point scale for rust (Table 1A and Fig. 1A) and late leaf spot (Table 1B and Fig. 1B) diseases was given by Subrahmanyam (1985) was used for screening RILs. The visual scores (1-9) and extent of leaf area damaged (1-100 %) are linearly related. The field disease score are mainly based on the extent of leaf area damaged. For late leaf spot, the extent of defoliation also incorporated into the scale. Genotypes were scored 70 (stage 1), 80 (stage 2) and 90 (stage 3) days after sowing for both rust and late leaf spot and total distribution quantitatively grouped into 3 categories by Subrahmanyam (1985)

Disease	Resistance	Moderate resistance	Susceptible
Rust	≤ 3	3.1-6.0	≥ 6.0
Late leaf spot	≤ 3	3.1-6.0	≥ 6.0

3.5.12 Fatty acid analysis

Fatty acid analysis of the advanced breeding lines and checks were carried out by NIRS analysis. The 10 g seed sample was used fatty acid analysis. The methodology involved in NIRS analysis for the determination of fatty acid composition is described below.

3.5.12.1 Near infrared spectroscopy (NIRS)

Near infrared spectroscopy either in reflectance (NIRs) or transmittance mode (NITS) is a multi-trait technique of large application in the analysis of quality traits in food and agricultural commodities.

Principle

The detection and measurement of chemical composition of biological material in NIRS is based on the vibrational responses of chemical bonds to NIR radiations.

3.5.12.2 Spectral measurements

NIR diffused reflectance spectra were collected by a monochromator NIR spectrometer model 6500 (Foss NIR systems, France) with the range from 400-2500 nm, which consisted of a light source of tungsten halogen lamps of 50w 12 volts.

The spectrometer was equipped with silicon detector. For NIR analysis, the seeds were placed in a special adapter about 3 mm thick, with a diameter of 37 mm and central hole of 6 mm. For NIR scanning, the adapter was inserted in a NIRS standard ring up (IH-0325, Infracore international, LLC, France) and single seed was placed in the central hole. Before spectra acquisition, a reference spectrum was collected from a standard check cell (IH-032 HA, Infracore International LLC, France). The instrument diagnostics was carried out to test the response of instrument, wave length and NIR repeatability to avoid the effect of surrounding environment on the instrument performance.

The absorbance spectra (10g 1/R) from 400 to 2500 nm were recorded at 8 nm intervals. The method permitted the analysis of about 40 single seeds per hour. Mathematical procedures on the spectral information were carried out with WINISI II project manager software, version 1.50 (Infra Soft International, LLC).

3.5.12.3 Calibration

Before using NIR spectrometer for any quantitative analysis, it has to be calibrated first using chemical reference method with the application of multivariate regression models to interpret chemical information encoded in the spectral data. Original reflectance spectra were corrected prior to calibration by applying first and second derivative transformation, standard normal variate transformation and de-trend scatter correction, and four passes were used to eliminate outliers. Second derivative was calculated from log (1/R) spectra of 6 data points and a smoothing over segments of 4 data points (2,6,4,1). This combination was selected after having tested six additional math treatments (1,4,4,1; 1,10,10,1; 2,10,10,1; 3,10,10,1; 4,10,10,1 and 2,5,5,1) with and without spectral corrections and data pre-treatments. The 2,6,4,1 treatment was either equal or superior in all cases based on standard error of cross-validation and 1-Vr (1 minus the ratio of unexplained variance to total variance) statistics. The calibration equations were developed using principal component regression (PCR), partial least square (PLS) and modified partial least square (mPLS) regression models. Wavelengths at interval of 8 nm across the entire visible-plus-near infrared spectrum (visible: 408-1092 nm; near infrared: 1108-2492 nm) were used for calibration. The standard error of calibration (SEC), standard error of cross-validation (SECV), correlation coefficient (r) and 1-VR statistics were used to select the best calibration equations.

3.5.12.4 Validation of calibration statistics

The performance of the calibration equations were monitored using the cross-validation and external validation set of samples (n = 100). SECV, standard error of prediction (SEP) and r were used to determine the accuracy of prediction. The best equation for determining the fatty acid composition was developed and used for the subsequent analysis of fatty acid profile of mutant populations in M₅ generation. The fatty acid contents obtained for the eight major fatty acids were used to compute various oil quality parameters as follows:

Oleic/linoleic acid ratio = % oleic (C18:1)/% linoleic (C18:2)

Poly unsaturated/saturated fatty acid ratio = % linoleic/% (palmitic + Stearic + Arachidic + Behemic + Lignoceric)

Unsaturated/saturated fatty acid ratio = % (oleic + linoleic + eicosenoic)/% (palmitic + Stearic + Arachidic + Behemic + Lignoceric).

Iodine value = (% oleic x 0.8601) + (% linoleic x 1.7321) + (% eicosenoic x 0.7854).

3.6 Statistical analysis

3.6.1 Analysis of variance (ANOVA)

The data was subjected to Randomized Complete Block Design. The mean values of line in each replication were used for analysis of variance as detailed by Panse and Sukhatme (1967). The software used for analysis was MS-Excel, PbStat 2.1 and WINDOWSTAT. The significant difference among the line was tested by F-test at one per cent and five per cent level of significance structured by analysis of variance (ANOVA) presented in the table below:

Source of variation

Source of variation	d.f	Sum of squares	Mean sum of squares	F value calculated
Replication	r-1	RSS	RSS/r-1	RMSS/EMSS
Treatments	t-1	TrSS	TrSS/t-1	TrMSS/EMSS
Error	(r-1) (t-1)	ESS	ESS/(r-1) (t-1)	
Total	n-1	TSS		

Where,

r = Number of replication

t = Number of treatments/lines

$$S.Em = \sqrt{EMSS}/r$$

= Error mean sum of square

$$CD = \sqrt{2 \times S.Em} \times t \text{ (error d.f.)}$$

The significance was tested by referring the table given by Snecedor (1946).

$$\text{Coefficient of variation (CV \%)} = \frac{\sqrt{EMSS}}{\bar{X}}$$

3.6.2 Estimation of genetic parameters

3.6.2.1 Phenotypic and genotypic variances

These were calculated according to the formula given by Lush (1940) and Choudhary and Prasad (1968).

$$\text{Genotypic variance } \sigma^2_g = (\text{TrMSS} - \text{EMSS})/r$$

$$\text{Phenotypic variance } \sigma^2_p = \sigma^2_g + \sigma^2_e$$

$$\text{Error variance } \sigma^2_e = \text{EMS}$$

The components of variance viz., phenotypic (σ^2_p), genotypic (σ^2_g) and environmental (σ^2_e) variance were used for the estimation of phenotypic and genotypic coefficients of variation as per the method suggested by Singh and Choudhary (1979).

$$\text{Phenotypic coefficient of variation (PCV \%)} = \frac{\sqrt{\sigma^2_p}}{\bar{X}} \times 100$$

$$\text{Genotypic coefficient of variation (GCV \%)} = \frac{\sqrt{\sigma^2_g}}{\bar{X}} \times 100$$

PCV and GCV were classified as low, moderate or high as suggested by Sivasubramanian and Menon (1973) is given below.

0-10 %	Low
10-20 %	Moderate
20 % and above	High

Heritability in broad sense (H) was calculated as a ratio of genotypic variance to phenotypic variance (Hanson et al., 1956), Allard (1960)

$$\text{Heritability in broad sense (H)} = \frac{\sigma^2_g}{\sigma^2_p} \times 100$$

The heritability percentage was categorized as suggested by Robinson et al. (1949) is given below.

0-30 %	Low
30-60 %	Moderate
60 % and above	High

Genetic advance was calculated by using the formula given by Johanson *et al.* (1955).

Where,

$$GA = h^2 \times k \times \sigma_p$$

h^2 =heritable estimate

k = selection differential which is equal to 2.06 at 5 % intensity of selection (Lush, 1940)

σ_p = phenotypic standard deviation

The GA as per cent of mean was categorized as low, moderate or high as suggested by Johanson *et al.* (1955) which is given below.

0-10 %	Low
10-20 %	Moderate
20 % and above	High

3.6.2.2 Association of characters

To assess the nature and magnitude of association between fatty acid profile, quality traits, yield and component traits, simple correlation coefficients were computed from the mean of all the traits over replications for all possible combinations of characters by using formula given by Weber and Moorthy (1952). The data recorded on various characters (fatty acid profile, quality and quantitative traits) subjected to correlation studies. Correlation coefficients were compared against table r values given by Fisher and Yates (1963) at (n-2) degrees of freedom at the probability levels of 0.05 and 0.01 to test their significance (Panse and Sukhatme, 1961)

$$r_{xy} = \frac{\text{Cov}_{xy}}{\sqrt{V_x \times V_y}}$$

Where,

Cov_{xy} = Variance between the characters x and y

V_x = Variance of the character x

V_y = Variance of the character y

Table 8A: Modified 9-point scale used for field screening groundnut genotypes for resistance to rust diseases

Disease score	Description	Disease severity (%)
1	No disease	0
2	Pustules sparsely distributed, largely on lower leaves	1-5
3	Many pustules on lower leaves, necrosis evident, very few pustules on middle leaves	6-10
4	Number of pustules on lower and middle leaves, severe necrosis of lower leaves	11-20
5	Severe necrosis of lower and middle leaves, pustules may be present on top leaves but less severe	21-30
6	Extensive damage to lower leaves, middle leaves, necrotic with dense distribution of pustules on top leaves	31-40
7	Severe damage of lower and middle leaves, pustules densely distributed on top leaves	41-60
8	100 per cent damage to lower and middle leaves, pustules on top leaves	61-80
9	Almost all leaves withered, bare stems seen	81-100

Table 8B: Modified 9-point scale used for field screening groundnut genotypes for resistance to late leaf spot disease

Disease score	Description	Disease severity (%)
1	No disease	0
2	Lesions present largely on lower leaves, no defoliation	1-5
3	Lesions present largely on lower leaves, very few on middle leaves; defoliation of some leaflets evident on lower leaves	6-10
4	Lesions present on lower and middle leaves but severe on lower leaves, defoliation of some leaflets evident on lower leaves	11-20
5	Lesions present on lower and middle leaves, over 50 % of defoliation of lower leaves	21-30
6	Severe lesions on lower and middle leaves; lesions present but less severe on top leaves; extensive defoliation of lower leaves; some defoliation on middle leaves	31-40
7	Lesions on all leaves but less severe on top leaves; defoliation of all lower and middle leaves	41-60
8	Defoliation of all lower and middle leaves; severe lesions on top leaves evident	61-80
9	Almost all leaves defoliated, leaving bare stem; some leaflets may remain, but show severe leaf spot	81-100

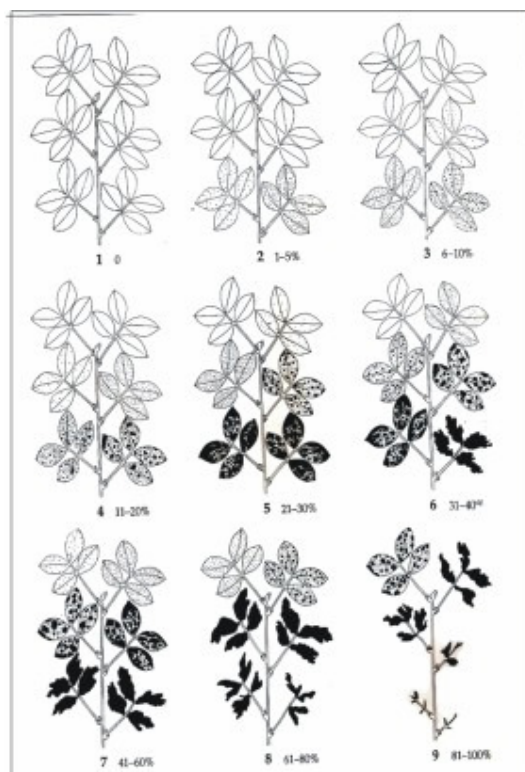


Fig 1a : The modified 9 point scale for field evaluation of rust in groundnut

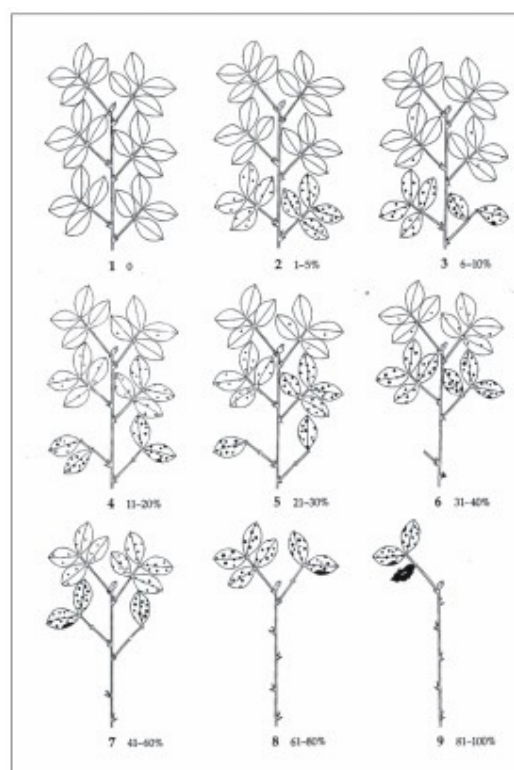


Fig 1b: The modified 9 point scale for field evaluation of late leaf spot in groundnut

EXPERIMENTAL RESULTS

The present investigation was carried out during 2011 and 2012 *kharif* seasons at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad to assess the extent of genetic variability for quantitative characters, oil content and fatty acid composition and to identify the high yielding lines with quality traits viz., oleic acid, O/L ratio, protein and disease resistance among 816 RILs derived from the cross GPBD-4 x GM4-3. Yield, its component traits and fatty acid composition recorded were used to estimate the genetic variability parameters. The results obtained from the analysis of data for each character are presented separately under the following headlines.

Analysis of variance

The analysis of variance revealed that there were significant differences among the genotypes for all the traits studied both in 2011 and 2012 *kharif* seasons and selected lines evaluated in 2012 *kharif* (Table 9, 10 and 12). In pooled analysis over two seasons, significant differences were observed between seasons for all characters as in case of genotypes except for days to 50% flowering. Significant differences for interaction of season x genotypes were also observed for all the characters studied except days to 50 per cent flowering (Table 11). For fatty acid composition there were significant differences observed among all the genotypes studied (Table 13-16).

4.1 Genetic variability for yield and yield components

Significant differences were recorded among the genotypes for all the characters studied in the Recombinant Inbred Lines (RILs). The magnitude of the genetic variability as indicated by the parameters like range, mean, genotypic and phenotypic coefficients of variation, heritability estimates and predicted genetic advance as per cent mean were computed for all the 11 characters studied and given in (Table 17).

4.1.1 Days to 50 per cent flowering

The analysis of variance revealed a highly significant variation among genotypes for days to 50 per cent flowering. Overall mean recorded for this character was 31.77 days with a range of 27 days (792) to 34.5 days (262) in 2011 *kharif* season and mean was 30.77 days with a range of 26 days (792) to 34 days (162) in 2012 *kharif* season (Table 17). The overall mean over both seasons was 31.27 days with a range of 26.5 days (792) to 34 days (262). The phenotypic and genotypic coefficients of variation recorded for this trait were low (4.73 and 4.32%, 4.88 and 4.46%, 5.00 and 4.81% respectively) in 2011, 2012 *kharif* and pooled data over two seasons. The phenotypic and genotypic coefficients of variation of selected lines evaluated in 2012 *kharif* were very low (2.2 and 1.2% respectively). High heritability (83.35 and 83.38%) and low genetic advance as per cent mean (8.12 and 8.39%) were recorded both in 2011 and 2012 *kharif* seasons respectively. Similarly heritability (92.33%) and low genetic advance as per cent mean (9.52%) were recorded from pooled analysis over seasons (Table 17).

4.1.2 Days to maturity

Recombinant inbred lines evaluated differed significantly in both 2011 and 2012 *kharif* seasons and in pooled analysis over seasons for days to maturity with the range of 101.50 (G2-52) to 117 days (345) in 2011 *kharif* season and from 98.5 days (700) to 114 days (94) in 2012 *kharif* season. In pooled analysis over seasons, days to maturity ranged from 100 days (700) to 115 days (345) and it ranged 101.5 days (83) to 112 days (64) for selected lines tested in 2012 *kharif* season.

The mean number of days taken to maturity was 112 days in 2011 *kharif* season and it was 109 days in 2012 *kharif* season. The mean number of days taken to maturity in pooled analysis over seasons was 110 days. The phenotypic and genotypic coefficients of variation for days to maturity were low both in 2011 *kharif* (2.69 and 2.61%) and 2012 *kharif* season (2.76 and 2.69%). The genotypic and phenotypic coefficients of variation in pooled analysis over seasons were also low (2.75 and 2.71% respectively) which was also true for selected lines evaluated during 2012 *kharif* season (2.2 and 0.21%).

High broad sense heritability (94.5 and 95.55%) and low genetic advance of (5.23 and 5.42%) were recorded in 2011 and 2012 *kharif* seasons respectively and similarly high broad sense heritability (97.46%) and low genetic advance as per of mean (5.52%) were recorded in pooled analysis over seasons. This trait had high heritability and low genetic advance as per cent mean (89.40 and 4.1%) in selected lines tested during 2012 *kharif* season.

Table 9: Analysis of variance of quantitative traits for 2011 *kharif* season

Source of variation	df	Days to 50% flowering	Days to maturity	Pod wt/plot (g)	Pod wt/plant (g)	100 kernel weight (g)	Shelling (%)	Protein content (%)	Oil content (%)	Pod yield (kg/ha)	Kernel yield Kg/ha	Oil yield Kg/ha	90 days rust	90days Late leaf Spot
Replication	1	0.88	5.012	1.166	3.22	1.38	0.153	0.217	0.05	1.166	5.0193	1.35	5.3	0.300
Genotypes	822	6.015**	18.20**	58.366**	15.8041**	22.76**	5.926**	5.190**	1.1551	46.95**	46.95**	37.55**	83.40**	88.24**
Error	822	1.01	1.01	1.00	1.01	1.00	1.00	1.00	1.00	1.01	1.01	1.00	1.01	1.01
SEm		0.613	0.700	6.57	1.35	0.86	1.74	0.83	1.18	145.93	125.57	67.89	0.120	1.589
CD at 5%		1.70	1.94	18.24	3.76	2.38	4.82	2.30	3.28	405.10	348.57	188.45	0.3343	0.441
CD at 1%		2.23	2.55	24.00	4.95	3.13	6.32	3.02	4.31	532.84	458.49	247.87	0.4397	0.58
CV%		2.72	0.891	5.332	9.88	2.99	3.47	3.39	3.52	5.33	6.43	7.30	4.9	6.2

** Significance at 1% * Significance at 5%

Table 10: Analysis of variance of quantitative traits for 2012 *kharif* season

Source of variation	df	Days to 50% flowering	Days to maturity	Pod wt/plot w(g)	Pod wt/plant (g)	100 kernel weight (g)	Shelling (%)	Protein content (%)	Oil content (%)	Pod yield(kg/ha)	Kernel yield Kg/ha	Oil yield Kg/ha	90 days rust	90 days LLS
Replication	1	0.88	0.85	0.214	0.003	1.495	6.22	0.05	3.07	0.214	0.05	0.57	5.4	0.21
Genotypes	822	6.01**	20.81**	10.76**	6.70**	23.86**	17.59**	1.155**	6.50**	10.77**	11.367**	10.90**	108.6*	95.6**
Error	822	1.00	1.00	1.00	1.00	1.01	1.01	1.00	1.00	1.01	1.01	1.01	1.01	1.01
SEm		0.613	0.6561	17.33	2.00	0.84	1.37	0.8268	1.18	384.84	287.1	137.60	0.10	0.15
CD at 5%		1.701	1.82	48.121	5.55	2.33	3.80	2.29	3.28	1068.285	796.9	381.97	0.28	0.42
CD at 1%		2.238	2.395	63.294	7.30	3.06	5.00	3.01	4.31	1405.146	1048.25	502.42	0.38	0.55
CV%		2.817	0.857	14.55	14.34	3.08	2.77	3.63	3.58	14.553	15.25	15.64	4.2	5.95

** Significance at 1% * Significance at 5%

Table 11: Analysis of variance of quantitative traits for pooled data of 2011 and 2012 *kharif* seasons.

Source of variation	df	Days to 50% flowering	Days to maturity	Pod wt/plot (g)	Pod wt/plant (g)	100 kernel weight (g)	Shelling (%)	Protein content (%)	Oil content (%)	Pod yield(kg /ha)	Kernel yield Kg/ha	Oil yield Kg/ha	90 days rust	90 days LLS
Season	1	1,243.95**	1,173.14**	49.97**	0.16**	156.23**	47.10**	15,176.30**	53,707.75**	49.97**	102.84**	242.95**	0.51	4.12
Replication*season	2	0.88 ^{ns}	6.66**	1.65 ^{ns}	101.2**	14.40**	2.49 ^{ns}	0.21 ^{ns}	0.06 ^{ns}	1.65 ^{ns}	0.85 ^{ns}	0.73 ^{ns}	5.41	0.26
Genotypes	822	0.98 ^{ns}	172.16**	2.45**	1.77**	1792**	2.53**	4.39**	1.904**	2.45**	2.55**	2.65**	73.30*	192.5**
Season*genotypes	822	0.06 ^{ns}	0.22**	9.71**	6.90**	0.03	5.89**	1.39**	1.565**	9.71**	9.62**	8.84**	2.54	0.95
Error	1644	1.00	1.01	1.01	1.02	1.03	1.01	1.01	1.00	1.01	1.04	1.01	1.00	1.01
SEm		0.216	0.24	4.63	0.60	0.30	0.55	0.29	0.342	102.89	78.33	38.35	0.03	0.05
CD at 5%		1.291	1.36	5.97	2.15	1.51	2.06	1.49	1.62	28.13	24.55	17.17	0.55	0.65
CD at 1%		1.69	1.78	7.84	2.83	1.99	2.70	1.97	2.13	36.95	32.24	22.56	0.76	0.87
CV%		2.77	0.875	10.81	12.35	3.03	3.144	3.50	2.91	10.81	11.53	12.00	4.61	6.07

** Significance at 1% * Significance at 5%

Table 12: Analysis of variance of quantitative and qualitative traits for selected lines evaluated in 2012 *kharif* season

Source of variation	df	Days to 50% flowering	Days to maturity	Pod wt/plot (g)	Pod wt/plant (g)	100 kernel weight (g)	Shelling (%)	Protein content (%)	O/L ratio	Pod yield (kg/ha)	Kernel yield Kg/ha	Oil yield Kg/ha
Replication	1	1.357	0.105	0.284	7.89	0.754	6.736	1.98	1.87	0.04	3.55	3.35
Genotypes	92	1.404*	9.405**	109.32**	3.99**	3.99**	9.147**	2.08**	7.48**	122.25**	88.12**	46.97**
Error	92	1.00	1.00	1.01	1.01	1.00	1.00	1.01	1.01	1.01	1.00	1.01
SEm		0.58	0.80	14.96	1.29	1.07	1.34	1.53	0.22	78.59	75.34	49.16
CD at 5%		1.63	2.25	42.02	3.62	3.02	3.76	4.29	0.61	220.74	211.60	138.07
CD at 1%		2.15	2.98	55.65	4.79	4.00	4.98	5.68	0.80	292.35	280.24	182.85
CV%		2.64	1.05	3.13	7.68	3.72	2.53	6.59	10.69	2.96	3.78	5.17

** Significance at 1% * Significance at 5%

Table13: Analysis of variance of Fatty acid composition in 2011 *kharif* season

Source of variation	df	Palmitic	Stearic	Oleic	Linolenic	Arachidic	Eicosenoic	Behenic	Lignoceric	Oleic/Linolenic	USFA	SFA
Replication	1	1.1087	3.18	1.45	1.43	1.40	1.84	1.77	0.28	1.2	2.69	0.06
Genotypes	822	6.15**	2.79**	12.78**	10.73**	3.40**	5.81**	3.71**	4.53**	9.58**	5.98**	4.413**
Error	822	1.01	1.00	1.01	1.00	1.00	1.01	1.01	1.00	1.00	1.01	1.00
SEm		0.22	0.21	1.06	1.05	0.08	0.02	0.09	0.04	0.25	0.26	0.56
CD at 5%		0.61	0.58	2.95	2.95	0.24	0.07	0.26	0.10	0.70	0.72	1.55
CD at 1%		0.81	0.76	3.88	3.88	0.31	0.09	0.34	0.13	0.92	0.95	2.04
CV%		3.22	8.10	2.64	7.14	6.96	3.35	3.60	3.55	12.37	1.82	1.01

** Significance at 1% * Significance at 5%

Table 14: Analysis of variance of Fatty acid composition for 2012 *kharif* season

Source of variation	df	Palmitic	Stearic	Oleic	Linolenic	Arachidic	Eicosenoic	Behenic	Lignoceric	Oleic/Linolenic	USFA	SFA
Replication	1	0.25	5.89	0.06	0.190	0.04	0.009	0.3395	0.155	1.91	0.077	3.07
Genotypes	822	4.75**	2.27**	12.56**	11.39**	4.618**	3.0633**	3.275**	2.86**	5.1905**	5.118**	6.50**
Error	822	1.00	1.00	1.00	1.00	1.00	1.01	1.00	1.00	1.00	1.00	1.00
SEm		0.279	0.212	1.22	1.03	0.07	0.033	0.146	0.048	0.213	0.543	0.306
CD at 5%		0.776	0.589	3.38	2.85	0.20	0.092	0.40	0.134	0.59	1.50	0.85
CD at 1%		1.02	0.775	4.45	3.76	0.26	0.121	0.535	0.177	0.78	1.98	1.11
CV%		3.79	8.61	3.31	5.75	6.20	4.90	5.44	5.23	13.977	0.98	2.10

** Significance at 1% * Significance at 5%

Table: 15: Analysis of variance of Fatty acid composition for pooled data of 2011 and 2012 *kharif* seasonss

Source of variation	df	Palmitic	Stearic	Oleic	Linolenic	Arachidic	Eicosenoic	Behenic	Lignoceric	Oleic/Linolenic	USFA	SFA
Season	1	811.10**	14.03**	1142.65**	1082.15**	2.15**	604.91**	662.71**	111.07**	488.48**	295.54**	120.90**
Replication*season	2	4.41**	18.59**	6.30**	7.41**	8.64**	0.65 ^{ns}	0.73 ^{ns}	0.22 ^{ns}	7.78**	0.04 ^{ns}	12.95**
Genotypes	822	1.61**	1.61**	4.36**	3.71	1.51**	3.51**	2.19**	3.14**	5.68**	2.63**	3.31**
Season*genotypes	822	1.94**	1.94**	4.73**	4.89**	3.14**	1.79**	2.14**	1.66**	8.65**	2.62**	2.91**
Error	1644	1.01	1.02	1.00	1.00	1.01	1.02	1.01	1.00	1.00	1.01	1.01
SEm		0.089	0.07	0.404	0.367	0.028	0.010	0.04	0.015	0.08	0.194	0.1
CD at 5%		0.828	0.757	1.76	1.68	0.4646	0.281	0.57	0.339	0.79	1.22	0.87
CD at 1%		1.9	1.00	2.31	2.20	0.67	1.42	0.78	0.69	1.05	1.61	1.16
CV%		3.54	8.34	2.96	6.376	6.60	4.123	4.63	4.41	13.08	0.991	1.966

** Significance at 1% * Significance at 5%

Table 16: Analysis of variance of Fatty acid composition for selected lines evaluated in 2012 *kharif* season

Source of variation	df	Palmitic	Stearic	Oleic	Linolenic	Arachidic	Eicosenoic	Behenic	Lignoceric	Oleic/Linolenic	USFA	SFA
Replication	1	0.25	5.89	0.06	0.190	0.04	0.009	0.3395	0.155	1.91	0.077	3.07
Genotypes	92	4.75**	2.27**	12.56**	11.39**	4.618**	3.0633**	3.275**	2.86**	5.1905**	5.118**	6.50**
Error	92	1.00	1.00	1.01	1.01	1.00	1.00	1.00	1.00	1.01	1.01	1.00
SEm		0.279	0.212	1.22	1.03	0.07	0.033	0.146	0.048	0.213	0.543	0.306
CD at 5%		0.776	0.589	3.38	2.85	0.20	0.092	0.40	0.134	0.59	1.50	0.85
CD at 1%		1.02	0.775	4.45	3.76	0.26	0.121	0.535	0.177	0.78	1.98	1.11
CV%		3.79	8.61	3.31	5.75	6.20	4.90	5.44	5.23	13.977	0.98	2.10

** Significance at 1% * Significance at 5%

4.1.3 Pod yield per plant (g)

The wide range variability for pod yield per plant was recorded in this mapping population studied. Pod yield per plant ranged from 4.9g (662) to 36.5 g (134) in 2011 *kharif* season and it ranged from 4.59 g (686) to 35 g (560) in 2012 *kharif* season. In pooled analysis over seasons a low yield of 5.7 g (37) and highest yield per plant 28.6g (88) was recorded in selected lines evaluated in 2012 *kharif*, it ranged from 13.6g (237 line) to 33.45g (162 line). The mean pod weight per plant of all recombinant lines were (19.39 g, 19.73 g and 19.56 g) in 2011 *kharif*, 2012 *kharif* and pooled analysis over seasons respectively. The mean pod weight per plant of selected lines evaluated in 2012 *kharif* was 23.72 g.

The GCV and PCV recorded for this trait were high (26.87 & 27.76%, and 24.22 & 26.26%) in 2011 and 2012 *kharif* seasons respectively. Moderate GCV (14.26%) and high PCV (21.26%) were estimated for this trait from pooled analysis over seasons. From the selected lines evaluated in 2012 *kharif* season the GCV and PCV evaluated were very high (23.0 and 23.10%). A high heritability (93.67 and 85.09%) and high genetic advance as per cent mean (53.58 and 46.03% respectively) were recorded in both 2011 and 2012 *kharif* seasons. However moderate amount of heritability and moderate genetic advance as per cent mean (43.59 and 19.39% respectively) were recorded from pooled analysis over seasons and a high heritability and high genetic advance as percent mean (99 and 33%) were recorded from selected lines evaluated in 2012 *kharif* season.

4.1.4 100-kernel weight (g)

A highly significant variation among genotypes tested were recorded for 100 kernel weight with a range from 23.50 g (688) to 48.75 g (709) in 2011 *kharif* season and a range of 21.50g (688) to 46.75g (709) in 2012 *kharif* season. In pooled analysis over seasons, 100 kernel weight ranged from 22.50g (688) to 47.75g (709), whereas a range of 35.25g (245) to 45.75g (228) was reported among selected lines evaluated in 2012 *kharif* season.

The mean 100-kernel weight of the RILs evaluated was 40.51g, 38.53 g, 39.52 and 40.86 g in 2011 *kharif*, 2012 *kharif*, pooled analysis over seasons and selected lines evaluated in 2012 *kharif* season respectively. GCV and PCV recorded for this trait were moderate (9.87%, 10.09 and 10.41%, 10.64%) in 2011 and 2012 *kharif* seasons respectively. The moderate GCV (10.36%) and PCV (10.47%) were recorded for this yield component in pooled analysis over seasons and a low GCV and PCV (4.5 and 5.2% respectively) were recorded for selected lines evaluated in 2012 *kharif* season. High genetic advance as per cent mean (19.88%, 21.0%) in 2011 and 2012 *kharif* seasons with high heritability (95.61 and 95.81% respectively) were recorded.

High genetic advance as per mean (21.11%) with high heritability of (97.90%) were also recorded for this trait in pooled analysis over seasons.

4.1.5 Shelling percentage

Mean shelling percentage (70.75 and 69.91%) were recorded with a range of 50.00 per cent (655) to 80.10 per cent (658) in 2011 *kharif* season and 40.50 per cent (686) to 77.75 per cent (711) in 2012 *kharif* season respectively. In pooled analysis over seasons mean shelling percentage was 70.33 per cent with a range of 48.80 per cent (698) to 76.58 per cent (544) were recorded and 58.50 (245) to 79.75 per cent (212) with a mean shelling percent of 74.83 was recorded in selected lines evaluated in 2012 *kharif* season.

Low GCV and PCV were recorded in 2011 *kharif* (5.44 and 5.97%), 2012 *kharif* (7.98 and 8.22%) and pooled analysis over seasons (4.72 and 6.07%) and also a low GCV and PCV (5.40 and 5.41%) were recorded for selected lines in 2012 *kharif* season.

High heritability estimates (83.13 and 94.31%) and moderate genetic advance as per cent mean (10.21 and 15.97%) were recorded in 2011 and 2012 *kharif* seasons respectively. High heritability estimates (80.49 and 89.07%) and low genetic advance as per cent mean (9.57 and 9.9%) were recorded in pooled analysis over seasons and selected lines evaluated in 2012 *kharif* season respectively.

4.1.6 Oil content (%)

High variability was observed for oil content in the RILs and checks evaluated. It ranged from 39.75 per cent (248) to 50.50 per cent (Dh-86) in 2011 *kharif* and 38.84 per cent (248) to 49.60 per cent (Dh-86) in 2012 *kharif* with the overall mean of 47.50 and 46.60 per cent, respectively.

In pooled analysis over seasons, oil content ranged from 39.30 per cent (248) to 50.31 per cent (Dh-86) and the overall mean oil content recorded in the RIL population was 47.05 per cent.

However low GCV (6.96%, 0.99%) and PCV (7.05%, 2.73%) were recorded in 2011 and 2012 *kharif* seasons respectively. High degree of heritability and low genetic advance as per cent mean (87.58 and 7.39%, 83.43 and 4.29%) were recorded in 2011 and 2012 *kharif* seasons respectively and a high degree of heritability and low genetic advance as per cent mean (69.79 and 4.64% respectively) were observed in pooled analysis over seasons.

4.1.7 Protein content (%)

Protein content of kernel is an important nutritional trait in groundnut that has much use in the confectionary preparations. In the present study more variability was recorded for protein content with a range from 22.69 per cent (TMV-2) to 38.02 per cent (RIL 59) in 2011 *kharif* and from 20.39 per cent (TMV-2) to 35.72 per cent (RIL 59) in 2012 *kharif* season. In pooled analysis over seasons wide variability in protein content was recorded with a range from 21.54 per cent (TMV-2) to 36.87 per cent (RIL 59) was recorded and for selected lines extremely low protein of 17.17 per cent (RIL 495) to 35.46 per cent (RIL 130) was recorded. The mean protein content was for 34.47% in 2011 *kharif* and 32.17 per cent in 2012 *kharif* were recorded. From pooled analysis over seasons mean protein content was 33.32 per cent and selected lines evaluated in 2012 *kharif* season, it was 32.76 per cent. The genotypic and phenotypic coefficients of variation recorded were low (4.91%, 5.46 and 5.26%, 5.85%) both in 2011 and 2012 *kharif* seasons. Genotypic (5.56%) and phenotypic (5.92%) coefficients of variation recorded were low even in pooled analysis over season and (4.00 and 6.00%) among selected lines evaluated in 2012 *kharif* season. High heritability (80.73 and 80.60%) and a low genetic advance as percent mean (9.08 and 9.73%) were recorded in both 2011 and 2012 *kharif* seasons respectively. But high heritability (91.21%) with moderate genetic advance (11.12%) was recorded for pooled analysis over seasons. Moderate heritability (51.90%) with low genetic advance as percent mean (7.2%) were recorded for selected lines evaluated in 2012 *kharif* season.

4.1.8 Pod yield (kg/ha)

The result of analysis of variance for this trait revealed significant differences among recombinant inbred lines evaluated. The overall mean for pod yield was 3870 kg/ha with a range of 555 kg/ha (RIL 771) to 6704 kg/ha (RIL 449) in 2011 *kharif* season, whereas, a mean of 3740 kg/ha with a range of 311 kg/ha (369) to 7370 kg/ha (709) in 2012 *kharif* season were recorded. In pooled analysis over seasons, the mean pod yield of 3809 kg/ha with a range of 538 kg/ha (370) to 6549 kg/ha (723) and among selected lines evaluated in 2012 *kharif* season, the mean pod yield was 3753 kg/ha with a range of 650 kg/ha (230) to 5586 kg/ha (162) were recorded. The GCV and PCV for this economic trait were high in both 2011 (28.56 and 28.80%) and 2012 (32.16 and 33.77%) *kharif* seasons respectively. The GCV and PCV for this trait were also high (20.31 and 26.39%) in pooled analysis over seasons. Higher broad sense heritability (98.29 and 90.71% respectively) and a high per cent of genetic advance as per cent mean (58.32 and 63.11% respectively) were recorded for this character in the recombinant inbred lines in 2011 and 2012 *kharif* seasons. Moderate broad sense heritability (59.22%) and high genetic advance as percent mean (32.19%) were also recorded for this character in pooled analysis over seasons, and selected lines evaluated in 2012 *kharif* season recorded high heritability (99.18%) with high genetic advance as per cent mean (47.1%).

4.1.9 Kernel yield (kg/ha)

A very wide range of kernel yield was recorded for recombinant inbred lines from 334 kg/ha (771) to 4926 kg/ha (470) in 2011 *kharif* season and 142 kg/ha (369) to 5674 kg/ha (709) in 2012 *kharif* season. Low kernel yield of 141.63 kg/ha (369). Highest kernel yield of 5674 kg/ha (709) was recorded. In pooled analysis over seasons, it ranged from 327 kg/ha (370) to 4865 kg/ha (723) and among selected lines evaluated in 2012 *kharif* season it ranged from 385 kg/ha (236) to 4329 kg/ha (162). The overall mean of the recombinant inbred lines were 2763 kg/ha, 2611 kg/ha, 2712 kg/ha and 2821 kg/ha in 2011 *kharif*, 2012 *kharif*, and pooled analysis over seasons respectively.

The GCV and PCV recorded were high in 2011 *kharif* (30.80 and 31.13%), 2012 *kharif* (36.37 and 36.54%) and pooled analysis over seasons (22.32 and 28.62%) respectively. High heritability (97.87%, 91.20%, 80.81 and 98.80%) with high genetic advance as percent mean (62.77%, 68.33%, 55.85 and 51%) were recorded for both seasons, pooled analysis over seasons and selected lines evaluated in 2012 *kharif* season respectively.

Table 17: Mean, Range and Genetic parameters for different quantitative traits for 2011, 2012 and pooled analysis over two seasons

Sl.No	Traits	Season	Mean	Range	GCV%	PCV%	h^2_{bs} (%)	Genetic advance	Genetic advance as per cent mean
1	Days to 50% flowering	2011	31.77	27-34.50\	4.321	4.73	83.35	2.58	8.12
		2012	30.77	26-34.00	4.461	4.88	83.38	2.58	8.39
		pooled	31.27	26.00-34.00	4.81	5.00	92.33	2.98	9.52
2	Days to maturity	2011	111.18	101.50-117	2.61	2.69	94.51	5.82	5.23
		2012	108.21	98-114	2.69	2.76	95.2	5.87	5.42
		pooled	109.7	100-115	2.71	2.75	97.46	6.05	5.52
3	Pod weight/plot (g)	2011	174.32	25.00-302	28.56	28.8	98.29	101.68	58.32
		2012	168.45	14-332	32.16	33.77	90.71	106.3	63.1
		pooled	171.39	24.5-295	20.31	26.39	59.22	55.17	32.19
4	Pod weight/plant (g)	2011	19.39	4.90-36.5	26.87	27.76	93.67	10.39	53.58
		2012	19.73	4.59-35	24.22	26.26	85.09	9.08	46.03
		pooled	19.56	5.7-28.6	14.26	21.6	83.59	3.79	19.39
5	100 kernel weight (g)	2011	40.51	23.50-48.75	9.87	10.09	95.61	8.05	19.88
		2012	38.53	21.50-46.75	10.41	10.64	95.81	8.09	21
		pooled	39.52	22.5-47.75	10.36	10.47	97.9	8.34	21.11
6	Shelling (%)	2011	70.75	50.00-80.10	5.44	5.97	83.13	7.233	10.224
		2012	69.91	40.50-77.75	7.98	8.22	94.31	11.17	15.97
		pooled	70.33	48.8-76.58	4.72	6.07	80.49	5.32	9.57

Sl.No	Traits	Season	Mean	Range	GCV%	PCV%	h^2_{bs} (%)	Genetic advance	Genetic advance as per cent mean
7	Protein (%)	2011	34.47	22.69-38.02	4.91	5.46	80.73	3.132	9.088
		2012	32.17	24.93-35.72	5.26	5.85	80.73	3.13	9.73
		pooled	33.32	21.54-36.87	5.56	5.92	91.21	3.71	11.12
8	Oil content (%)	2011	47.5	39.75-50.50	6.96	7.05	87.58	3.51	7.395
		2012	46.6	38.84-49.60	0.99	2.73	83.43	2.00	0.042
		pooled	47.05	39.3-50.31	2.7	3.23	69.79	2.18	4.64
9	Oil yield (kg/ha)	2011	1314.81	156.56-2367.24	31.21	31.64	97.34	834.25	63.45
		2012	1243.48	65.58-2648.33	34.82	36.54	90.83	850.23	68.37
		pooled	1279.15	149.8-2270	22.89	29.02	62.23	475.81	37.2
10	Pod yield (kg/ha)	2011	3870.06	555-6704.50	28.56	28.8	98.29	2257.35	58.32
		2012	3739.66	310.80-7370.40	32.16	33.77	90.71	2360.07	63.11
		pooled	3804.86	538.35-6549	20.31	26.39	59.22	1224.8	32.19
11	Kernel yield (kg/ha)	2011	2763.33	333.89-4926.26	30.8	31.13	97.87	1734.8	62.77
		2012	2611.32	141.63-5674.42	36.37	36.54	91.2	1818.58	68.33
		pooled	2712.32	326.87-4865	22.32	28.62	80.81	972.39	55.85

Table 18: Mean, Range and Genetic parameters of quantitative and qualitative traits for selected lines evaluated in 2012 *kharif* season

Sl.No	Traits	Mean	Range	GCV%	PCV%	h^2_{bs} (%)	Genetic advance	Genetic advance as per cent mean
1	Days to 50% flowering	30.99	28-32	1.2	2.2	82.80	0.407	1.3
2	Days to maturity	109.44	101-112	2.1	2.2	89.40	4.52	4.1
3	Crop canopy (cm)	28.08	25.9-32.75	4.2	4.3	95.20	2.39	8.5
4	Internodal length (cm)	3.13	1.45-5.6	30.00	31.00	97.47	1.95	62.00
5	Pod weight/plot (g)	675.47	117-1005.50	23	23.1	99.00	319.26	47.00
6	Pod weight/plant (g)	23.72	13.60-33.45	17	17.9	90.70	7.90	33.00
7	100 kernel weight (g)	40.86	35.25-45.75	4.5	5.2	74.9	3.314	8.1
8	Shelling (%)	74.83	58.50-79.50	5.4	5.4	89.07	7.42	9.9
9	Protein (%)	32.76	17.17-35.46	4.00	6.00	51.9	2.35	7.2
10	O/L Ratio (%)	2.86	1.19-13.62	64.00	65	98.60	3.80	13.2
11	Oil yield (kg/ha)	1344.52	187.94-2104.82	24.7	25.00	97.87	679.22	50.00
12	Pod yield (kg/ha)	3752.63	650-5586.12	23.0	23.1	99.18	1775.42	47.1
13	Kernel yield (kg/ha)	2821.29	384.75-4328.82	24.9	25.1	98.80	1440.34	51.00

Table 19: Mean, Range and Genetic parameters for rust and late leaf spot disease for 2011 *kharif*, 2012 *kharif* and pooled analysis over two seasons

Sl. No.	season	2011 <i>kharif</i>				2012 <i>kharif</i>				Pooled data for 2011 and 2012 <i>kharif</i>			
	Trait	80 DAS		90 DAS		80 DAS		90 DAS		80 DAS		90 DAS	
	Genetic parameters	Rust	LLS	Rust	LLS	Rust	LLS	Rust	LLS	Rust	LLS	Rust	LLS
1	Mean	3.25	3.41	3.45	3.62	3.243	3.40	3.45	3.61	3.25	3.42	3.45	3.62
2	Range	3-6	3-7	3-8	3-9	3-6	3-7	3-8	3-9	3-6	3-7	3-8	3-9
3	GCV%	19.05	28.9	31.60	40.90	18.734	28.97	31.37	40.96	18.48	29.30	31.44	40.99
4	PCV%	19.25	29.35	31.79	41.23	18.99	29.28	31.51	41.177	18.80	29.30	31.44	41.10
5	h^2_{bs} (%)	97.92	97.59	98.80	98.87	97.28	97.86	99.08	98.00	96.56	98.86	98.64	99.45
6	Genetic advance	1.26	2.01	2.23	3.039	1.23	2.01	2.21	3.03	1.21	2.03	2.21	3.04
7	Genetic advance as per cent mean	38.83	59.00	64.71	83.97	38.06	59.04	64.33	83.93	37.40	59.67	63.89	84.21

4.1.10 Oil yield (kg/ha)

The significant difference among the recombinant inbred lines was observed for this economic trait. The overall mean recorded was 1315 kg/ha in 2011 *kharif* season and 1243 kg/ha 2012 *kharif* season and it ranged from 157 kg/ha (771) to 2367 kg/ha (589) in 2011 *kharif* season and 66 kg/ha (369) to 2648 kg/ha (709) in 2012 *kharif* season. In pooled analysis over seasons the range was from 150 kg/ha (370) to 2270 kg/ha (723) with over all mean of 1279 kg/ha. Among selected lines evaluated in 2012 *kharif* season it ranged from 188 kg/ha (236) to 2105 kg/ha (162). The genotypic and phenotypic coefficients of variation were found to be high in 2011 (31.21 and 31.64%) and 2012 (34.82 and 36.54%) *kharif* seasons. The genotypic and phenotypic coefficients of variation were also found to be high (14.44 and 15.01%) in pooled analysis over seasons and the same was true among selected lines evaluated in 2012 *kharif* season with higher GCV (24.7%) and PCV (25.00%). High degree of broad sense heritability (95.07% , 95.80%, 62.23 and 97.87%) with high genetic advance as per cent mean (63.45%, 68.37%, 37.20 and 50%) were recorded in 2011 and 2012 *kharif* seasons, pooled analysis over seasons and selected lines evaluated in 2012 *kharif* season respectively.

4.1.11 Foliar disease resistance

4.1.11.1 Rust

Genetic variability in the present study for rust resistance recorded at 80 DAS and 90 DAS was high range with 3-6 and 3-8 in 2011, 3-6 and 3-8 in 2012 *kharif*, 3-6 and 3-8 in pooled analysis over seasons with a mean score of 3.25 and 3.45 in 2011, 3.24 and 3.45 in 2012 *kharif* and 3.25 and 3.45 in pooled analysis over seasons on 1-9 scale indicating better resistance in the mapping population studied.

Genotypic and phenotypic coefficient of variation for were very high in 2011 *kharif* (31.60 and 31.79), 2012 *kharif* (31.37, 31.51) and in pooled analysis over seasons (31.44 and 31.44) indicating presence of high genetic variability for this trait. Less difference between PCV and GCV for this character indicates that there is a least effect of environment.

A high heritability (98.80%, 99.08 and 98.64%) and a high genetic advance as per cent mean (64.71%, 64.33 and 63.89%) recorded for this trait indicate that we can go for direct selection of the lines that are resistance to rust. (Table 19)

4.1.11.2 Late leaf spot

High heritability (98.97 and 98.00%) with high genetic advance as per cent mean (83.97 and 83.93%) were recorded for late leaf spot resistance in 2011 and 2012 *kharif* season respectively. The pooled analysis over seasons also indicated high heritability (99.5%) with high genetic advance as per cent mean (84.21%) indicating that the character is probably governed by additive gene action, thus direct selection for the trait would be effective in segregating generation.

GCV and PCV recorded for late leaf spot resistance were also high in 2011 (40.09 and 41.23%), 2012 *kharif* (40.96 and 41.77%) and in pooled analysis over seasons (40.99 and 41.10%) for 90DAS disease score indicating a wide range of variability for late leaf spot resistance to make desirable selections for this trait improvement. (Table 19)

4.2 Genetic variability for fatty acid composition

4.2.1 Palmitic acid (C16:0)

The analysis of variance revealed highly significant variation for palmitic acid among recombinant inbred lines studied with overall mean of 9.69 per cent in 2011 and 10.43 per cent 2012 *kharif* season and range of 7.68 per cent (39) to 11.70 per cent (TMV-2) in 2011 and 7.35 per cent (812) to 12.17 per cent (784) for 2011 and 2012 *kharif* seasons with overall mean of 10.06 per cent and a range of 7.65 per cent (38) to 11.71 per cent (TMV-2) in pooled analysis over seasons.

The low GCV (5.17%, 5.20%) and PCV (5.65%, 6.09%) were recorded for this trait in 2011 and 2012 *kharif* seasons respectively and in pooled analysis over seasons also indicated low GCV (4.02%) and PCV (4.97%) for this fatty acid in the mapping population studied. High heritability (83.75, 78.98 and 65.56%) with low genetic advance as percent mean (9.75, 9.51 and 6.71%) was recorded in *kharif* 2011 and 2012 and pooled analysis over seasons. (Table 18)

4.2.2 Stearic acid (C18:0)

The highly significant variation for the stearic acid was observed in recombinant inbred lines with the overall mean of 3.65 per cent, 3.48 and 3.57 per cent respectively for *kharif* 2011, *kharif* 2012 and pooled analysis over seasons with a range of 2.54 per cent (674) to 6.28 per cent (751) in *kharif* 2011, from 2.46 per cent (701) to 6.28 per cent (751) in 2012 *kharif*, and in pooled analysis over seasons it ranged from 2.60 per cent (701) to 6.29 per cent (751).

Relatively lower GCV and PCV were recorded in both 2011 (7.68%, 9.57%) and 2012 (6.88%, 9.19%) *kharif* seasons and in pooled analysis over seasons (4.55%, 7.78%) respectively. High heritability (64%) with moderate genetic advance as per cent mean (12.65%) in 2011 *kharif* season and moderate heritability (56.08%) with moderate genetic advance (10.63%) in 2012 *kharif* seasons were recorded. But low heritability (38%) with low genetic advance as per cent mean was recorded in pooled analysis over seasons. (Table 18)

4.2.3 Oleic acid (C18:1)

A wide range of variability with significant difference among the recombinant inbred lines was observed with a range from 42.81 per cent (786) to 73.26 per cent (38) in 2011 and from 39.69 per cent (235) to 76.10 per cent (812) in 2012 *kharif* season with mean of 56.86 and 52.07 per cent were recorded in 2011 and 2012 *kharif* seasons respectively. In pooled analysis over seasons, similar range of 42.78 per cent (800) to 73.41 per cent (38) with over all mean of 54.47 per cent was recorded.

Lower GCV and PCV were recorded for *kharif* 2011(6.48% & 6.68%), *kharif* 2012 (7.96 and 8.30) and pooled analysis over seasons (5.92 and 6.74%) respectively.

High heritability (92.18%, 92.04 and 77.04%) with a moderate genetic advance as per cent mean were recorded in *kharif* 2011 (12.69%), *kharif* 2012 (15.74%) and pooled analysis over two seasons (10.70%). (Table 18)

4.2.4 Linoleic acid (C18:2)

Significant variability was recorded for linoleic acid content with over all mean of 20.75 per cent. It ranged from 6.78 per cent (38) to 33.68 per cent (TMV-2) in *kharif* 2011. Whereas, in *kharif* 2012 it ranged from 5.54 per cent (812) to 34.64 per cent (375) and pooled analysis over two seasons it ranged from 6.49 per cent (38) to 33.68 per cent (TMV-2) with overall mean of 25.30 and 23.02 per cent respectively.

The genotypic and phenotypic coefficients of variation recorded were moderate (15.74 and 16.53%) in *kharif* 2011, (13.11 and 13.73%) in *kharif* 2012, (11.38 and 13.31%) in pooled analysis over two seasons respectively. However, high heritability (90.68%, 91.22 and 73.04%) with high genetic advance as per cent mean (30.89%, 25.80 and 20.30%) in 2011, 2012 *kharif* seasons and in pooled analysis over seasons. (Table 18)

4.2.5 Arachidic acid (C20:0)

The RILs evaluated differed significantly for arachidic acid with range from 1.14 per cent (683) to 2.88 per cent (751) in 2011 *kharif* and from 1.07 per cent (250) to 2.88 per cent (751) in 2012 *kharif* season with overall mean of 1.73 per cent and 1.67 per cent in 2011 and 2012 *kharif* season respectively. Pooled analysis over two seasons also indicated such from 1.22 per cent (691) to 2.88 per cent (751) with over all mean of 1.70 per cent.

Genotypic and phenotypic coefficients of variation were low in 2011 (7.63 and 9.08%); 2012 (8.35 and 9.40%) and in pooled analysis (4.16 and 7.16%) over two seasons. High heritability (70.67 and 78.35%) with moderate genetic advance as per cent mean (13.22 and 15.22%) were recorded in 2011 and 2012 *kharif* seasons respectively. However, low heritability (33.73%) with low genetic advance as percent mean (4.99%) were recorded for pooled analysis over two seasons. (Table 18)

4.2.6 Eicosenoic acid (C20:1)

Mean eicosenoic acid content was 1.05 per cent in 2011 and 0.95 per cent in 2012 *kharif* season with range from 0.71 per cent (JL-24) to 1.19 per cent (84) in 2011 and 0.71 per cent (JL-24) to 1.18 per cent (232) in 2012 *kharif* season. In pooled analysis over two seasons over all mean was 1.00 per cent with range from 0.72 per cent (JL-24) to 1.16 per cent (232).



Plate 5: Photographs showing leaf sample with foliar disease infestation for high oleic acid RILs

Dorsal view



Ventral view

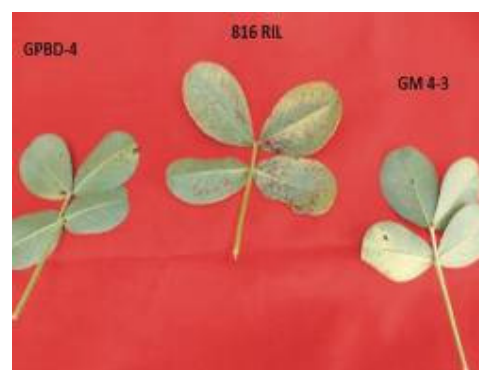
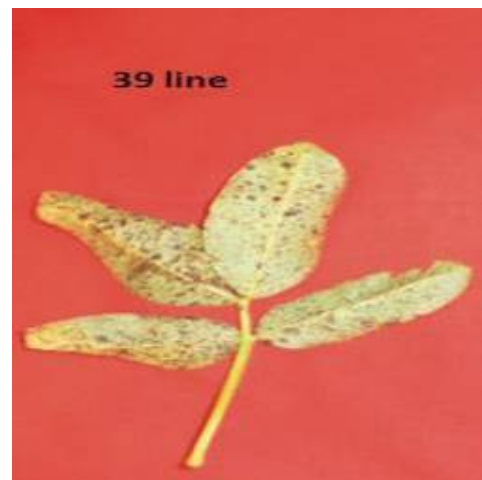


Plate 5: Photographs showing leaf sample with foliar disease infestation for high oleic acid RILs

Low GCV and PCV in 2011 (5.20%, 5.71%) and 2012 (4.98%, 6.07%) *kharif* seasons were recorded and also in pooled analysis over two seasons.

High heritability (82.80%, 67.36 and 71.54%) with low genetic advance as per cent mean (9.75%, 8.41 and 7.63%) was recorded for fatty acid trait in both seasons and in pooled analysis over seasons. (Table 18)

4.2.7 Behenic acid (C22:0)

The analysis of variance revealed significant differences among the RILs evaluated for behenic acid content. The overall mean was 3.67 per cent in 2011 and 3.80 per cent in 2012 *kharif* season with range from 2.82 per cent (690) to 4.24 per cent (463) in 2011 and 2.77 per cent (241) to 4.62 per cent (380) in 2012 *kharif* season. Whereas, in pooled analysis over two seasons range was from 2.82 per cent (690) to 4.39 per cent (380).

Genotypic and phenotypic coefficients of variation recorded for this fatty acid content were low in 2011 (4.19% and 4.90%) and in 2012 (5.81 and 6.97%) *kharif* seasons as well as in pooled analysis over two seasons were (3.71 and 5.03%).

High heritability (73.06 and 69.47%) with low genetic advance as per cent mean (7.38 and 9.97%) were recorded in 2011 and *kharif* 2012 seasons respectively. Moderate heritability (5.46%) with a low genetic advance as per cent mean (5.63%) was recorded in pooled analysis over two seasons. (Table 18)

4.2.8 Lignoceric acid (C24:0)

Overall mean of 1.41 and 1.30 per cent with range from 0.78 per cent (751) to 1.58 per cent (84) in 2011 and 0.77 per cent (751) to 1.64 per cent (232) in 2012 *kharif* season. In pooled analysis over two seasons over all mean 13.36 per cent with a range of 0.78 per cent (751) to 1.56 per cent (232).

Genotypic and phenotypic coefficient of variation were low in 2011 (4.72 and 5.34%); 2012 (5.06 and 6.27%) and in pooled analysis (4.15 and 5.03%) over two seasons. High heritability (77.97%, 65.13 and 68.15%) with low genetic advance as per cent mean (8.59%, 8.41 and 7.07%) were recorded in 2011 and 2012 *kharif* season and in pooled analysis over two seasons. (Table 18)

4.2.9 Ratio of oleic to linoleic acid (C18:1/C18:2)

The significant differences among the recombinant inbred lines were observed for this trait. The overall mean recorded was 2.87 in 2011 *kharif* season and 2.16 in 2012 *kharif* season and it ranged from 1.31 (TMV-2) to 11.12 (38 line) in 2011 and 1.16 (375 line) to 14.60 (812 line) in 2012 *kharif* seasons. In pooled analysis over seasons over all mean was 2.52 with from 1.32 (TMV-2) to 11.47 (38).

Genotypic and phenotypic coefficients of variation were high in 2011 (25.63 and 27.08%), in 2012 (38.01 and 39.27%) and in pooled analysis (27.07 and 29.82%) over two seasons.

High heritability (89.56 and 93.67%) and with high genetic advance as per cent mean (49.96 and 75.78%) were recorded in 2011 and 2012 *kharif* seasons respectively. In pooled analysis over two seasons also high heritability (82.39%) with high genetic advance as per cent mean (50.61%) was recorded. (Table 18)

4.2.10 Total unsaturated fatty acid

The analysis of variance revealed the significant differences for this trait and it ranged from 74.31 per cent (371) to 82.43 per cent (691) in 2011 and 73.94 per cent (272) and 82.69 per cent (812) in 2012 *kharif* season with the mean of 78.63 per cent in 2011 and 78.34 per cent in 2012 *kharif* season. In pooled analysis over two seasons it ranged from 75 per cent (37) to 82.04 per cent (GM6-1) with overall mean recorded was 78.49 per cent.

Genotypic and phenotypic coefficients of variation recorded for this trait were low in 2011 (1.31 and 1.49%); 2012 (1.40 and 1.56%) and in pooled analysis (1.02 and 1.30%) over two seasons.

High heritability (77.34%, 80.46 and 61.94% respectively) with a low genetic advance as per cent mean (2.37%, 2.59 and 1.66% respectively) were recorded for 2011 and 2012 *kharif* seasons and in pooled analysis over two seasons. (Table 18)

4.2.11 Total saturated fatty acids (%)

In recombinant inbred lines, analysis of variance revealed a highly significant variation for total saturated fatty acids with overall mean of 20.14 per cent in 2011 and 20.70 per cent in 2012 *kharif* season and range of 18.11 per cent (38 line) to 22.61 per cent (37 line) in 2011 and 17.81 per cent (812 line) to 22.81 per cent (380 line) in 2012 *kharif* season. In pooled analysis over two seasons mean (20.42%) with from 19.97 per cent (812) to 22.61 per cent (37) was recorded.

The genotypic and phenotypic coefficients of variation recorded for these traits were low in *kharif* 2011 (2.87 and 3.15%) and 2012 (3.46 and 3.77%) *kharif* seasons. In pooled analysis GCV (2.55%) and PCV (3.05%) over seasons were recorded.

High heritability (83.30%, 84.60 and 69.80%) with low genetic advance as per cent mean (5.41%, 6.57 and 4.39%) for 2011 and 2012 *kharif* seasons and in pooled analysis over two seasons. (Table 18)

4.3 Character association studies among yield and component traits

The phenotypic and genotypic correlations between yield and other yield components and also among the yield components were computed and presented in Tables (21 and 23). Phenotypic correlation coefficients in general were lower than the genotypic correlation coefficients.

4.3.1 Pod yield (kg/ha)

Positive association at both phenotypic and genotypic level were recorded for pod yield (kg/ha) with pod weight per plant (0.76**, 0.79** & 0.75**, 0.83**), shelling percentage (0.53**, 0.58** & 0.63**, 0.66**), oil yield (0.98**, 0.99** & 0.98**, 0.99**) and oil content (0.19**, 0.52** & 0.26**, 0.75**), 100 kernel weight (0.47**, 0.48** & 0.66**, 0.69**), Days to 50 per cent flowering (0.37**, 0.79** & 0.52**, 0.59**), Days to maturity (0.27**, 0.28 ** & 0.32**, 0.34**) and protein content (0.38**, 0.43** & 0.53**, 0.62**) in 2011 and 2012 *kharif* seasons.

But a significant negative correlation of pod yield with rust (-0.51**, -0.52** & -0.65**, -0.69**) and late leaf spot (-0.53**, -0.54** & -0.67**, -0.71**) were recorded in 2011 and 2012 *kharif* seasons.

4.3.2 Kernel yield (kg/ha)

Highly significant and positive association of kernel yield at both phenotypic and genotypic level in 2011 and 2012 *kharif* seasons were found with pod weight per plant (0.76**, 0.78** & 0.74**, 0.82**), oil yield (0.997**, 0.998** & 0.99**, 0.99**) and pod yield (0.990**, 0.993** & 0.991**, 0.992**), shelling per cent (0.63**, 0.66** & 0.70**, 0.73**), 100 kernel weight (0.48**, 0.50** & 0.69**, 0.71**), days to maturity (0.29**, 0.30** & 0.32**, 0.34**), days to 50 per cent flowering (0.39**, 0.43** & 0.52**, 0.59**), protein content (0.41**, 0.45** & 0.54**, 0.63**) and oil content (0.20**, 0.54** & 0.26**, 0.75**) respectively.

However, significant negative association of kernel yield with rust (-0.54**, -0.55** & -0.66**, -0.70**) and late leaf spot (-0.56**, -0.57** & -0.68**, -0.71**) were recorded in 2011 and 2012 *kharif* seasons.

4.3.3 Days to 50 per cent flowering

Days to 50 per cent flowering was positively and significantly associated at phenotypic and genotypic level with days to maturity (0.37**, 0.40** & 0.37**, 0.41**), pod weight/plant (0.23**, 0.25** & 0.52**, 0.59**), pod yield (0.37**, 0.41** & 0.47**, 0.56**), oil yield (0.40**, 0.44** & 0.52**, 0.59**) in 2011 *kharif* and 2012 *kharif* respectively.

But a significant negative correlation for days to 50 per cent flowering with shelling per cent (-0.42**, -0.51** & -0.47**, -0.52**), 100 kernel weight (-0.52**, -0.55** & -0.52**, -0.59**), rust (-0.67**, -0.73** & -0.67**, -0.74**) and late leaf spot (-0.71**, -0.77** & -0.71**, -0.78**) in both 2011 and 2012 *kharif* seasons respectively.

4.3.4 Days to maturity

Significant positive association of days to maturity at both phenotypic and genotypic level in 2011 *kharif* and 2012 *kharif* were recorded with pod weight/plant (0.21**, 0.22** & 0.30**, 0.33**), oil yield (0.29**, 0.30** & 0.32**, 0.34**) and pod yield (0.27**, 0.28 & 0.32**, 0.34**) but its association was negative with 100-kernel weight (-0.36**, -0.38** & -0.37**, -0.39**), shelling per cent (-0.32**, -0.36** & -0.33**, -0.35**), rust (-0.45**, -0.47** & -0.43**, -0.45**) and late leaf spot (-0.45**, -0.47** & -0.45**, -0.46**) in 2011 and 2012 *kharif* seasons respectively.

Table 20: Mean, Range and Genetic parameters for different fatty acid composition for 2011 *kharif*, 2012 *kharif* season and pooled analysis over two seasons

SI.No	Traits	Season	Mean	Range	GCV%	PCV%	h^2_{bs} (%)	Genetic advance	Genetic advance as per cent mean
1	Palmitic acid (%)	2011	9.69	7.68-11.70	5.17	5.65	83.75	0.94	9.75
		2012	10.43	7.35-12.17	5.2	5.85	78.98	0.99	9.51
		pooled	10.06	7.65-11.71	4.02	4.97	65.56	0.68	6.71
2	Stearic acid (%)	2011	3.65	2.54-6.28	7.68	9.57	64	0.46	12.65
		2012	3.48	2.46-6.28	6.88	9.19	56.08	0.37	10.63
		pooled	3.57	2.6-6.29	4.55	7.38	38	0.21	5.78
3	Oleic acid (%)	2011	56.86	42.81-73.26	6.41	6.68	92.18	7.21	12.69
		2012	52.07	39.69-76.10	7.96	8.3	92.04	8.19	15.74
		pooled	54.47	42.78-73.41	5.92	6.74	77.04	5.83	10.7
4	Linoleic acid (%)	2011	20.75	6.72-33.68	15.74	16.53	90.68	6.4	30.89
		2012	25.3	5.54-34.64	13.11	13.73	91.22	6.53	25.8
		pooled	23.02	6.49-33.68	11.38	13.31	73.04	4.61	20.3
5	Arachidic acid (%)	2011	1.73	1.14-2.88	7.63	9.08	70.67	0.22	13.22
		2012	1.67	1.07-2.88	8.35	9.4	78.35	0.255	15.22
		pooled	1.7	1.22-2.88	4.16	7.18	33.73	0.08	4.99
6	Eicosenoic acid (%)	2011	1.05	0.71-1.19	5.2	5.71	82.8	0.1	9.75
		2012	0.95	0.71-1.18	4.98	6.07	67.36	0.08	8.41
		pooled	1	0.72-1.16	4.34	5.18	71.54	0.08	7.63

Sl.No	Traits	Season	Mean	Range	GCV%	PCV%	h^2_{bs} (%)	Genetic advance	Genetic advance as per cent mean
7	Behenic acid (%)	2011	3.67	2.82-4.24	4.19	4.9	73.06	0.27	7.38
		2012	3.8	2.77-4.62	5.81	6.97	69.47	0.379	9.97
		pooled	3.74	2.82-4.39	3.71	5.03	54.36	0.21	5.63
8	Lignoceric acid (%)	2011	1.41	0.78-1.58	4.72	5.34	77.97	0.12	8.59
		2012	1.3	0.77-1.64	5.06	6.27	65.13	0.11	8.41
		pooled	1.36	0.78-1.56	4.15	5.03	68.15	0.1	7.07
9	Oleic /linoleic ratio	2011	2.87	1.31-11.12	25.63	27.08	89.56	1.43	49.96
		2012	2.16	1.16-14.60	38.01	39.27	93.67	1.63	75.78
		pooled	2.52	1.32-11.47	27.07	29.82	82.39	1.27	50.61
10	Total saturated fatty acid	2011	20.14	18.11-22.61	2.87	3.15	83.3	1.09	5.41
		2012	20.7	17.81-22.81	3.46	3.77	84.6	1.36	6.57
		pooled	20.42	17.97-22.61	2.55	3.05	69.8	0.9	4.39
11	Total unsaturated fatty acid	2011	78.63	74.31-82.43	1.31	1.49	77.34	1.86	2.37
		2012	78.34	73.94-82.69	1.56	1.56	80.46	2.03	2.59
		pooled	78.49	75-82.04	1.02	1.3	61.94	1.3	1.66

4.3.7 Pod yield per plant (g)

The positive and significant correlation of pod yield per plant with days to 50 per cent flowering (0.23**, 0.25** & 0.47**, 0.56**), days to maturity (0.21**, 0.22** & 0.30**, 0.33**), pod yield kg/ha (0.76**, 0.79** & 0.75**, 0.83**), kernel yield (0.76**, 0.78** & 0.74**, 0.82**), oil yield (0.75**, 0.78** & 0.74**, 0.82**) shelling per cent (0.43**, 0.48** & 0.54**, 0.60**), 100 kernel weight (0.36**, 0.38** & 0.61**, 0.66**) protein content (0.32**, 0.36** & 0.46**, 0.56**) and oil content (0.14**, 0.43** & 0.24**, 0.69**) were recorded in 2011 and 2012 *kharif* seasons respectively.

But a significant negative correlation was recorded for rust (-0.36**, -0.37** & -0.56**, -0.69**) and late leaf spot (-0.39**, -0.40** & -0.58**, -0.64**) in both 2011 and 2012 *kharif* seasons respectively.

4.3.8 100-kernel weight (g)

Significant positive association of 100-seed weight with shelling percentage (0.49**, 0.55** & 0.74**, 0.75**) and oil content (0.34**, 0.93** & 0.34**, 0.93**) were recorded at both phenotypic as well as genotypic level in 2011 and 2012 *kharif* seasons.

However, a negative significant association of 100-kernel weight with protein content (-0.54**, -0.61** & -0.54**, -0.60**), days to 50 per cent (-0.52**, -0.59** & -0.52**, -0.59**), Days to maturity (-0.36**, -0.38** & -0.37**, -0.39**), rust (-0.67**, -0.69** & -0.66**, -0.68**) and late leaf spot (-0.69**, -0.71** & -0.70**, -0.72**) was also recorded in 2011 *kharif* and 2012 *kharif* season respectively, at both phenotypic as well genotypic level.

4.3.9 Shelling percentage

There was positive and significant correlation of shelling percentage with pod yield (kg/ha) (0.53**, 0.58** & 0.63**, 0.66**), pod yield per plant (0.43**, 0.48** & 0.54**, 0.60**), oil yield (0.63**, 0.66** & 0.70**, 0.73**) and oil content (0.14*, 0.44** & 0.35**, 0.97**) at both phenotypic and genotypic level in 2011 and 2012 *kharif* seasons respectively.

Shelling per cent has significant and negative correlation with days to flowering (-0.42**, -0.51** & -0.47**, -0.52**), days to maturity (-0.32**, -0.36** & -0.33**, -0.35**), rust (-0.55**, -0.61** & -0.61**, -0.63**) and late leaf spot (-0.57**, -0.63** & -0.64**, -0.66**) at both genotypic and phenotypic level in both seasons respectively.

4.3.10 Protein content (%)

Significant negative association of protein content with oil content (-0.31**, -0.89** & -0.63**, -0.78**), rust (-0.66**, -0.74** & -0.68**, -0.76**) and late leaf spot (-0.67**, -0.75 & -0.69**, -0.77**) respectively in 2011 and 2012 *kharif* at both phenotypic and genotypic level.

But a significant positive correlation was recorded in both 2011 and 2012 *kharif* for pod yield kg/ha (0.38**, 0.43** & 0.53**, 0.62**), pod yield per plant (0.32**, 0.36** & 0.47**, 0.56**), kernel yield (0.41**, 0.45** & 0.54**, 0.63**) and oil yield (0.42**, 0.47** & 0.54**, 0.63**).

4.3.11 Oil content (%)

Positive and significant association of oil content with pod yield (0.19**, 0.52** & 0.21**, 0.69**), kernel yield (0.20**, 0.54** & 0.26**, 0.75**), oil yield (0.26**, 0.54** & 0.30**, 0.73**) and shelling percent (0.14**, 0.44** & 0.35**, 0.97**) only at genotypic and phenotypic level were recorded in both 2011 and 2012 *kharif* seasons respectively. The negative and significant association was also found with protein content (-0.31**, -0.88**, -0.63**, -0.78**), rust (-0.28**, -0.77** & -0.28**, -0.76**) and late leaf spot (-0.28**, -0.80** & -0.29**, -0.82**) at both phenotypic and genotypic level in both seasons respectively.

4.3.12 Oil yield (kg/ha)

Oil yield was shown significant positive association at both phenotypic and genotypic level with pod yield (0.98**, 0.99** & 0.98**, 0.99**), pod weight per plant (0.75**, 0.78 & 0.74**, 0.82**), kernel yield (0.99**, 0.99** & 0.99**, 0.99**), shelling per cent (0.63**, 0.66** & 0.70**, 0.73**), 100 kernel weight (0.50**, 0.55** & 0.69**, 0.72**) protein content (0.42**, 0.47** & 0.54**, 0.63**) in 2011 and 2012 *kharif* seasons respectively.

Table 21: Correlation for quantitative characters in 2011 *kharif* season

		Days to 50% flowering	Days to maturity	90 days rust	90 days late leaf spot	Pod yield (kg/ha)	Pod yield/plant (g)	Kernel yield (kg/ha)	Oil yield (kg/ha)	Shelling (%)	100 kernel wt. (g)	O/L ratio	Protein content (%)	Oil content (%)
Days to 50% flowering	P	1.000	0.3704**	-0.6715**	-0.710.**	0.3791**	0.2331**	0.3974**	0.4016**	-0.4264**	-0.5295**	0.2515**	0.464**	0.254*
	G	1.000	0.4098**	-0.7368**	-0.7791**	0.4157**	0.2592**	0.4372**	0.4437**	-0.5130**	-0.5939**	0.2958**	0.521**	0.537*
Days to maturity	P		1.000	-0.4570**	-0.4630**	0.2765**	0.2139**	0.2930**	0.2933**	-0.3244**	-0.3648**	0.2434**	0.3321**	0.1580*
	G		1.000	-0.4738**	-0.4793**	0.2851**	0.2224**	0.3034**	0.3043**	-0.3657**	-0.3855**	0.2595**	0.3803**	0.2864*
90 days rust	P			1.000	0.9547**	-0.5178**	-0.3670**	-0.5433**	-0.5507**	-0.5538**	-0.6784**	-0.1993**	-0.6682*	-0.2830*
	G			1.000	0.9607**	-0.5259	-0.3798	-0.5531**	-0.562**	-0.6123**	-0.6983**	-0.2127**	-0.7474*	-0.7785*
90 days late leaf spot	P				1.000	-0.5349**	-0.3917**	-0.5609**	-0.5681**	-0.5741**	-0.6986**	-0.2457**	-0.6758*	-0.2895*
	G				1.000	-0.5430	-0.4057	-0.5706**	-0.5797**	-0.6343**	-0.7193**	-0.2605**	-0.7557*	-0.8094*
Pod yield (kg/ha)	P					1.000	0.7662**	0.9905**	0.9876**	0.5381**	0.4705**	0.2381**	0.3898**	0.1951*
	G					1.000	0.7931**	0.9931**	0.9929**	0.5897**	0.4852**	0.2558**	0.4329**	0.5228*
Pod yield/plant (g)	P						1.000	0.7616**	0.7577**	0.4318**	0.3625**	0.2233**	0.3215**	0.1467*
	G						1.000	0.7897**	0.7887**	0.4851**	0.3810**	0.2496**	0.3684**	0.4303*
Kernel yield (kg/ha)	P							1.000	0.9974**	0.6358**	0.4897**	0.2403**	0.4110**	0.2000*
	G							1.000	0.9981**	0.6676**	0.5059**	0.2591**	0.4581**	0.5401
Oil yield (kg/ha)	P								1.000	0.6341**	0.5001**	0.2356**	0.4212**	0.2649*
	G								1.000	0.6677**	0.5541**	0.2566**	0.4700**	0.5496
Shelling (%)	P									1.000	0.4934**	0.2243**	0.4197**	0.1466*
	G									1.000	0.5541**	0.2643**	0.5123**	0.4484*
100 kernel wt. (g)	P										1.000	0.2401**	-0.5457**	0.3453*
	G										1.000	0.2594**	-0.6123**	0.9377*
O/L ratio	P											1.000	0.2012**	0.0159*
	G											1.000	0.2253**	0.0028*
Protein content (%)	P												1.000	-0.3122*
	G												1.000	-0.889*
Oil content (%)	P													1.000
	G													1.000

** Significance at 1% * Significance at 5%

Table 22: Correlation for Quantitative Character in 2012 *Kharif* season.

		Days to 50% flowering	Days to maturity	90 days rust	90 days late leaf	Pod yield (kg/ha)	Pod yield/plant (g)	Kernel yield (kg/ha)	Oil yield (kg/ha)	Shelling (%)	100 kernel wt. (g)	O/L ratio	Protein content (%)	Oil content (%)
Days to 50% flowering	P G	1.000 1.000	0.3712** 0.4108**	-0.6788** -0.7454**	-0.7158** -0.7851**	0.5214** 0.5994**	0.4769** 0.5676**	0.5220** 0.5977**	0.5214** 0.5987**	-0.4707** -0.5261**	-0.5284** -0.5907**	0.0328 0.0397	-0.4964** -0.6121**	0.2055** 0.6237**
Days to maturity	P G		1.000 1.000	-0.4397** -0.4513**	-0.4506** -0.4643**	0.3242** 0.3489**	0.3024** 0.3359**	0.3237** 0.3474**	0.3234** 0.3475**	-0.3328** -0.3508**	-0.3735** -0.3922**	-0.2180** -0.2269**	-0.3192** -0.3644**	0.1050** 0.2844**
90 days rust	P G			1.000 1.000	0.9435** 0.9491**	-0.6599** -0.6976**	-0.5625** -0.6976**	-0.6643** -0.7002**	-0.6647** -0.7020**	-0.6149** -0.6369**	-0.6679** -0.6874**	0.0228 0.0224	-0.6811** -0.7608**	-0.2826** -0.7632**
90 days late leaf spot	P G				1.000 1.000	-0.6752** -0.7134**	-0.5869** -0.6405**	-0.6801** -0.7165**	-0.6810** -0.7191**	-0.6432** -0.6651**	-0.7021** -0.7226**	-0.0428 -0.0453	-0.6924** -0.7736**	-0.2974** -0.8281**
Pod yield (kg/ha)	P G					1.000 1.000	0.7545** 0.8338**	0.9914** 0.9926**	0.9898** 0.9932**	0.6330** 0.6699**	0.6679** 0.6963**	0.0397 0.0398	0.5368** 0.6280**	0.2638** 0.7567**
Pod yield/plant (g)	P G						1.000 1.000	0.7488** 0.8252**	0.7482** 0.8256**	0.5473** 0.6005**	0.6156** 0.6604**	0.0623* 0.0664*	0.4737** 0.5635**	0.2426** 0.6990**
Kernel yield (kg/ha)	P G							1.000 1.000	0.9984** 0.9987**	0.7057** 0.7335**	0.6913** 0.7162**	0.0367 0.0373	0.5418** 0.6306**	0.2655** 0.7539**
Oil yield (kg/ha)	P G								1.000 1.000	0.7072** 0.7362**	0.6943** 0.7200**	0.0357 0.0371	0.5428** 0.6341**	0.3075** 0.7337**
Shelling (%)	P G									1.000 1.000	0.7413** 0.7597**	0.0507* 0.0575*	0.5451** 0.6209**	0.3525** 0.9793**
100 kernel wt. (g)	P G										1.000 1.000	0.0772** 0.0847**	-0.5412** -0.6067**	0.3456** 0.9305**
O/L ratio	P G											1.000 1.000	0.0569* 0.0602*	0.0485* 0.1105**
Protein content (%)	P G												1.000 1.000	-0.6312** -0.7892**
Oil content (%)	P G													1.000 1.000

** Significance at 1% * Significance at 5%

4.3.13 Foliar disease resistance

4.3.13.1 Rust

Significant negative correlation for rust with all the characters except late leaf spot was recorded. A negative correlation for days to 50 percent flowering (-0.67**, -0.73** & -0.67**, -0.74**), days to maturity (-0.45**, -0.47** & -0.43**, 0.45**), pod yield kg/ha (-0.51**, -0.52** & -0.65**, -0.69**), pod weight per plant (-0.36**, -0.37** & -0.56**, -0.69**), kernel yield kg/ha (-0.54**, -0.55** & -0.66**, -0.70**), oil yield (-0.55**, -0.56** & -0.66**, -0.70**), shelling per cent (-0.55**, -0.6188 & -0.61**, 0.63**), 100 kernel weight (-0.67**, -0.69** & -0.66**, -0.68**)

A positive association of rust with late leaf spot (0.95**, 0.96**) in 2011 *kharif* season & (0.94**, 0.94**) in 2012 *kharif* season was recorded.

4.3.13.2 Late leaf spot

A negative association for almost all characters were recorded with late leaf spot.

A significant positive association of late leaf spot with rust (0.95**, 0.96** & 0.94**, 0.94**) and a negative significant association for pod yield kg/ha (-0.53**, -0.54** & -0.67**, -0.71**), pod yield per plant (-0.39**, -0.40** & -0.85**, -0.64**), kernel yield (-0.56**, -0.57** & -0.68**, -0.78**), oil yield (-0.56**, -0.57** & -0.68**, -0.71**), shelling per cent (-0.57**, 0.63** & -0.64**, -0.66**) and 100 kernel weight (-0.69**, -0.71** & -0.70**, -0.72**) were recorded in 2011 and 2012 *kharif* seasons respectively.

4.4 Character association for fatty acid composition

The phenotypic and genotypic correlation coefficients were computed to know the nature and magnitude of relationship existing between different fatty acids which are presented in Table (22 and 24).

4.4.1 Palmitic acid (%)

The existence of very strong positive association of palmitic acid with linoleic acid (0.92**, 0.95** & 0.88**, 0.94**), Behenic acid (0.12**, 0.22** & 0.08*, 0.23**) with saturated fatty acid (0.53**, 0.63** & 0.65**, 0.73**) in 2011 and 2012 *kharif* seasons respectively.

Highly significant negative correlation of palmitic acid with stearic acid (-0.33**, -0.26** & -0.16**, -0.18**), arachidic acid (-0.53**, -0.54** & -0.23**, -0.25**), eicosenoic acid (-0.34**, -0.41** & -0.38**, -0.44**), Lignoceric acid (-0.34**, -0.40** & -0.36**, -0.42**), O/L ratio (-0.84**, -0.88** & -0.73**, -0.78**), unsaturated fatty acid (-0.24**, -0.29** & -0.55**, -0.63**) and oleic acid (-0.90**, -0.93** & -0.86**, -0.92**) were recorded at both phenotypic and genotypic levels in 2011 and 2012 *kharif* seasons respectively.

4.4.2 Stearic acid (%)

The positive and significant association of stearic acid with arachidic acid (0.72**, 0.74** & 0.43**, 0.48**), behenic acid (0.44**, 0.47** & 0.40**, 0.55**), oleic/linoleic acid ratio (0.18**, 0.20** & 0.06*, 0.04*) and saturated fatty acid (0.49**, 0.52** & 0.47**, 0.49**) were recorded.

But with linoleic acid a significant positive correlation (0.23** & 0.20**) were recorded in 2011 *kharif* and only positive correlation (0.17, 0.06*) in 2012 *kharif* season. A significant negative association with eicosenoic acid (-0.39**, -0.39** & -0.43**, -0.57**), lignoceric acid (-0.34**, -0.40** & -0.32**, -0.45**), unsaturated fatty acid (-0.43**, -0.46** & -0.26**, -0.47) were also recorded. A negative correlation for oleic acid (-0.05, -0.08) in 2011 *kharif* season and a significant negative for genotypic correlation (-0.16**) and only negative correlation for phenotype correlation (-0.08**) in 2012 *kharif* season were recorded.

4.4.3 Oleic acid (%)

Oleic acid was significantly and negatively associated with linoleic acid (-0.95**, -0.96** & -0.97**, -0.98**), palmitic acid (-0.90**, -0.93** & -0.86**, -0.92**), behenic acid (-0.41**, -0.47** & -0.46**, -0.52**) and total saturated fatty acid percentage (-0.73**, -0.78** & -0.83**, -0.87**) were recorded in both seasons but its association with eicosenoic acid (0.39**, 0.43** & 0.36**, 0.45**), lignoceric acid (0.38**, 0.43** & 0.30**, 0.41**), O/L ratio (0.89**, 0.90** & 0.81**, 0.82**) and total unsaturated fatty acid (0.47**, 0.51** & 0.77**, 0.82**) were significantly positive.

4.4.4 Linoleic acid (%)

There was positive and significant correlation of linoleic acid with behenic acid (0.20**, 0.27** & 0.34**, 0.39**) and saturated fatty acid (0.56**, 0.64** & 0.76**, 0.80**) at both phenotypic and genotypic level. It was shown significant negative association with O/L ratio (-0.90**, -0.91** & -0.83**, -0.85**), arachidic acid (-0.45**, -0.45** & -0.08*, -0.09*), eicosenoic acid (-0.39**, -0.44** & -0.33**, -0.41**), lignoceric acid (-0.41**, -0.46** & -0.32**, -0.41**) at both phenotypic and genotypic level in both 2011 and 2012 *kharif* seasons.

4.4.5 Arachidic acid (%)

Significant positive association of arachidic acid with behenic acid (0.47**, 0.48** & 0.48**, 0.52**), o/l ratio (0.39**, 0.40**, & 0.14**, 0.14**) and saturated fatty acid (0.26**, 0.32** & 0.38**, 0.39**) were recorded at both phenotypic and genotypic level. Whereas, it shown negative and significant association with eicosenoic acid (-0.13**, -0.14** & -0.24**, -0.30**), lignoceric acid (-0.006, -0.04 & -0.07, -0.12*) and significant negative with total unsaturated fatty acid (-0.37**, -0.38** & -0.27**, -0.28**) at both phenotypic and genotypic level in 2011 and 2012 *kharif* seasons respectively.

4.4.6 Eicosenoic acid (%)

The positive and significant association of eicosenoic acid with lignoceric acid (0.85**, 0.89** & 0.75**, 0.80**), o/l ratio (0.22**, 0.26** & 0.16**, 0.21**) and total unsaturated fatty acid (0.16**, 0.18** & 0.38**, 0.51**) was recorded but it was negatively associated with behenic acid (-0.16**, -0.22** & -0.07*, -0.17**) and total saturated fatty acid (-0.48**, -0.53** & -0.48**, -0.56**) at both phenotypic and genotypic level in *kharif* 2011 and *kharif* 2012 respectively.

4.4.7 Behenic acid (%)

Behenic acid was significantly and negatively associated with O/L ratio (-0.24**, -0.31** & -0.29**, -0.35**) but its association with total unsaturated fatty acid per cent (-0.75**, -0.83** & -0.66**, -0.77**) and it was found significantly positive with saturated fatty acid (0.75**, 0.78** & 0.70**, 0.76**).

Lignoceric acid shown non-significant positive association at phenotypic correlation (0.008) and positive significant for genotypic correlation (0.10**) in 2011 *kharif* season, and there was significant positive association (0.05**, 0.21**) in 2012 *kharif* season.

4.4.8 Lignoceric acid (%)

Positive and significant association between o/l ratio (0.25**, 0.27** & 0.16**, 0.21**), and total unsaturated fatty acid (0.08**, 0.11* & 0.20**, 0.32**) at both phenotypic and genotypic level were recorded. However, a significant negative association found with saturated fatty acid (-0.37**, -0.46** & -0.21**, -0.35**) at both phenotypic and genotypic levels.

4.4.9 Oleic acid to linoleic acid (O/L) ratio

The positive and significant association of O/L ratio with stearic acid (0.18**, 0.20** & 0.06*, 0.04), arachidic acid (0.39**, 0.40** & 0.14**, 0.14**) oleic acid (0.89**, 0.90** & 0.81**, 0.82*) and total unsaturated fatty acid (0.47**, 0.51** & 0.77, 0.82**) were recorded at phenotypic and genotypic level in both *kharif* seasons. It also shown a negative and significant association with palmitic acid (-0.84**, -0.88 & -0.73**, -0.78**), linoleic acid (-0.90**, -0.91** & -0.83**, -0.85**), behenic acid (-0.24**, -0.31** & -0.29**, -0.35**) and saturated fatty acid (-0.55**, -0.63** & -0.60**, -0.64**) at both phenotypic and genotypic levels.

4.4.10 Total saturated fatty acid (%)

The correlation coefficient of this trait with palmitic acid (0.53**, 0.63** & 0.65**, 0.73**), stearic acid (0.49**, 0.52** & 0.47**, 0.49**), linoleic acid (0.56**, 0.64** & 0.76**, 0.80**) and behenic acid (0.75**, 0.78** & 0.70**, 0.76**) was significantly positive. and significant association at both phenotypic and genotypic level.

Negative and significant relation was found with oleic acid (-0.73**, -0.78** & -0.83**, -0.87**), eicosenoic acid (-0.48**, -0.53** & -0.48**, -0.56**) and lignoceric acid (-0.37**, -0.46** & -0.21**, -0.35**) at both phenotypic and genotypic level in 2011 and 2012 *kharif* seasons respectively.

Table 23: Correlation for Quality parameters in 2011 *kharif* season

		Palmitic	Stearic	Linoleic	Arachidic	Eicosenoic	Behenic	Lignoceric	O/L ratio	SFA	USFA	Oleic
Palmitic	P G	1.000 1.000	-0.3357** -0.2695**	0.9239** 0.9568**	-0.5356** -0.5482**	-0.3410** -0.4100**	0.1210** 0.2291**	-0.3497** -0.4002**	-0.8476** -0.8828**	0.5377** 0.6310**	-0.2485** -0.2959**	-0.9044** -0.9331**
Stearic	P G		1.000 1.000	0.2351** 0.2011	0.7262** 0.7444**	-0.3908** -0.3969**	0.4450** 0.4711**	-0.3417** -0.4034**	0.1877** 0.2096**	0.4978** 0.5255**	-0.4357** -0.4647**	-0.545 -0.837
Linoleic	P G			1.000 1.000	-0.4526** -0.4533**	-0.3963** -0.4483**	0.2006** 0.2741**	-0.4146** -0.4615**	-0.9033** -0.9120**	0.5629** 0.6464**	-0.1878** -0.2647**	-0.9534** -0.9624**
Arachidic	P G				1.000 1.000	-0.1389** -0.1441**	0.4834** 0.4777**	-0.0063 -0.0497	0.3967** 0.4080**	0.2600** 0.3209**	-0.3763** -0.3872**	0.2943** 0.2981**
Eicosenoic	P G					1.000 1.000	-0.1623** -0.2241**	0.8564** 0.8989**	0.2276** 0.2601**	-0.4885** -0.5335**	0.1609** 0.1850**	0.3912** 0.4382**
Behenic	P G						1.000 1.000	0.0082 0.1093**	-0.2458** -0.3109**	0.7508** 0.7869**	-0.7596** -0.8344**	-0.4126** -0.4775**
Lignoceric	P G							1.000 1.000	0.2506** 0.2786**	-0.3743** -0.4658**	0.0807** 0.1126**	0.3853** 0.4311**
O/L ratio	P G								1.000 1.000	-0.5572** -0.6300**	0.2703** 0.3356**	0.8942** 0.9065**
SFA	P G									1.000 1.000	-0.7525** -0.7786**	-0.7319** -0.7894**
USFA	P G										1.000 1.000	0.4751** 0.5164**
Oleic	P G											1.000 1.000

** Significance at 1% * Significance at 5%

Table 24: Correlation for Quality Character in 2012 *Kharif* season.

		Palmitic	Stearic	Linoleic	Arachidic	Eicosenoic	Behenic	Lignoceric	O/L ratio	SFA	USFA	Oleic
Palmitic	P	1.000	-0.166**	0.8849**	-0.2369**	-0.3895**	0.0887**	-0.3672**	-0.732**	0.6568**	-0.555**	-0.86**
	G	1.000	-0.189**	0.9489**	-0.1589**	-0.448**	0.2333**	-0.4279**	-0.781**	0.7316**	-0.638**	0.923**
Stearic	P		1.000	0.0178	0.4345**	-0.4398**	0.4023**	-0.3276**	0.060*	0.4700**	-0.266**	-0.0842
	G		1.000	0.0621	0.4852**	-0.5706**	0.5507**	-0.4589**	0.049	0.4989**	-0.472**	-0.168**
Linoleic	P			1.000	-0.0984**	-0.3315**	0.3448**	-0.3226**	-0.839**	0.7623**	-0.620**	-0.975**
	G			1.000	-0.0860**	-0.4126**	0.3975**	-0.4174**	-0.8528**	0.8046**	-0.705**	-0.982**
Arachidic	P				1.000	-0.2470	0.5247**	-0.0799**	0.1410**	0.3865**	-0.278**	0.0033
	G				1.000	-0.3052	0.4861**	-0.1220**	0.1417**	0.3938**	-0.286**	0.0037
Eicosenoic	P					1.000	-0.0723**	0.7541**	0.1632**	-0.4801**	0.381**	0.361**
	G					1.000	-0.1799**	0.8094**	0.2116**	-0.5693**	0.519**	0.456**
Behenic	P						1.000	0.2113**	-0.2997**	0.7024**	-0.665**	-0.46**
	G						1.000	0.0589**	-0.3534**	0.7681**	-0.772**	-0.52**
Lignoceric	P							1.000	0.1622**	-0.2198**	0.202**	0.308**
	G							1.000	0.2164**	-0.3505**	0.321**	0.410**
O/L ratio	P								1.000	-0.6033**	0.502**	0.815**
	G								1.000	-0.6408**	0.557**	0.828**
SFA	P									1.000	-0.804**	-0.83**
	G									1.000	-0.904**	-0.877**
USFA	P										1.000	0.777**
	G										1.000	0.824**
Oleic	P											1.000
	G											1.000

** Significance at 1% * Significance at 5%

DISCUSSION

Crop breeders are mainly concerned with identification of important factors limiting productivity and formulation of appropriate breeding strategies to develop suitable genotypes to overcome these limiting factors. The average yield for groundnut in India (1341 kg/ha) is lower than the world average productivity (1.41 t/ha). Several reasons were attributed for low yield levels viz., poor adaptation of improved high yielding cultivars, cultivation under shallow soils of low fertility, uneven rainfall distribution, continuous cropping without rotation of crop, low plant population and incidence of foliar diseases and insect pests are cited as the major limiting factors in most of the groundnut growing regions. This is an indication of the incomplete utilization of the genetic potential of the crop in our country without proper crop management practices.

Though India is closer to world average productivity but less or no attention paid on quality parameters. In this current century people are much concerned with the nutritional qualities in the food items consumed. In the present context emphasis should be to develop high yield varieties along with the oil quality improvement. In order to minimize losses due to major foliar diseases there is immediate need to develop high yielding, disease resistant cultivars besides quality parameters viz., high protein, high oleic acid, high oleic to linoleic acid ratio that is required to impart stability to the oil. To achieve this, sufficient genetic variability required for hybridization and selection programme but the natural variability in cultivated groundnut is very less due to limited natural crossing.

In such cases, creation of new variability through induced mutagenesis followed by hybridization could be the potential means to create genetic variability for the improvement of crop plants especially in groundnut. Lack of genetic variability even between the botanical groups of groundnut as evidenced by molecular analysis (Halward *et al.*, 1990) limits the improvement of the crop. So, interspecific hybridization between species has to be used to generate and exploit genetic variability. Wide hybridization results in increased genetic variation of economic characters like disease resistance, pod yield, and other morphological characters. However, it is not possible to practice this commonly because of common problems like sterility, linkage drag of undesirable genes etc.

In oilseed crops, fatty acid composition determines the nutritional qualities and oxidative stability of the oil. Groundnut is the major oilseed crop grown in India. Unlike in other groundnut producing countries, nearly 80 per cent of the produce is crushed for extraction of edible oil and it constitutes 34 per cent of the total oil produced in the country. There were very limited efforts for genetic improvement of oil content and oil quality traits in most of the oilseed crops like groundnut. Recombinant inbred lines developed from distinct genotypes provide an opportunity for selection among RILs, especially in combinations of durable traits for oil quality.

In the present study, 816 recombinant inbred lines (RILs) along with parents (2) and checks (5) were evaluated in advanced generation. All these RILs were evaluated for yield and its component traits, protein content, oil content, fatty acid composition and foliar disease resistance for two seasons i.e., in 2011 and 2012 *kharif* seasons at Main Agriculture Research Station, UAS Dharwad. The results obtained from the present investigation are discussed in this chapter under following headings.

5.1 Genetic variability for yield and yield components

The development of genetic variability with hybridization and selection supplements the spontaneous variability for the crop improvement. In addition, it also helps in analyzing and understanding gene action controlling these economic traits.

5.1.1 Genetic variability, heritability and expected genetic advance

Since the effectiveness of the selection depends on the extent of genetic variability present for different characters, it is essential to study the variability with reference to genetic parameters like genotypic coefficient of variability, heritability and genetic advance. The estimation of genotypic and phenotypic coefficient of variability indicates the amount of genetic and non- genetic variation present for different desirable traits while heritability gives an insight into the proportion of the variation which is inherent. However, heritability estimate itself is not an indication of the amount of genetic progress that would result from selecting the best individual plants. Thus, the study of heritability in conjunction with genetic advance was emphasized in predicting the resultant effect for selecting the best individuals (Johanson *et al.*, 1955).

In the present study, an attempt has been made to partition the total variability into genetic and non-genetic and their magnitude for different groups has been compared by computing genotypic and phenotypic coefficient of variation. Other genetic parameters viz., heritability in broad sense and genetic advance were also calculated and the results obtained are discussed as below.

5.1.1.1 Phenotypic and genotypic coefficient of variation

Although the range for a particular trait can provide a preliminary idea about the variability but coefficient of variation as it is independent of unit of measurement also indicate amount of variability. The extent of variability as measured by PCV and GCV also gives information regarding the relative amount of variation in different populations. The phenotypic and genotypic coefficient of variation showed wide variation for most of the characters among the recombinant inbred lines evaluated. Phenotypic coefficient of variability (PCV) was slightly higher than the genotypic coefficient of variability (GCV) for all the characters studied indicating the less role of environment in influencing the traits studied.

A relative comparison of the magnitude of genotypic and phenotypic coefficients of variation for different traits revealed that higher genotypic and phenotypic variability among RILs enhanced was present for pod weight per plant in both the seasons, indicating greater scope for improvement of pod weight per plant in desirable direction. These results are in conformity with the findings of Mensah and Obadani (2007). Oil yield, kernel yield, and pod yield recorded high genotypic and phenotypic variability indicating the presence of high genetic variability for these characters and there is more scope for selection. Such high genetic variation was also being reported by Reddy and Gupta (1992), Shinde *et al.* (2010), Zaman *et al.* (2011) for kernel yield, Yadav *et al.* (1998), Salara and Gowda (1998), Shinde *et al.* (2010) for pod yield and Dwivedi *et al.* (1990) for oil yield.

However, in the present investigation, 100 kernel weight had moderate PCV and low GCV in 2011 *Kharif* season and moderate for both genotypic and phenotypic coefficient of variability in 2012 *Kharif* season and in pooled analysis over seasons, indicating less response to selection. The results obtained in the study are in accordance with Purnima *et al.* (2008) in soybean, Korat *et al.* (2009), Mothilal *et al.* (2004) for 100 kernel weight.

Shelling per cent, protein content, oil content, days to 50 per cent flowering and days to maturity recorded low genotypic and phenotypic variability indicating the narrow range of variability for these characters and restricting the scope of selection. Such low variation for above characters have also been reported earlier by Venkataraman *et al.* (2001), Nadaf and Habib (1987), Sharma and Gupta (2011) for shelling percentage, and Kavera *et al.* (2008), Sarvamangala *et al.* (2011) for the traits oil content and protein content.

For reaction to foliar diseases like rust and late leaf spot, both GCV and PCV recorded were very high, indicating wide range of variability for these characters in the population. The results of this study are in accordance with the results published by Khedikar *et al.* (2008), Reddy and Gupta (1992).

5.1.1.2 Heritability and genetic advance

In the present study, genotypes consisted recombinant inbred lines in F_8 generation, hence all were expected to be homozygous. Thus, for the prediction of response to selection it is apt to use broad sense heritability because the entire genotypic value is transmitted to the progeny when any selection is advanced through selfing. The results of genetic advance holds good as long as selection is practiced between the lines. Heritability in broad sense being the ratio of genotypic variability to the phenotypic variability indicates heritable component thus, it aids in estimating the extent of variation due to genetic and non-genetic factors. High heritability in broad sense does not always mean better response to selection, since it is also an inclusive of non-additive genetic factors. Thus, estimation of genetic advance furnishes clue to the nature of gene effects and thus, its response to selection can be easily predicted.

High heritability estimates have also been recorded for days to 50 per cent flowering, days to maturity, pod weight per plant, 100-kernel weight, shelling per cent, protein content, oil content, oil yield, pod yield, kernel yield, reaction to rust and late leaf spot diseases in 2011 and 2012 *Kharif* seasons. These results were in agreement with the findings of Upadhaya *et al.* (2005), Zaman *et al.* (2011) for 100-kernel weight and Upadhaya *et al.* (2005), Korat *et al.* (2009) for shelling percentage, Nazar Ali *et al.* (1999), Zaman *et al.* (2011) for kernel yield, Kavera *et al.* (2008), Sarvamangala *et al.* (2011), Noubissie *et al.*

(2012) for oil content, Mollers and Schierhold (2002), Sharma and Gupta (2011) for protein content and Khedikar *et al.* (2008), Vishnuvardhan *et al.* (2012) for rust and late leaf spot.

Low to moderate broad sense heritability indicates the greater influence of environment in the expression of these traits. However, genetic advance can help to predict the extent of genetic improvement that can be achieved for the traits. A high genetic gain along with the high heritability would suggest that character is governed by additive gene action which is suitable for making effective selection.

The estimated genetic advance was high for the traits like pod weight per plant (Abhay Darshora *et al.*, 2002, Shinde *et al.*, 2010), 100-kernel weight (Venkataramana *et al.*, 2001), oil yield, pod yield and kernel yield (Sumathi and Ramanathan, 1995, Sharma and Gupta, 2011), reaction to rust and late leaf spot diseases (Venkataravana *et al.*, 2008, Vishnuvardhan *et al.*, 2012) in both the seasons. The high genetic advance coupled with high heritability estimates for these traits suggested the importance of additive genetic variance and improvement of these characters could be made by simple phenotypic selection.

For shelling per cent, moderate genetic advance in both seasons were also estimated but in pooled analysis over two seasons it was low, indicating that it was also effected by environment. High heritability with low genetic advance indicates the greater role of non-additive genetic variance like epistatic and dominant interaction factors controlling the inheritance of these traits. These findings are on conformity with the results of Uddin *et al.* (1995), Shoba *et al.* (2008), Korat *et al.* (2009) for shelling per cent.

The other characters like protein content, oil content recorded high heritability with moderate to low expected genetic advance indicating the substantial contribution of additive genetic variance in the expression of these characters. These findings were in agreement with the results obtained by Kavera *et al.* (2008), Sharma and Gupta, (2011).

The results of the present study clearly indicated that significant amount of variability was present in advanced generation RILs. However, the variability generated to a large extent depends on the parental genotype for the trait under study.

5.2 Genetic variability for oil quality

5.2.1 Genotypic and phenotypic coefficient of variation

The extent of variability present in the material under study helps in planning breeding programmes aimed at improving the fatty acid profile for oil quality purpose, along with improvement for yield in groundnut. A keen observation of the phenotypic coefficient of variation and genotypic coefficient of variation for 11 fatty acid traits studied revealed that phenotypic coefficient of variation were slightly higher than the genotypic coefficient of variation thus indicating that these quality traits are less influenced by environment.

Oleic acid, arachidic acid and linoleic acid recorded low to moderate genotypic and phenotypic coefficient of variability estimates in recombinant inbred lines. However, the O/L ratio an important indicator of oil stability and nutritional quality recorded high GCV and PCV. These results are in conformity with the findings of Archana *et al.* (2007) in soybean and Kavera *et al.* (2008) in groundnut where they observed greater magnitude of variations for stearic acid, oleic acid, linoleic acid content and O/L ratio.

However, RILs lacked variability for palmitic acid, eicosenoic acid, behenic acid and lignoceric that are minor fatty acids present in low quantity in groundnut.

5.2.2 Heritability and genetic advance

In the present study, high heritability values coupled with high genetic advance were recorded for linoleic acid, and O/L ratio. This indicates that these characters are under the influence of additive gene action and prediction of high genetic advance supports better improvement for these traits.

On the other hand, all other minor fatty acids recorded high heritability coupled medium expected genetic advance including major fatty acid oleic acid and minor fatty acid arachidic acid indicating that these traits might be under the influence of additive and non additive gene action. High heritability with low genetic advance for other minor fatty acids rendering them not suitable for improvement through selection.

These results were also in agreement with the findings of Mollers and Schierholf (2002) in doubled haploid segregating population of the oil seed rape and Kavera *et al.* (2008) in groundnut.

5.3 Correlation studies for yield and yield components

Yield is a complex quantitative character governed by a large number of genes and is greatly affected by environmental fluctuations, the final yield being sum total effects of several component factors. Therefore, it is important to know the extent and nature of inter-relationship between pod yield and its contributory component traits and also among themselves. Hence, the selection of superior genotypes based on yield as such would not be effective. Association of yield components and yield thus, assumed special importance as the basis for selecting desired lines. The results on phenotypic and genotypic correlations between yield and its components in the present investigation are discussed below.

In this investigation, genotypic correlation coefficients were higher than phenotypic values indicating that strong intrinsic association are reduced at phenotypic level due to environmental effects. Higher genotypic correlation coefficients compared to phenotypic correlation coefficients have been reported by Nadaf and Habib (1989).

Pod yield was positively and significantly associated with pod weight per plant, days to 50 per cent flowering, days to maturity, kernel yield, oil yield, shelling per cent and 100 kernel weight. These results clearly indicate that indirect selection for yield in this mutant could be purely based on these traits. These results were in consonance with those of Shobhakuparani (1999), Nagda *et al.* (2001) for days to 50 per cent flowering, Ramesh Kumar *et al.* (1998), Sangha and Sandhu (1970) for oil yield, Abhay Dashora *et al.* (2002), Venkataramana (2001) for kernel yield.

Pod yield was significantly and negatively associated with reaction to rust and late leaf spot diseases as expected since these foliar diseases reduce the photosynthetic activity of the plant. The negative association was observed between rust, late leaf spot with pod yield by John *et al.* (2005).

Days to 50 per cent flowering was positively and significantly associated with days to maturity indicating that the number of days taken for 50 per cent flowering indirectly indicates days to maturity.

It was also evident that 100-kernel weight is positively associated with shelling percentage, indicating possibility of simultaneous improvement of both these traits these results were in agreement with the findings of Sangha (1973) who observed positive association of shelling percentage with 100-kernel weight.

The correlation studies indicated that pod weight per plant, 100-kernel weight, shelling per cent should be given greater weightage during selection for yield improvement in groundnut.

5.4 Correlation studies in fatty acid composition

Increasing the ratio of oleic acid to linoleic acid (O/L) in groundnut significantly improves the nutritional and quality attributes of the crop. Before formulation of suitable strategies to breed varieties with specific requirements like better quality groundnut, understanding the relationship among oil quality parameters and other agronomic and seed traits of economic importance would be essential for successful improvement.

Highly significant negative correlations of oleic acid with linoleic acid and palmitic acid were recorded whereas significant positive association was recorded between oleic acid and total unsaturated fatty acids. The inverse relationships between oleic acid with palmitic acid and linoleic acid was also evident from various earlier studies of Anderson *et al.* (1998), Bovi (1983) and Sekhon *et al.* (1980).

The negative relationship between palmitic acid and oleic acid was likely due to an increased rate of palmitic acid elongation to stearic acid with rapid desaturation to oleic acid via delta-9 desaturase (Groff *et al.*, 1996). An inverse relationship between linoleic acid, O/L ratio confirmed earlier reports by Braddock *et al.* (1995) and O'keefe *et al.* (1993). The strong negative correlation between oleic acid and linoleic acid results from these being the chief acyl desaturation of oleic acid leads to linoleic acid accumulation in the oil. Similar results were reported by Mercer *et al.* (1990) in groundnut. From these correlations it can be concluded that breeding for increased oleic acid normally results in reduced palmitic acid and linoleic acid. Eicosenoic acid was positively correlated with oleic acid. The synthesis of Eicosenoic acid from oleic acid requires only the addition of a two carbon moiety via acetyl coenzyme A (Anderson *et al.*, 1998).

Stearic acid had significant positive correlation with arachidic acid. Similar association between stearic acid and arachidic acid was reported by Lukonge *et al.* (2007) in cotton and Hammond *et al.* (1997) but it had significant and negative association with oleic acid. Similar results were also reported by Lajara *et al.* (1990). Eicosenoic acid was positively associated with lignoceric acid (Hammond *et al.*, 1997). Behenic acid and lignoceric acid were positively correlated with similar reports of Hammond *et al.*, 1997, who observed significant negative correlation between O/L ratio and saturated fatty acid.

All these observations clearly indicated that, it would be possible to extend the shelf life of oil and improve oil quality by genetic improvement of oleic acid content.

5.5 Superior recombinant inbred lines for economic traits and oil quality

5.5.1 Outstanding RILs for economic characters

Yield increment being the main objective in most of the plant breeding programmes, about 27 RILs in 2011 *Kharif* and 49 RILs in 2012 *Kharif* and 99 RILs in pooled analysis over two seasons recorded higher pod yield (kg/ha) compared to the high yielding check, G2-52 and most of these RILs had associated increased 100-seed weight and shelling per cent. Among them top ten RILs for pod yield were identified viz., RIL No. 449, 486, 600, 192, 718, 108, 470, 121, 748, 252 in 2011 *Kharif* season (Table 25) (Fig 2). In 2012 *Kharif* season, the top ten RILs that recorded higher yield compared to check were 709, 707, 570, 551, 723, 400, 162, 192, 750, 591 presented in the (Table 26) (Fig3). In pooled analysis over two seasons revealed stable high yielding varieties consistent over both seasons, viz. RIL no. 723, 192, 600, 718, 750, 363, 162, 333, 27, 470 as presented in the (Table 27) (Fig 4-6). All these recombinant inbred lines recorded moderate amount of O/L ratio, but all were significantly high were significantly high compared to parent, GPBD-4.

5.5.2 Outstanding RILs for 100-seed weight, oil content, protein content and shelling per cent

The quality traits viz. 100-seed weight, oil content and protein content largely determine the end use of groundnut genotypes for direct consumption or for oil extraction. Large seed size is one of the most important criteria when whole kernels are used for table purpose. Nevertheless, all the large seeded types may not possess the essential confectionery traits; hence, seed size coupled with the chemical composition would determine the worth of groundnut for direct consumption. Low oil content groundnuts are preferred from confectionery point of view due to increasing health awareness among the consumers.

The superior RILs identified with increased 100-seed weight play an important role in selection for large seeded genotypes. Among these, 40 lines recorded significantly increased 100-seed weight compared to the best check Dh-86 (44.25 g) in 2011 *Kharif* season. RIL 709 (48.75g), RIL 599 (47.75g), RIL 597 (47.50g), RIL 723 (47.25g), RIL 166 (46.75), RIL 316 (46.75), RIL 162 (46.50), RIL 332 (46.50), RIL 596 (46.50), RIL 463 (46.25g) were the best ten lines for 100-seed weight (Table 25). In 2012 *Kharif* season, top 10 RILs for 100-seed weight compared to the best check Dh-86 (44.25g) are 709 (46.75g), 599 (45.75g), 597 (45.50g), 723 (45.25g), 162 (44.75g), 166 (44.75g), 316 (44.75g), 332 (44.50g), 596 (44.50) and 463 (45.25g) (Table 26).

Groundnut is an important edible oil crop in India and hence improvement in oil content is of interest to the plant breeders. In the present investigation, the oil content in recombinant inbred lines identified for better oil content were 107 (50.50%), 335 (50.35%), 792 (50.04%), 225 (49.92%) and 201 (49.91%), but none of them were high compared to best check, Dh-86 (50.76%), however RIL 107 is on par with Dh-86 (50.76%) in 2011 *Kharif* (Table 25) and the same genotypes which were superior in 2011 *Kharif* were also superior in 2012 *Kharif* with exception of 107 (49.60%) that was on par with Dh-86 (49.85%) (Table 26).

Protein is an important nutritional component of groundnut seeds. Oilseeds have been recognized to play a valuable role as source of edible protein apart from their customary use as source of oil. Groundnut kernels are considered as an important source of vegetable protein as both the content and digestibility of groundnut protein is quite high (Sadhanakumari and Snehalatha, 1998). Higher the protein content more is the nutritional value. More than 100 RILs were recorded significantly higher protein content compared to the parent GM4-3 (32.60%) and best check G2-52 (31.27%) in 2011 *Kharif* season. Among these, RIL No. 59 (38.02%) recorded highest protein content followed by RIL 85 (37.99%). In 2012 *Kharif* also more than 100 RILs recorded high protein compared to check and parents. The same RIL No. 59 (35.72%) recorded highest protein content followed by RIL 85 (35.69%) compared to the best check, G2-52 (30.05%).

Table 25: Identification of superior Recombinant Inbred Lines (RILs) for economic traits and quality traits in 2011 *kharif* season

Sl.No	Genotypes Number (RIL NO.)	Pod yield (kg/ha)	Genotype Number (RIL NO.)	Kernel Yield (kg/ha)	Genotype Number (RIL NO.)	oil Yield (kg/ha)	Genotype Number (RIL NO.)	Oil content	Genotype Number (RIL NO.)	Protein content	Genotype Number (RIL NO.)	100 Kernel weight (g)	Genotype Number (RIL NO.)	Shelling (%)	Genotype Number (RIL NO.)	Oleic acid	Genotype Number (RIL NO.)	O/L ratio
1	449	6704.40	470	4926.26	598	2367.24	107	50.50	59	38.02	709	48.75	658	80.10	38	73.26	38	11.12
2	486	6637.80	192	4866.33	470	2353.85	335	50.35	85	37.99	599	47.75	589	77.55	39	70.87	39	9.48
3	600	6626.70	486	4781.08	449	2279.73	792	50.04	260	37.93	597	47.50	7	77.50	34	70.45	34	7.90
4	192	6515.70	589	4778.28	748	2266.65	225	49.92	195	37.85	723	47.25	308	77.40	812	70.45	812	7.90
5	718	6460.20	185	4739.07	185	2260.54	201	49.91	57	37.83	166	46.75	590	77.25	136	67.87	136	5.88
6	108	6449.10	748	4706.62	486	2253.43	106	49.81	101	37.62	316	46.75	499	77.15	816	66.94	816	5.81
7	470	6426.90	449	4686.83	19	2247.19	806	49.66	76	37.44	162	46.50	544	77.15	815	66.24	247	5.11
8	121	6360.30	600	4663.90	192	2233.13	455	49.66	80	37.43	332	46.50	610	77.15	438	66.08	815	5.03
9	748	6360.30	121	4652.38	200	2231.83	632	49.61	592	37.40	596	46.50	415	77.10	813	66.0	440	4.92
10	252	6315.90	610	4641.64	600	2213.45	611	49.60	94	37.37	463	46.25	498	76.90	805	66.0	438	4.90
checks	G2-52 GPBD-4 JL-24	5416.80 5028.30 4928.40	G2-52 GPBD-4 JL-24	3874.01 3610.21 3572.54	G2-52 JL-24 GPBD-4	1849.46 1721.91 1711.14	DH-86 GM4-3 JL-24	50.76 50.07 48.23	GM6-1 GM4-3 G2-52	33.80 32.36 31.27	DH-86 JL-24 TMV-2	44.25 44.00 43.75	DH-86 GM4-3 JL-24	75.50 72.70 72.50	GM4-3 GM6-1 G2-52	69.48 69.00 54.41	GM4-3 GM6-1 G2-52	6.12 5.77 2.19
	CD 5% CD 1%	405.10 532.84		348.57 458.41		188.45 247.87		3.28 4.31		0.70 0.92		2.38 3.13		4.82 6.32		2.95 3.88		0.70 0.92

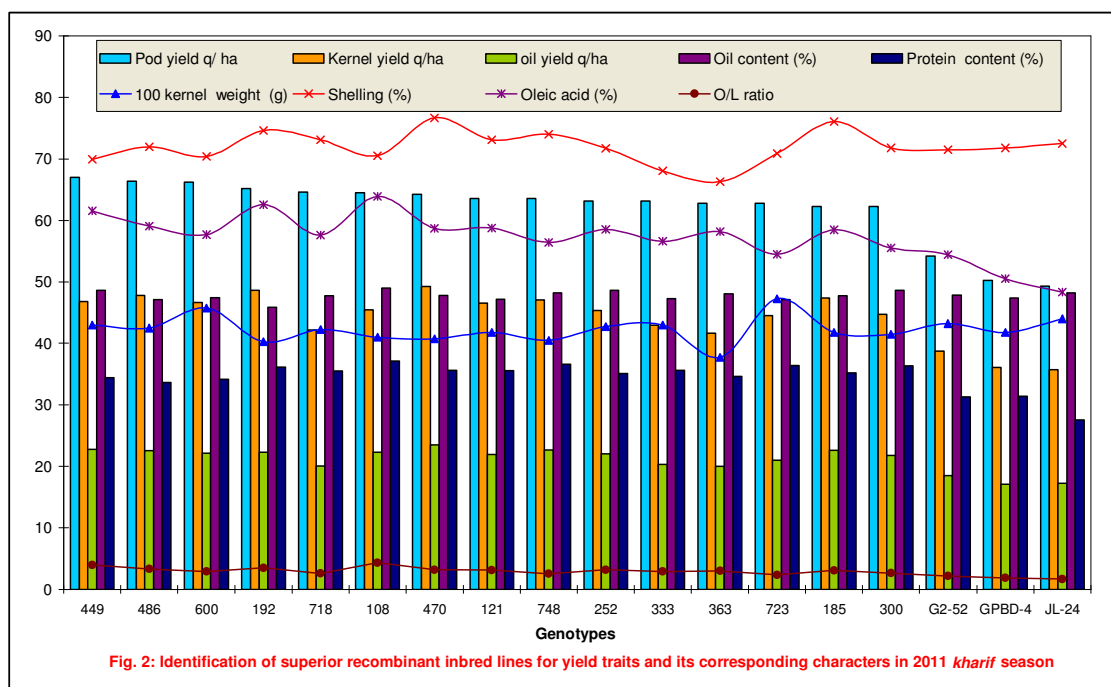


Fig. 2: Identification of superior recombinant inbred lines for yield traits and its corresponding characters in 2011 kharif season

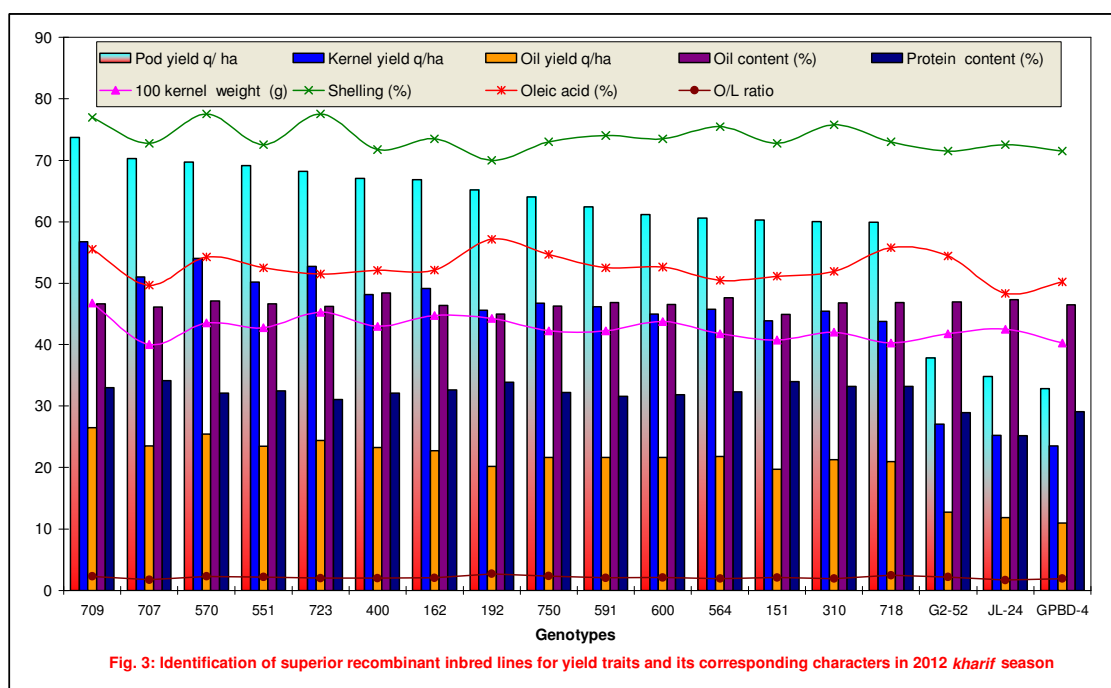


Fig. 3: Identification of superior recombinant inbred lines for yield traits and its corresponding characters in 2012 kharif season

Table 26: Identification of superior Recombinant Inbred Lines for economic traits and quality traits in 2012 *kharif* season

Sl.No	Genotypes Number (RIL NO.)	Pod yield (kg/ha)	Genotype Number (RIL NO.)	Kernel Yield (kg/ha)	Genotype Number (RIL NO.)	oil Yield (kg/ha)	Genotype Number (RIL NO.)	Oil content	Genotype Number (RIL NO.)	Protein content	Genotype Number (RIL NO.)	100 Kernel weight (g)	Genotype Number (RIL NO.)	Shelling (%)	Genotype Number (RIL NO.)	Oleic acid	Genotype Number (RIL NO.)	O/L ratio
1	709	7370.40	709	5674.54	709	2648.23	107	49.60	59	35.72	709	46.75	711	77.75	812	76.13	812	14.61
2	707	7026.30	570	5402.59	570	2543.17	335	49.44	85	35.69	599	45.75	327	77.50	38	73.55	38	11.81
3	570	6970.80	723	5276.83	723	2441.00	792	49.12	260	35.63	597	45.50	570	77.50	34	71.56	34	8.56
4	551	6915.30	707	5100.89	707	2351.56	225	49.02	195	35.54	723	45.25	723	77.50	39	71.50	816	8.54
5	723	6815.40	551	5016.42	551	2342.52	201	49.01	57	35.53	162	44.75	48	77.25	816	70.16	39	7.75
6	400	6704.40	162	4914.08	400	2328.87	106	48.91	101	35.32	166	44.75	713	77.25	813	67.15	815	5.97
7	162	6682.20	400	4814.29	162	2275.57	806	48.76	76	35.13	316	44.75	728	77.25	815	67.11	813	5.94
8	192	6515.70	750	4673.15	564	2183.14	455	48.75	80	35.13	332	44.50	398	77.00	438	66.07	440	4.92
9	750	6404.70	591	4618.15	591	2163.26	632	48.71	592	35.10	596	44.50	709	77.00	805	65.99	438	4.90
10	591	6238.20	600	4497.88	750	2161.53	611	48.70	94	35.07	463	44.25	719	77.00	440	64.91	805	4.70
checks	G2-52 JL-24 GPBD-4	3785.1 3485.4 3285.6	G2-52 JL-24 GPBD-4	2705.51 2520.03 2350.53	G2-52 JL-24 GPBD-4	1272.60 1184.69 1093.96	Dh-86 GM4-3 JL-24	49.85 49.16 47.33	GM6-1 GM4-3 G2-52	31.50 30.06 30.05	Dh-86 JL-24 TMV-2	44.25 42.50 42.25	Dh-86 GM4-3 JL-24	75.50 73.00 72.50	GM4-3 GM6-1 G2-52	70.42 69.00 54.41	GM4-3 GM6-1 G2-52	6.75 5.76 2.19
	CD 5% CD 1%	1068.28 1405.14		796.94 1048.25		381.97 502.42		3.28 4.31		2.29 3.01		2.32 3.06		3.80 5.00		3.38 4.45		0.59 0.78

Table 27: Identification of superior Recombinant Inbred Lines for economic traits and quality traits in pooled analysis of 2011 and 2012 *kharif* seasons

Sl.No	Genotypes Number (RIL NO.)	Pod yield (kg/ha)	Genotype Number (RIL NO.)	Kernel Yield (kg/ha)	Genotype Number (RIL NO.)	oil Yield (kg/ha)	Genotype Number (RIL NO.)	Oil content	Genotype Number (RIL NO.)	Protein content	Genotype Number (RIL NO.)	100 Kernel weight (g)	Genotype Number (RIL NO.)	Shelling (%)	Genotype Number (RIL NO.)	Oleic acid	Genotype Number (RIL NO.)	O/L ratio
1	723	6549.00	723	4865.83	723	2270.00	107	50.05	59	36.87	709	47.75	544	76.58	38	73.41	38	11.47
2	192	6515.70	600	4580.89	600	2187.49	335	49.90	85	36.84	599	46.75	658	76.55	812	73.29	812	11.26
3	600	6371.40	162	4414.78	162	2062.52	792	49.59	260	36.78	597	46.50	313	76.33	39	71.19	39	8.62
4	718	6227.10	192	4389.76	718	2053.70	225	49.47	195	36.70	723	46.25	709	76.33	34	71.01	34	8.24
5	750	6005.10	750	4369.27	470	2046.71	201	49.46	57	36.69	166	45.75	550	76.13	816	68.55	816	7.18
6	363	5988.45	470	4319.22	750	2041.07	106	49.36	101	36.48	316	45.75	64	75.98	815	66.68	815	5.55
7	162	5949.45	718	4296.95	363	1999.89	455	49.21	76	36.29	162	45.63	715	75.88	813	66.57	813	5.36
8	333	5899.65	363	4203.33	27	1998.70	806	49.21	80	36.28	332	45.50	308	75.83	438	66.08	440	4.92
9	27	5799.75	27	4198.95	192	1996.94	632	49.17	592	36.25	596	45.50	415	75.80	805	66.00	438	4.91
10	470	5799.75	333	4170.20	333	1952.89	611	49.16	94	36.22	463	45.25	728	75.70	440	64.91	805	4.7
checks	G2-52 JL-24 GPBD-4	4600.95 4206.90 4156.95	G2-52 JL-24 GPBD-4	3289.76 3048.06 2980.59	G2-52 JL-24 GPBD-4	1561.05 1453.30 1402.49	Dh-86 GM4-3 G2-52	50.31 49.62 47.40	GM6-1 GM4-3 GPBD-4	32.65 31.21 30.26	Dh-86 JL-24 TMV-2	44.25 43.25 43.00	Dh-86 GM4-3 JL-24	75.50 72.85 72.50	GM4-3 GM6-1 G2-52	69.96 69.00 54.41	GM4-3 GM6-1 G2-52	6.43 5.77 2.19
	CD 5% CD 1%	28.13 36.95		24.55 32.24		17.17 22.56		1.62 2.13		1.49 1.97		1.51 1.99		2.06 2.70		1.76 2.31		0.79 1.05

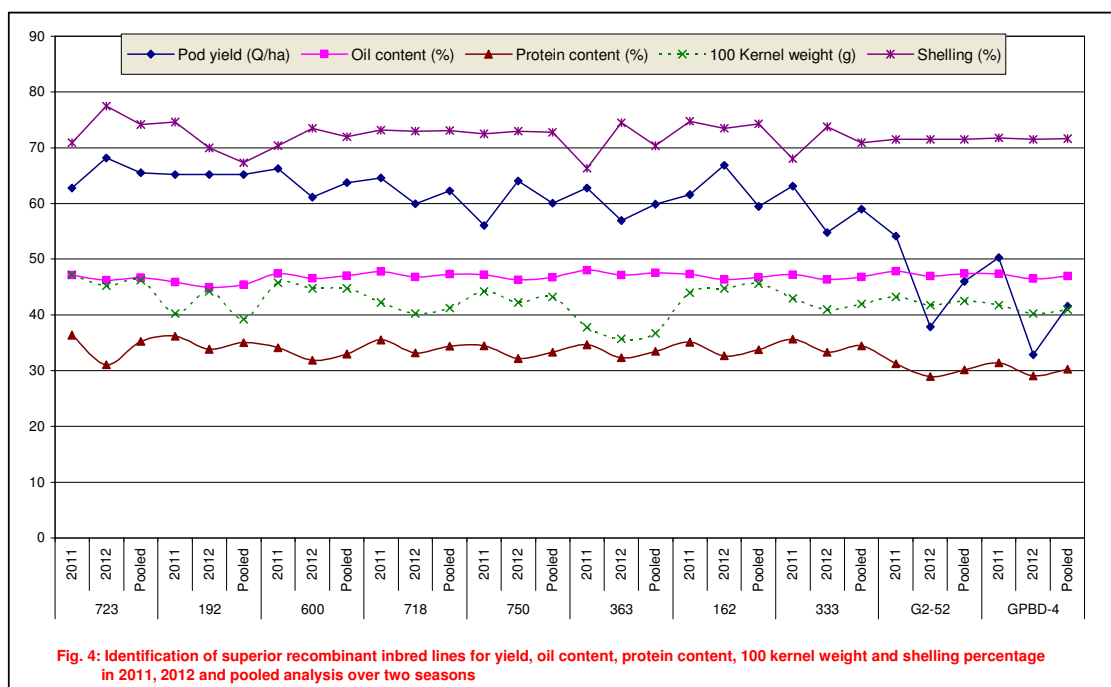


Fig. 4: Identification of superior recombinant inbred lines for yield, oil content, protein content, 100 kernel weight and shelling percentage in 2011, 2012 and pooled analysis over two seasons

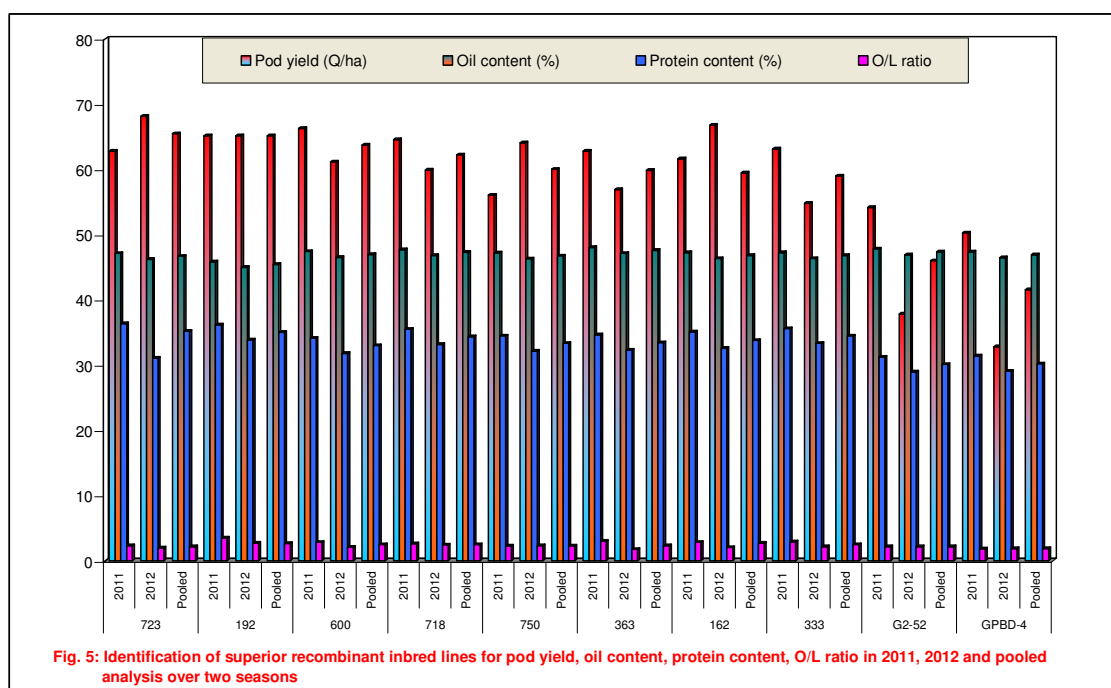


Fig. 5: Identification of superior recombinant inbred lines for pod yield, oil content, protein content, O/L ratio in 2011, 2012 and pooled analysis over two seasons

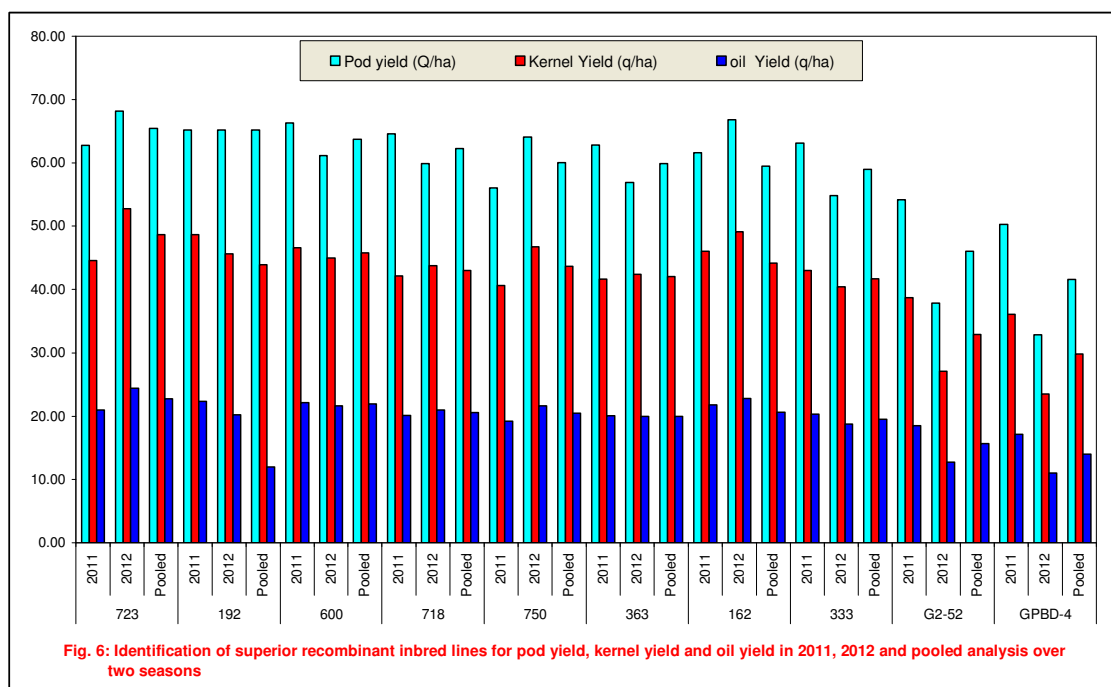


Fig. 6: Identification of superior recombinant inbred lines for pod yield, kernel yield and oil yield in 2011, 2012 and pooled analysis over two seasons

Shelling percentage is an important trait contributing to the final kernel yield and oil yield. The superior recombinant inbred lines identified in 2011 *Kharif* season ranged from 76.90 per cent (498) to 80.10 per cent (658) for this trait compared to the best check, Dh-86 (75.50 %) (Table 25). Whereas in 2012 *Kharif* season, it ranged from 77.00 per cent (719) to 77.75 per cent (711) compared to check Dh-86 (76.50 %) (Table 26).

The superior recombinant inbred lines identified in the present study for respect 100-kernel weight, protein, oil content and shelling percentage could be used in future breeding programmes aiming towards improvement of these quality traits and for confectionery purpose. These RILs need to be tested further for confirming their superiority in large scale evaluation.

5.5.3 Outstanding recombinant inbred lines for fatty acid profile

The superior recombinant inbred lines identified for high oleic acid content indicates greatly improved oil quality with reference to higher proportions of oleic acid (C18:1) and lower percentage of linoleic acid (C18:2) and palmitic acid (C16:0).

Advanced breeding lines *viz.* RIL no 38 (11.47) had increased O/L ratio that was six folds higher compared to parent GPBD-4 (1.89) (Table 33) (Fig 7).

Four RILs recorded above 70 per cent oleic acid and five had above 65 per cent oleic acid and about 40 RILs were with above 60 per cent oleic acid. Top ten RILs that were consistent for high oleic acid over two seasons were RIL no.38, 812, 39, 34, 816, 815, 813, 438, 805, 440 that are presented in Table 33 (Fig 7).

In the present investigations most of the high oleic acid RILs identified were also significantly superior for other quality traits *viz.*, protein content and oil content. Among them two genotypes *i.e.* RIL No 440 (4890 kg/ha) and RIL No 438 (4784kg/ha) showed high yield and resistance to rust and late leaf spot diseases as in case of standard checks GPBD-4 (4157 kg/ha) and G2-52 (4600kg/ha). These results confirmed the findings of Kavera *et al.* (2008) who reported that seed yield, oil content and protein content were unaffected by selection for changes in oleic acid content in groundnut. Results of the present findings and reports from earlier works indicate that selection for increased oleic acid was not associated with other undesirable agronomic traits. Thus, it would be possible to extend the shelf- life of oil and enhance oil quality by genetically altering the fatty acid composition.

Table 28: Identification of superior Recombinant Inbred Lines for economic traits and quality traits among selected lines evaluated in 2012 *kharif* season

Sl.No	Genotypes Number (RIL NO.)	Pod yield (kg/ha)	Genotype Number (RIL NO.)	Kernel Yield (kg/ha)	Genotype Number (RIL NO.)	oil Yield (kg/ha)	Genotype Number (RIL NO.)	Oil content	Genotype Number (RIL NO.)	Protein content	Genotype Number (RIL NO.)	100 Kernel weight (g)	Genotype Number (RIL NO.)	Shelling (%)	Genotype Number (RIL NO.)	Oleic acid	Genotype Number (RIL NO.)	O/L ratio
1	162	5586.12	162	4328.82	162	2104.82	41	49.39	130	35.46	228	45.75	212	79.50	812	75.14	816	13.62
2	92	5111.12	718	4009.00	92	1897.36	358	49.37	443	35.36	136	45.00	136	79.25	816	73.50	812	13.59
3	718	5075.00	92	3935.70	718	1849.84	449	19.26	150	35.07	812	45.00	180	79.25	39	71.50	39	7.76
4	108	5044.45	520	3728.17	91	1783.04	64	19.18	11	35.05	526	44.50	812	79.25	443	61.69	443	3.78
5	456	4969.45	108	3706.67	108	1780.34	236	19.03	185	35.02	737	44.25	449	79.00	197	60.34	192	3.33
6	437	4961.12	456	3677.39	520	1764.57	48	48.91	197	35.02	212	44.00	718	79.00	102	59.88	449	3.29
7	520	4922.23	60	3677.00	456	1762.15	168	48.83	5	34.98	266	44.00	102	78.75	449	59.76	102	3.18
8	106	4858.34	91	3674.70	106	1751.75	355	48.69	358	34.97	233	43.75	64	78.50	600	58.86	600	3.02
9	60	4775.00	106	3643.46	437	1750.62	537	48.67	192	34.65	255	43.50	173	78.50	10	58.70	10	2.97
10	600	4663.89	195	3642.42	266	1742.61	102	48.65	439	34.60	130	43.25	191	78.50	486	58.59	161	2.95
checks	GM4-3 G2-52 GPBD-4	3744.45 3600.00 3430.56	GM4-3 GPBD-4 G2-52	2789.84 2504.34 2174.97	GM4-3 GPBD-4 G2-52	1327.08 1228.57 1052.93	GPBD-4 G2-52 GM6-1	49.05 48.42 47.88	Gm4-3 G2-52 GPBD-4	34.68 33.99 31.15	Dh-86 JL-24 TMV-2	44.25 42.50 42.25	Dh-86 GM4-3 GPBD-4	75.50 74.50 73.00	GM4-3 GM6-1 G2-52	72.21 69.00 54.78	GM4-3 GM6-1 G2-52	8.38 5.77 2.19
	CD 5% CD 1%	220.74 292.35		211.60 280.24		138.07 182.85		3.01 3.79		4.29 5.68		3.02 4.00		3.76 4.98		3.01 3.99		0.61 0.80

Table 29: Top 20 superior Recombinant Inbred Lines for yield traits and its corresponding characters in 2011 *kharif* season

Sl.No	Genotypes Number RIL.NO	Pod yield (kg/ha)	Kernel Yield(kg/ha)	oil Yield (kg/ha)	Oil content	Protein content	100 Kernel weight (g)	Shelling (%)	Oleic acid	O/L ratio
1	449	6704.4	4686.83	2279.73	48.63	34.42	43	69.95	61.53	3.99
2	486	6637.8	4781.08	2253.43	47.14	33.65	42.5	72	59.05	3.29
3	600	6626.7	4663.9	2213.45	47.45	34.15	45.75	70.4	57.67	2.89
4	192	6515.7	4866.33	2233.13	45.87	36.19	40.25	74.65	62.58	3.52
5	718	6460.2	4219.28	2008.15	47.75	35.52	42.25	73.15	57.64	2.62
6	108	6449.1	4546.65	2229.11	49.01	37.13	41	70.5	63.87	4.36
7	470	6426.9	4926.9	2353.85	47.78	35.6	40.75	76.65	58.69	3.22
8	121	6360.3	4652.38	2197.08	47.22	35.58	41.75	73.15	58.78	3.15
9	748	6360.3	4706.62	2266.65	48.25	36.6	40.5	74	56.4	2.53
10	252	6315.9	4530.61	2205.23	48.67	35.08	42.75	71.75	58.54	3.22
11	333	6315	4297.22	2030.2	47.26	35.63	43	68.05	56.58	2.9
12	363	6282.6	4166.56	2001.21	48.04	34.64	37.75	66.3	58.16	3.04
13	723	6280	4454.83	2099	47.13	36.39	47.25	70.9	54.47	2.38
14	185	6227.1	4739.07	2260.54	47.72	35.21	41.75	76.1	58.46	3.06
15	300	6227	4471.56	2175.88	48.62	36.34	41.5	71.8	55.51	2.66
16	162	6160.5	4605.04	2178.04	47.28	35.12	44	74.75	57.81	2.87
17	722	6060.6	4408.39	2106.99	47.79	34.81	43.25	72.7	56.25	2.58
18	610	6016.2	4641.64	2208.39	47.57	34.18	42	77.15	56.21	2.67
19	27	5794.2	4099.1	1971.45	48.1	36.48	42.75	70.75	57.23	2.82
20	750	5605.5	4065.38	1920.51	47.2	34.49	44.25	72.5	54.36	2.28
checks	G2-52	5416.8	3874.01	1849.43	47.85	31.27	43.25	71.5	54.41	2.19
	GPBD-4	5028.3	3610.21	1711.14	47.39	31.41	41.75	71.8	50.54	1.87
	JL-24	4928.4	3572.54	1721.91	48.23	27.52	44	72.5	48.37	1.67
	Mean	3870.06	2763.33	1314.81	47.5	34.47	40.51	70.75	56.86	2.87
CD 5%		405.1	348.57	188.45	3.28	0.7	2.38	4.82	2.95	0.7
CD 1%		532.84	458.41	247.87	4.31	0.92	3.13	6.32	3.88	0.92

Table 30: Top 20 superior Recombinant Inbred Lines for yield traits and quality traits in 2012 *kharif* season

Sl.No	Genotypes (RIL NO.)	Pod yield (kg/ha)	Kernel Yield (kg/ha)	oil Yield (kg/ha)	Oil content	Protein content	100 Kernel weight (g)	Shellin (%)	Oleic acid	O/L ratio
1	709	7370.4	5674.54	2648.23	46.67	32.99	46.75	77	55.54	2.27
2	707	7026.3	5100.9	2351.56	46.13	34.09	40	72.75	49.67	1.75
3	570	6970.8	5402.59	2543.17	47.07	32.1	43.5	77.5	54.24	2.29
4	551	6915.3	5016.42	2342.52	46.65	32.52	42.75	72.5	52.53	2.2
5	723	6815.4	5276.83	2441.00	46.23	31.06	45.25	77.5	51.46	2.01
6	400	6704.4	4814.29	2328.87	48.41	32.16	43	71.75	52.07	1.98
7	162	6682.2	4914.08	2275.57	46.34	32.63	44.75	73.5	52.12	2.05
8	192	6515.7	4560.19	2018.23	44.97	33.89	44.25	70	57.12	2.73
9	750	6404.7	4673.15	2161.62	46.3	32.18	42.25	73	54.66	2.36
10	591	6238.2	4618.15	2163.26	46.85	31.56	42.25	74	52.5	2.06
11	600	6116.1	4497.887	2161.53	46.55	31.84	43.75	73.5	52.64	2.12
12	564	6060.6	4577.75	2183.14	47.6	32.34	41.75	75.5	50.48	1.9
13	151	6027.3	4388.83	1972.59	44.89	34.01	40.75	72.75	51.09	2.09
14	310	6005.1	4547.61	2127.62	46.78	33.2	42	75.75	51.88	1.9
15	718	5994	4374.62	2099.24	46.84	33.21	40.25	73	55.77	2.46
16	502	5927.4	4242.53	1936.63	45.66	30.78	40.5	71.5	51.33	2.03
17	712	5838.6	4364.18	2095.14	48.01	32.97	42.75	74.75	49.83	1.8
18	363	5694.3	4240.08	1998.56	47.13	32.34	35.75	74.5	47.77	1.77
19	443	5594.4	4128.2	1947.27	47.09	32.56	38.5	73.75	52.43	2.08
20	333	5483.4	4043.17	1875.58	46.35	33.33	41	73.75	53.49	2.2
checks	G2-52	3785.1	2705.51	1272.6	46.94	28.96	41.75	71.5	54.41	2.19
	JL-24	3485.4	2523.58	1184.69	47.33	25.21	42.5	72.5	48.36	1.66
	GPBD-4	3285.6	2350.98	1098.84	46.49	29.1	40.25	71.5	50.2	1.91
	MEAN	3739.661	2661.32	1243.48	46.6	32.17	38.53	69.91	52.07	2.16
CD 5%		1068.28	796.94	381.97	3.28	2.29	2.32	3.8	3.38	0.59
CD 1%		1405.14	1048.25	502.42	4.31	3.01	3.06	5.00	4.45	0.78

Table 31: Top 10 superior Recombinant Inbred Lines for yield traits and its corresponding characters in pooled analysis over two seasons

Sl.No	Genotypes (RIL NO.)	Pod yield (kg/ha)	Kernel Yield (kg/ha)	Oil Yield (kg/ha)	Oil content	Protein content	100 Kernel Weight (g)	Shelling (%)	Oleic acid	O/L ratio
1	723	6549.00**	4865.83**	2270.00**	46.68	35.24**	46.25**	74.2*	52.97	2.20
2	192	6515.70**	4389.76**	1196.94**	45.43	35.04**	39.25	67.33	54.34	2.69
3	600	6371.40**	4580.89**	2187.49**	47.01	33.00**	44.75*	71.95	55.16	2.51
4	718	6227.10**	4296.95**	2053.70**	47.30	34.37**	41.25	73.08	56.71	2.55
5	750	6005.10**	4369.27**	2041.07**	46.75	33.34**	43.25	72.75	54.51	2.30
6	363	5988.45**	4203.33**	1999.89**	47.59	33.49**	36.75	70.40	52.97	2.38
7	162	5949.45**	4414.78**	2062.52**	46.79	33.79**	45.63**	74.28*	55.91	2.74
8	333	5899.65**	4170.20**	1952.89**	46.81	34.49**	42.00	70.90	55.04	2.55
9	27	5799.75**	4198.95**	1998.70**	47.66	34.34**	41.75	72.38	57.1**	2.7
10	470	5799.75**	4319.22**	2046.71**	47.33	34.55**	39.75	74.08*	55.06	2.63
checks	G2-52	4600.95	3289.76	1561.02	47.40	30.12	42.50	71.5	54.41	2.19
	JL-24	4206.90	3048.06	1453.30	47.79	26.37	43.25	72.50	48.37	1.67
	GPBD-4	4156.95	2980.59	1402.49	46.95	30.26	41.00	71.65	50.37	1.89
	MEAN	3804.86	2712.32	1279.15	47.05	33.32	39.52	70.33	54.47	2.52
CD 5%		28.13	24.55	17.17	1.62	1.49	1.51	2.06	1.76	0.79
CD 1%		36.95	32.24	22.56	2.13	1.97	1.99	2.20	2.31	1.05

Table 32: Top 10 superior Recombinant Inbred Lines for economic traits and quality traits among selected lines evaluated in 2012 *kharif* season

Sl.No	Genotypes Number (RIL NO.)	Pod yield (kg/ha)	Kernel Yield (kg/ha)	oil Yield (kg/ha)	Oil content	Protein content	100 Kernel weight (g)	Shelling (%)	Oleic acid	O/L ratio
1	162	5586.12**	4328.82**	2104.82**	48.63	33.01	39.25	77.50	55.10	2.39
2	92	5111.12**	3935.70**	1897.36**	48.19	32.85	43.00*	77.00	57.88	2.82
3	718	5075.00**	4009.00**	1849.84**	46.16	32.67	41.5	79.00*	53.96	2.27
4	108	5044.45**	3706.67**	1780.34**	48.03	33.95	41.50	74.50	52.37	2.10
5	456	4969.45**	3667.39**	1762.15**	47.92	32.39	41.50	74.00	57.62	2.66
6	437	4961.12**	3633.05**	1750.62**	48.19	33.64	43.00*	73.25	56.64	2.63
7	520	4922.23**	3728.17**	1764.57**	47.33	33.46	40.50	75.75	55.83	2.51
8	106	4858.34**	3643.46**	1751.75**	48.10	32.00	38.75	75.50	54.44	2.30
9	60	4775.00**	3677.00**	1698.38**	46.18	33.22	41.00	77.00	57.66	2.60
10	600	4663.89**	3532.86**	1669.12**	48.08	31.06	41.75	77.00	58.86	3.02
checks	GM4-3 G2-52 GPBD-4	3744.45	2789.84	1327.08	47.56	34.38	39.95	74.50	72.21	8.38
		3600.00	2610.00	1314.26	49.37	32.33	41.25	72.50	55.20	2.30
		3430.56	2054.34	1228.57	49.05	31.99	38.70	73.00	50.56	1.80
	MEAN	3752.63	2821.29	1344.52	47.67	32.76	40.86	74.83	56.20	2.86
CD 5%		220.74	211.60	138.07	3.01	4.29	3.02	3.76	3.01	0.61
CD 1%		292.35	280.24	182.85	3.79	5.68	4.00	4.98	3.99	0.80

Table 33: Identification of superior Recombinant Inbred Lines for high oleic acid and their corresponding characters

Sl.No	Genotypes (RIL NO.)	season	Oleic acid	Linoleic acid	O/L ratio	Saturated fatty acid (%)	Protein (%)	Oil (%)	Pod yield (kg/ha)	Kernel Yield (kg/ha)	Oil yield	90 days rust	90 days LLS
1	38	2011	73.26	39.50	11.12	18.11	36.22	48.55	3230.10	2282.37	1106.92	6.00	4.00
		2012	73.56	37.50	11.81	18.18	33.92	47.65	2464.20	1669.00	797.61	6.50	3.50
		pooled	73.41	6.49	11.47	18.15	35.08	48.10	2847.15	1975.68	952.26	6.25	3.75
2	812	2011	70.45	40.25	7.90	18.12	31.30	47.75	3807.30	2667.09	1271.56	6.00	8.00
		2012	76.13	38.25	14.61	17.82	29.00	46.85	2852.70	2005.49	929.51	6.00	8.00
		pooled	73.29	7.39	11.26	17.97	30.15	47.30	3330.00	2336.29	1100.54	6.00	8.00
3	39	2011	70.87	37.75	9.48	18.56	35.02	46.48	4440.00	3025.72	1406.11	5.00	4.00
		2012	71.50	35.75	7.76	17.97	32.72	45.58	1964.70	1197.97	549.44	5.50	3.00
		pooled	71.19	8.80	8.62	18.27	33.87	46.03	3202.35	2111.84	977.78	5.25	3.50
4	34	2011	70.45	38.00	7.90	18.12	34.78	46.76	3252.30	2327.29	1088.27	7.00	4.00
		2012	71.56	36.00	8.57	18.04	32.48	45.86	3685.20	2451.99	1124.56	6.00	3.50
		pooled	71.01	8.84	8.24	18.08	33.64	46.31	3468.75	2389.64	1106.42	6.50	3.75
5	816	2011	66.94	38.00	5.81	18.84	33.50	45.97	2331.00	1615.45	742.58	5.00	6.00
		2012	70.17	36.00	8.55	19.52	31.20	45.07	4140.30	2688.81	1211.59	6.00	7.50
		pooled	68.55	10.03	7.18	19.18	32.35	45.52	3235.65	2152.13	977.09	5.50	6.75
6	815	2011	66.24	38.50	5.03	19.20	36.67	46.31	2719.50	1927.12	892.64	5.50	8.00
		2012	67.11	36.50	5.98	18.74	34.37	45.41	2275.50	1548.40	703.65	5.00	6.00
		pooled	66.68	12.32	5.50	18.97	35.52	45.86	2497.50	1737.75	798.14	5.25	7.00

7	813	2011	66.00	41.00	4.78	18.93	36.13	48.53	2608.50	1772.33	860.11	6.00	9.00
		2012	67.15	39.00	5.95	18.99	33.83	47.63	4084.80	2926.85	1391.10	5.50	8.00
		pooled	66.57	12.91	5.36	18.96	34.98	48.08	3346.65	2349.59	1125.60	5.75	8.50
8	438	2011	66.08	13.47	4.90	18.92	34.86	48.90	5605.50	3976.74	1944.67	3.00	3.00
		2012	66.08	38.25	4.90	18.92	32.56	48.00	3962.70	2683.48	1287.24	3.00	3.00
		Pooled	66.08	13.48	4.91	18.92	33.71	48.45	4784.10	3330.11	1615.95	3.00	3.00
9	805	2011	66.00	40.00	4.70	18.81	35.15	47.71	3807.30	2644.03	1261.28	5.50	6.50
		2012	66.00	38.00	4.70	18.81	32.85	46.81	3374.40	2408.76	1122.95	5.50	6.50
		pooled	66.00	14.08	4.70	18.81	34.01	47.27	3590.85	2526.39	1192.12	5.50	6.50
10	440	2011	64.91	40.00	4.92	19.54	34.61	47.53	4140.30	3029.76	1440.81	3.00	3.00
		2012	64.91	38.00	4.92	19.54	32.31	46.63	5638.80	3968.25	1851.68	3.00	3.00
		pooled	64.91	13.62	4.92	19.54	33.47	47.08	4889.55	3499.00	1646.24	3.00	3.00
checks	GM4-3	2011	69.48	11.39	6.12	18.42	32.36	50.07	3785.10	2751.80	1378.22	3.00	3.00
		2012	70.43	10.46	6.75	18.55	30.06	49.17	2941.50	2147.30	1064.31	3.00	3.00
		pooled	69.96	10.93	6.43	18.48	31.21	49.62	3363.30	2449.55	1221.27	3.00	3.00
	GM6-1	2011	69.00	12.08	5.77	18.15	33.80	46.12	3707.40	2539.68	1171.50	3.00	3.00
		2012	69.00	12.08	5.77	18.15	31.50	45.22	2730.60	1869.46	844.45	3.00	3.00
		Pooled	69.00	12.08	5.77	18.15	32.65	45.67	3219.00	2204.57	1007.97	3.00	3.00
	GPBD-4	2011	50.54	41.75	1.87	20.80	31.41	47.39	5028.30	3610.21	1711.14	3.00	3.00
		2012	50.20	40.25	1.91	21.07	29.11	46.49	3285.60	2350.98	1093.85	3.00	3.00
		pooled	50.37	26.67	1.89	20.94	30.26	46.95	4156.95	2980.59	1402.49	3.00	3.00
	CD at 5% CD at 1%	2011	2.95	2.95	0.70	1.55	2.30	3.28	405.10	348.57	188.45	0.33	0.44
			3.88	3.88	0.92	2.04	3.02	4.31	532.84	458.49	247.87	0.43	0.58
	CD at 5% CD at 1%	2012	3.38	2.85	0.59	0.85	2.29	3.28	1068.28	796.9	381.14	0.38	0.42
			4.45	3.76	0.78	1.11	3.01	4.31	1405.14	1048.25	502.42	0.42	0.55
	CD at 5% CD at 1%	pooled	1.76	1.68	0.79	0.87	1.49	1.62	19.30	18.55	15.09	0.55	0.65
			2.31	2.20	1.05	1.16	4.46	1.97	28.30	24.55	17.17	0.76	0.87

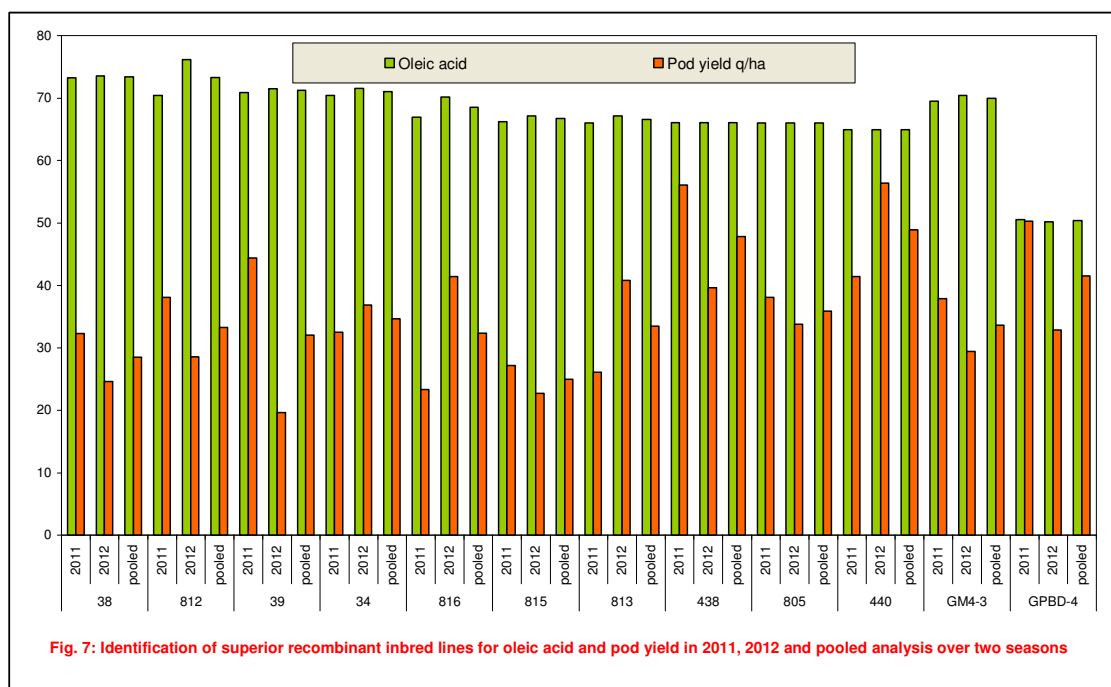


Fig. 7: Identification of superior recombinant inbred lines for oleic acid and pod yield in 2011, 2012 and pooled analysis over two seasons

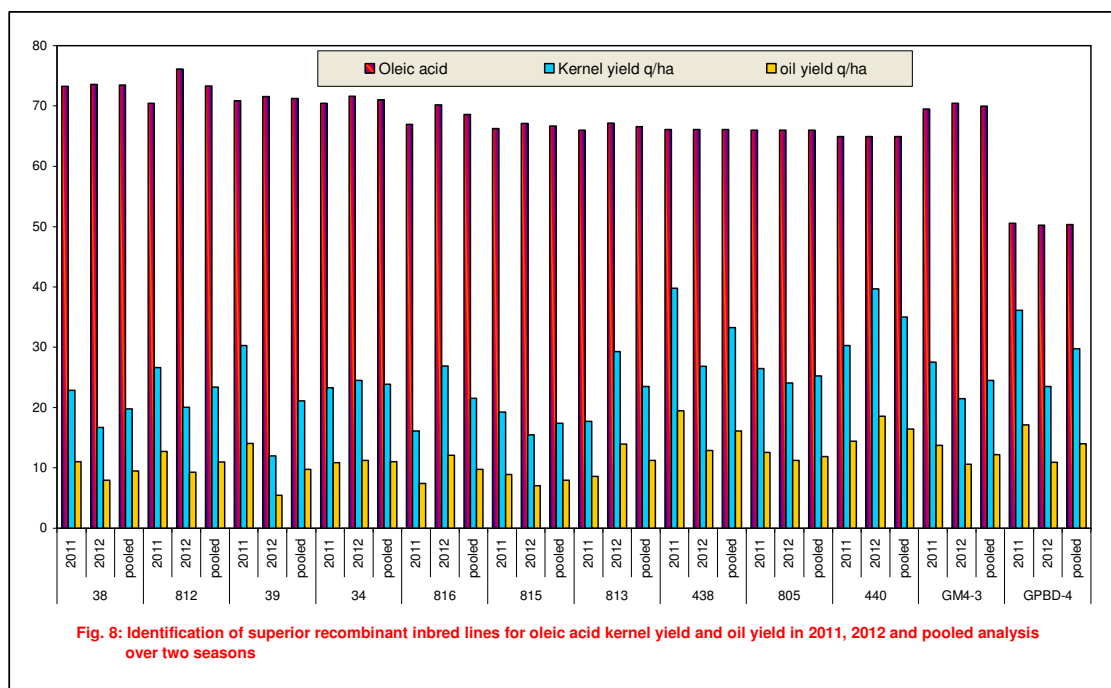


Fig. 8: Identification of superior recombinant inbred lines for oleic acid kernel yield and oil yield in 2011, 2012 and pooled analysis over two seasons

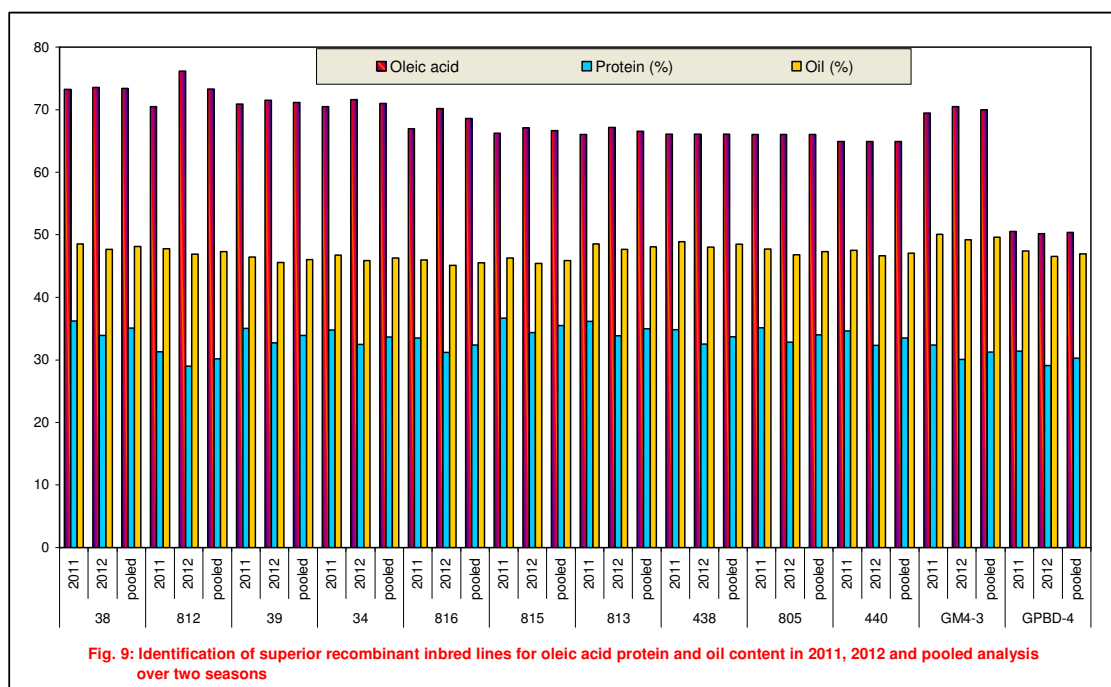


Fig. 9: Identification of superior recombinant inbred lines for oleic acid protein and oil content in 2011, 2012 and pooled analysis over two seasons

Future line of work

1. A number of recombinant inbred lines were observed to be significantly superior for individual characters compared to the checks. In addition superior RILs for combination of characters viz., pod yield and its components in both the seasons in RILs were identified. These identified lines from both the seasons may be further evaluated preferably over locations, seasons and in larger plot size to confirm their superiority and stability
2. Superior recombinant inbred lines identified with desirable fatty acid profile need to be further tested for their agronomic performance in large scale trials over locations and seasons.
3. Selected RILs can be used in future breeding programmes to improve oil quality of the high yielding cultivars in groundnut by using them as one of the parent in hybridization.

SUMMARY AND CONCLUSIONS

The present investigation was conducted during 2011 and 2012 *Kharif* seasons at the Main Agricultural Research Station, University of Agricultural Sciences, Dharwad to study the variability for yield and its component traits, oil content, protein content and oil quality in groundnut and their association with yield and its components.

A total of 816 RILs derived from the cross GPBD x GM4-3 in F_7 generation were evaluated along with two parents and five checks in Randomized Block Design in two replications, in which 12 quantitative characters and 11 oil quality traits were assessed among these recombinant inbred lines and checks and the data recorded were analyzed with appropriate statistical methods.

The salient findings of the present study are

1. The analysis of variance revealed the prevalence of highly significant differences among the Recombinant Inbred Lines and checks for oil content, fatty acid composition, yield and component trait studied.
2. Phenotypic coefficient of variation was higher in magnitude than the genotypic coefficient of variation in respect of all the characters studied including fatty acid composition and other oil quality parameters. The two characters studied viz., linoleic acid and 100-seed weight, recorded moderate GCV and PCV, whereas pod weight per plant, pod yield (kg/ha), kernel yield (kg/ha), oil yield (kg/ha) and O/L ratio recorded high GCV and PCV. On the other hand days to 50 per cent flowering, days to maturity, shelling per cent, protein content and oil content recorded low GCV and PCV in 2011 *Kharif*, 2012 *Kharif* season, pooled analysis over seasons and selected lines evaluated in 2012 *Kharif* season.
3. For different fatty acid composition and oil quality parameters there low GCV and PCV except for linoleic acid, oleic to linoleic acid ratio. Linoleic acid recorded moderate GCV and PCV whereas, O/L ratio recorded higher GCV and PCV.
4. Heritability in broad sense and genetic advance as per cent mean were higher for pod weight/plant, pod weight/plot, pod yield (kg/ha), kernel yield (kg/ha) and oil yield (kg/ha) indicating the simple selection scheme would be effective for these traits to bring genetic improvement in desired direction. High heritability in broad sense coupled with low genetic advance as per cent mean was observed for days to 50 per cent flowering, days to maturity and oil content due to low genetic variability for these traits.
5. Heritability in broad sense and genetic advance as per cent mean were higher for linoleic acid and O/L ratio. High heritability and low to moderate genetic advance recorded for lignoceric acid, behenic acid, arachidic acid, eicosenoic acid oleic acid, total unsaturated fatty acid and total saturated fatty acid percentage.
6. Two agronomic traits viz., 100 seed weight and pod yield (kg/ha) had positive and significant correlation with pod yield per plant, kernel yield and oil content. Strong association of these traits with pod yield, kernel yield and oil content revealed that selection based on these traits would ultimately improve the yield.
7. Oleic acid and linoleic acid were negatively and significantly correlated and therefore selection of one would decrease the other. The quality of oil depends on the O/L ratio; the O/L ratio had significant positive correlation with oleic acid and significant negative correlation with linoleic acid. Therefore, selection of genotypes for oil quality with high oleic acid content and low linoleic acid is possible to achieve genetic improvement of oil quality.
8. Superior RILs for oil content (RIL No.107, 335, 792, 225 and 201), pod yield (RIL.No.723, 192, 600, 718, 750, 363, 162, 333, 27, 470), kernel yield (RIL. No.723, 192, 600, 718, 750), oil yield (RIL No.723, 192, 600, 718, 750), 100-kernel weight (RIL No.709, 599, 597, 723, 166, 162, 332, 596, 463), oleic acid (RIL No.38, 812, 39, 34, 816, 815, 813, 805, 440 and 438) were identified.
9. Some recombinant inbred lines that were superior for high 100 kernel weight and yield (RIL No. 723 and 162), high oleic acid, yield and foliar disease resistance (RIL No.440, 438) were identified.
10. The RILs (RIL No.723, 192, 600, 718, 750, 363, 162, 333, 27 and 470) that were superior for pod yield, kernel yield, test weight and protein content in pooled analysis over two seasons, which can be used for breeding of table purpose groundnut (Table 34) (Fig 10).

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Appendix I: Meteorological data of UAS, Dharwad during course of investigation

Months	Max Temp.		Min Temp.		Rainfall (mm)		RH %		No. of rainy days	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
January	29.2	29.8	12.5	13.9	0	0	59	62	0	0
February	30.8	32.8	14	16.1	4.6	0	48	44	1	0
March	35.2	35.8	18.6	18.5	0.8	0	44	43	0	0
April	34.9	35.7	20.2	21.2	77.4	56.6	57	57	3	7
May	34.7	35.7	4.3	21.5	66.6	38	61	57	6	0
June	27.5	30.2	4.3	21.2	194	43.4	84	76	14	4
July	26.9	27.3	20.6	20.8	131	111.6	85	83	14	10
August	26.2	27	20.7	20.5	124.2	92.4	87	85	13	10
September	28.1	28.2	19.9	19.7	82.8	87	80	80	11	9
October	29.9	29.7	19.5	18.2	49.7	89.2	73	65	8	4
November	29.8	29.2	15.8	17	4.6	35.7	55	63	1	1
December	29.6	30	13.7	14.4	0	19.6	57	58	0	1
Total							922.7	539.3	71	46

Appendix II: Mean performance of recombinant inbred lines in *kharif* 2011

RIL No.	50 PF	D2M	70 R	70LL S	80R	80LL S	90R	90LL S	pd wt	Yld/ plan	Yld/ ha	k.yld/ ha	oil yld/	S%	100 SM	PAL	STE	OLE	LIN	ARA	ECO	BEH	LIG	o/ l	prote in	oil	SFA	USF A
1	33	110.5	2	2	3	3	3	3	224	21.37	4973	3564	1701	71.65	41.75	10.00	3.64	55.92	22.59	1.56	1.09	3.56	1.38	2.48	35.98	47.70	20.14	79.60
2	31	112.5	2	2	3	3	3	3	263	26.30	5839	4236	2032	72.55	41.25	9.80	3.53	57.06	21.27	1.75	1.08	3.57	1.41	2.71	34.54	47.95	20.06	79.40
3	30.5	113.5	2	2	3	3	3	3	185	17.64	4107	3078	1485	74.95	40.75	9.99	3.48	56.04	22.62	1.57	1.09	3.55	1.43	2.48	35.71	48.29	20.02	79.74
4	30.5	112	2	2	3	3	3	3	108.5	17.30	2409	1721	826	71.45	42.75	10.30	3.23	54.27	23.43	1.69	1.07	3.82	1.50	2.32	35.41	47.96	20.54	78.77
5	31	113.5	2	2	3	3	3	3	214	29.68	4751	3537	1686	74.45	43.75	10.22	3.49	54.68	23.23	1.55	1.07	3.58	1.39	2.36	35.81	47.67	20.23	78.98
6	31	108	2	2	3	3	3	3	136.5	17.25	3030	2117	990	69.80	41.50	10.12	3.62	53.27	25.23	1.60	1.05	3.62	1.40	2.11	34.78	46.76	20.35	79.55
7	29	114.5	2	2	3	3	3	3	250.5	21.83	5561	4310	2063	77.50	39.75	9.66	3.52	56.83	20.92	1.79	1.04	3.65	1.44	2.72	35.84	47.83	20.06	78.79
8	31	110	2	2	3	3	3	3	128	18.60	2842	2063	999	72.60	42.75	10.17	3.54	54.64	23.03	1.58	1.05	3.62	1.39	2.38	34.90	48.39	20.30	78.72
9	31.5	112.5	2	2	3	3	3	3	226.5	29.93	5028	3720	1735	74.00	42.50	9.66	3.77	57.15	20.15	1.79	1.01	3.54	1.42	2.86	36.16	46.64	20.19	78.30
10	31.5	113.5	2	2	3	3	3	3	162.5	27.08	3608	2528	1248	70.05	42.25	9.48	3.73	56.87	20.62	1.81	1.06	3.67	1.46	2.77	36.97	49.39	20.14	78.55
11	30.5	110.5	2	2	3	3	3	3	231.5	21.19	5139	3715	1768	72.30	42.25	9.85	3.62	56.44	21.82	1.56	1.07	3.50	1.37	2.59	35.97	47.59	19.89	79.33
12	31.5	111.5	2	2	3	3	3	3	206.5	21.76	4584	3301	1550	72.00	43.50	9.36	3.61	58.03	19.72	1.94	1.11	3.68	1.46	2.94	34.51	46.96	20.05	78.85
13	31.5	109.5	2	2	3	3	3	3	202.5	22.63	4496	3267	1540	72.65	41.00	10.04	3.50	55.70	21.66	1.68	1.10	3.63	1.49	2.58	33.98	47.16	20.34	78.46
14	31.5	109	2	2	3	3	3	3	253.5	33.84	5628	4122	2016	73.25	45.75	9.36	3.51	59.43	18.66	1.88	1.10	3.50	1.46	3.20	35.00	48.91	19.71	79.19
15	32.5	111.5	2	2	3	3	3	3	211.5	20.44	4695	3357	1600	71.50	42.50	10.08	3.45	55.90	21.41	1.70	1.07	3.60	1.45	2.67	36.27	47.67	20.27	78.39
16	31.5	114	2	2	3	3	3	3	149.5	18.69	3319	2200	1061	66.25	42.25	9.83	3.73	56.22	22.07	1.58	1.05	3.52	1.41	2.55	34.35	48.15	20.08	79.33
17	32	113.5	2	2	3	3	3	3	167.5	20.18	3719	2599	1248	69.90	43.00	9.55	3.65	58.13	19.26	1.84	1.05	3.59	1.46	3.04	35.96	47.98	20.09	78.44
18	31.5	114	2	2	3	3	3	3	181	22.85	4018	2934	1355	73.05	40.50	9.69	3.67	57.28	20.15	1.78	1.03	3.53	1.41	2.85	32.41	46.18	20.09	78.47
19	32	113	2	2	3	3	3	3	270	26.30	5994	4565	2247	76.15	42.75	9.86	3.44	55.50	20.84	1.80	1.07	3.74	1.44	2.66	34.99	49.18	20.29	77.41
20	33	113.5	2	2	3	3	3	3	189.5	24.48	4207	3092	1501	73.50	44.00	8.62	4.07	63.23	14.80	2.09	1.04	3.59	1.40	4.28	34.92	48.52	19.77	79.06
21	31.5	108.5	2	2	3	3	3	3	256.5	23.65	5694	4179	1979	73.40	42.00	9.16	4.18	61.06	17.16	1.80	0.95	3.72	1.43	3.58	35.62	47.36	20.30	79.17
22	32.5	108.5	2	2	3	3	3	3	184	24.33	4085	2928	1386	71.65	42.50	9.85	3.55	55.26	23.31	1.88	1.11	3.86	1.51	2.37	34.02	47.31	20.65	79.67
23	32.5	109.5	2	2	3	3	3	3	219	27.38	4862	3530	1711	72.60	43.50	10.19	3.45	54.15	23.86	1.67	1.05	3.61	1.44	2.27	31.99	48.46	20.35	79.06
24	32	112.5	2	2	3	3	3	3	217	31.70	4817	3526	1700	73.20	41.25	10.03	3.39	55.64	21.83	1.84	1.07	3.75	1.46	2.58	35.24	48.19	20.47	78.54
25	32.5	108.5	2	2	3	3	3	3	254	31.75	5639	4004	1942	71.00	40.00	9.83	3.74	55.43	23.12	1.74	1.06	3.54	1.43	2.40	34.97	48.48	20.28	79.61
26	33	107	2	2	3	3	3	3	222.5	28.13	4940	3475	1691	70.35	42.75	9.04	3.28	63.87	16.34	1.75	0.92	3.56	1.40	3.96	34.81	48.65	19.03	81.13
27	32	109.5	2	2	3	3	3	3	261	23.90	5794	4099	1971	70.75	42.75	9.98	3.47	57.23	20.27	1.78	1.03	3.56	1.45	2.82	36.48	48.10	20.24	78.54
28	32.5	113	2	2	3	3	3	3	259.5	23.90	5761	4102	1970	71.20	45.00	9.86	3.50	56.57	21.09	1.73	1.10	3.63	1.49	2.76	34.32	48.03	20.20	78.77

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29	31.5	112	2	2	3	3	3	3	165	27.05	3663	2639	1235	72.05	43.75	9.93	3.68	56.20	21.46	1.86	1.07	3.72	1.48	2.64	33.71	46.79	20.66	78.73
30	32.5	110.5	2	2	3	3	3	3	234	26.30	5195	3596	1703	69.20	42.50	10.15	3.19	55.60	21.87	1.68	1.07	3.60	1.43	2.58	34.35	47.37	20.06	78.54
31	31.5	109	2	2	3	3	3	3	262.5	24.97	5828	4117	1943	70.65	42.50	9.80	3.63	56.24	21.29	1.83	1.04	3.68	1.41	2.66	35.28	47.20	20.35	78.57
32	33	108.5	2	2	3	3	3	3	263.5	27.74	5850	4346	2090	74.30	43.25	9.26	3.27	59.84	19.14	1.85	0.90	3.89	1.38	3.15	35.13	48.08	19.67	79.88
33	32.5	110.5	2	2	3	3	3	3	255	21.65	5661	3688	1721	65.15	38.50	9.72	3.66	57.73	19.07	1.96	1.05	3.69	1.40	3.03	34.32	46.67	20.43	77.85
34	33.5	105	3	3	4	3.5	7	4	146.5	27.40	3252	2327	1088	71.55	38.00	8.24	3.31	70.45	9.24	1.65	1.11	3.41	1.50	7.90	34.78	46.76	18.12	80.80
35	31.5	114	3	3	4	3	6	3.5	224	32.04	4973	3479	1693	69.95	35.75	10.28	3.94	50.90	25.69	1.97	1.01	3.91	1.35	1.98	31.71	48.63	21.45	77.60
36	33	112	3	3	4	3	6	4	146.5	17.35	3252	2209	1080	67.95	38.75	10.09	3.78	54.19	23.42	1.80	1.03	3.87	1.39	2.32	33.60	48.83	20.93	78.65
37	32	114.5	3	3	4	3.5	6	3	127.5	15.94	2831	1963	917	69.35	37.75	11.20	4.04	44.92	29.56	1.93	0.85	4.21	1.23	1.52	34.38	46.68	22.61	75.32
38	32	105.5	3	3	4	3	6	4	145.5	17.26	3230	2282	1107	70.65	39.50	7.76	3.62	73.26	6.72	1.92	1.07	3.34	1.47	11.12	36.22	48.55	18.11	81.05
39	32.5	105	2	2	3.5	3	5	4	200	32.10	4440	3026	1406	68.15	37.75	7.68	3.81	70.87	8.35	2.06	1.01	3.60	1.40	9.48	35.02	46.48	18.56	80.22
40	30.5	109.5	2	2	3	4	4	3.5	210.5	24.33	4673	3269	1547	69.95	44.25	10.03	3.47	57.69	19.57	1.83	1.04	3.77	1.46	2.95	37.05	47.34	20.56	78.31
41	32	112	2	2	3	3.5	5.5	3	196	28.15	4351	3078	1437	70.75	43.00	9.96	3.58	56.05	21.15	1.76	1.06	3.78	1.42	2.65	37.02	46.69	20.50	78.26
42	31.5	112.5	2	2	3	3	3	3	190	24.90	4218	3018	1407	71.55	43.50	9.84	3.56	55.97	21.31	1.78	1.08	3.66	1.44	2.69	36.71	46.62	20.29	78.36
43	30.5	113	2	2	3	3	3	3	145.5	19.38	3230	2369	1115	73.35	45.00	9.73	3.71	57.39	20.12	1.88	1.09	3.79	1.50	2.86	35.43	47.07	20.62	78.59
44	32	113.5	2	2	3	3	3	3	183	22.05	4063	2584	1202	63.50	38.50	8.63	4.21	62.56	15.25	2.14	0.98	3.57	1.38	4.10	35.53	46.52	19.94	78.78
45	32	114	2	2	3	3	3	3	126	17.00	2797	2041	975	73.00	39.75	8.62	4.15	62.05	15.58	2.13	1.00	3.64	1.38	3.99	35.16	47.81	19.91	78.62
46	32	113	2	2	3	3	3	3	168	30.67	3730	2475	1150	66.35	39.25	9.92	3.53	55.02	22.67	1.65	1.05	3.62	1.37	2.43	35.54	46.47	20.09	78.74
47	32	112.5	2	2	3	3	3	3	132.5	20.44	2942	2125	1025	72.25	38.50	9.79	3.72	54.32	22.45	1.85	1.07	3.82	1.46	2.43	35.58	48.25	20.64	77.84
48	33.5	113.5	2	2	3	3	3	3	115	23.00	2553	1865	860	73.10	41.75	8.61	4.12	62.76	15.25	2.08	1.03	3.61	1.43	4.12	34.41	46.14	19.86	79.03
49	30.5	110.5	2	2	3	3	3	3	162	23.42	3596	2686	1288	74.70	45.00	9.69	3.45	54.33	21.96	1.73	1.09	3.80	1.44	2.47	34.95	47.96	20.11	77.38
50	31.5	108.5	2	2	3	3	3	3	183.5	30.58	4074	3096	1450	76.00	39.75	10.13	3.74	53.70	23.04	1.68	1.00	3.68	1.40	2.34	35.32	46.82	20.63	77.74
51	31	111.5	2	2	3	3	3	3	199.5	28.88	4429	3163	1528	71.40	40.75	9.88	3.80	55.23	21.96	1.81	1.07	3.85	1.46	2.52	35.45	48.25	20.79	78.25
52	31.5	109.5	2	2	3	3	3	3	136.5	24.95	3030	2239	1063	73.90	41.25	9.76	3.84	54.98	20.94	1.94	1.08	3.75	1.41	2.63	34.61	47.47	20.71	77.01
53	31	110	2	2	3	3	3	3	130.5	29.28	2897	2145	1023	74.10	41.00	9.49	3.87	56.25	20.64	1.91	1.05	3.88	1.44	2.73	35.65	47.71	20.59	77.93
54	31	115.5	2	2	3	3	3	3	218.5	24.25	4851	3561	1679	73.40	41.50	9.96	3.58	54.79	22.46	1.67	1.07	3.74	1.47	2.46	35.05	47.14	20.42	78.32
55	30.5	114.5	2	2	3	3	3	3	198.5	31.65	4407	3272	1542	74.25	40.25	9.48	3.60	57.64	20.04	1.89	1.06	3.86	1.55	2.88	36.49	47.14	20.38	78.74
56	33	111	2	2	3	3	3	3	213	25.59	4729	3472	1703	73.40	41.50	9.84	3.70	54.21	22.68	1.66	1.08	3.77	1.45	2.39	35.98	49.03	20.43	77.97
57	31	115.5	2	2	3	3	3	3	172.5	28.75	3830	2735	1282	71.45	37.75	10.15	3.44	54.40	22.73	1.63	1.05	3.65	1.40	2.40	37.83	46.86	20.28	78.19
58	31.5	115	2	2	3	3	3	3	178.5	27.75	3963	3008	1424	75.90	37.75	9.44	3.60	59.70	18.74	1.97	1.04	3.79	1.52	3.19	36.62	47.35	20.32	79.48
59	32.5	116	2	2	3	3	3	3	183	22.15	4063	2866	1358	70.55	37.75	9.65	3.52	59.74	18.96	1.90	1.04	3.88	1.52	3.15	38.02	47.38	20.48	79.74
60	31	115.5	2	2	3	3	3	3	151	17.74	3352	2450	1153	73.10	40.25	9.64	3.44	58.16	19.62	1.83	1.08	3.74	1.47	2.99	36.07	47.07	20.13	78.87
61	31.5	113.5	2	2	3	3	3	3	145	32.33	3219	2316	1123	71.95	42.00	9.84	3.53	55.01	22.05	1.63	1.12	3.82	1.48	2.49	34.44	48.47	20.31	78.18
62	30.5	114	2	2	3	3	3	3	216	33.27	4795	3633	1757	75.75	39.75	9.77	3.94	56.17	20.06	1.79	1.06	3.87	1.43	2.80	34.97	48.36	20.79	77.29
63	31	113.5	2	2	3	3	3	3	142.5	14.25	3164	2232	1062	70.55	44.25	10.05	3.47	54.40	22.94	1.66	1.07	3.69	1.42	2.38	35.90	47.58	20.28	78.41

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64	31	112	2	2	3	3	3	3	213	25.03	4729	3580	1703	75.70	40.75	8.99	3.88	61.19	18.12	1.84	0.88	3.79	1.36	3.38	36.46	47.55	19.87	80.20
65	30.5	113.5	2	2	3	3	3	3	240.5	26.84	5339	4084	1988	76.50	42.00	9.70	3.44	57.37	20.46	1.66	1.11	3.76	1.45	2.80	35.17	48.69	20.01	78.94
66	31	115	2	2	3	3	3	3	182	28.27	4040	3049	1506	75.45	43.25	9.68	3.66	55.69	21.77	1.83	1.13	3.85	1.48	2.56	35.73	49.37	20.50	78.59
67	31	115.5	2	2	3	3	3	3	207	25.85	4595	3305	1584	71.90	43.75	9.27	3.58	58.31	19.06	1.75	1.07	3.70	1.44	3.06	35.57	47.88	19.73	78.44
68	31	112	2	2	3	3	3	3	152.5	18.70	3386	2419	1166	71.45	42.50	9.47	3.71	57.53	21.09	1.70	1.10	3.60	1.40	2.73	34.95	48.19	19.87	79.72
69	30.5	111.5	2	2	3	3	3	3	145	17.90	3219	2367	1121	73.55	40.00	10.01	3.33	55.40	21.82	1.62	1.07	3.64	1.42	2.58	35.25	47.31	20.03	78.29
70	31	111	2	2	3	3	3	3	219	27.38	4862	3588	1687	73.80	42.25	9.85	3.56	56.01	20.82	1.78	1.09	3.64	1.45	2.69	34.98	47.02	20.28	77.91
71	31.5	113.5	2	2	3	3	3	3	195.5	24.44	4340	3196	1579	73.60	41.00	9.47	3.58	57.75	19.71	1.71	1.11	3.87	1.48	2.93	36.06	49.26	20.12	78.57
72	32	112.5	2	2	3	3	3	3	182.5	23.59	4052	2905	1392	71.65	41.75	9.90	3.41	55.67	21.73	1.61	1.09	3.67	1.44	2.61	34.55	47.92	20.02	78.49
73	32	110.5	2	2	3	3	3	3	199.5	23.30	4429	3152	1496	71.10	41.75	9.20	3.88	60.31	19.30	1.69	0.95	3.48	1.29	3.13	35.23	47.53	19.54	80.57
74	32	109.5	2	2	3	3	3	3	245	27.38	5439	4013	1945	73.80	42.75	9.96	3.44	55.91	21.22	1.74	1.09	3.61	1.46	2.63	34.89	48.46	20.23	78.22
75	32	110	2	2	3	3	3	3	113	17.35	2509	1486	690	59.30	39.75	9.75	3.58	57.68	19.39	1.78	1.06	3.75	1.45	2.98	34.28	46.51	20.30	78.12
76	33	109	2	2	3	3	3	3	238.5	26.50	5295	4058	1920	76.65	41.25	9.62	3.69	56.49	21.14	1.74	1.09	3.77	1.49	2.67	37.44	47.33	20.31	78.73
77	31.5	108.5	2	2	3	3	3	3	175	15.34	3885	2546	1204	65.55	40.75	9.68	3.72	56.55	20.43	1.70	1.07	3.71	1.40	2.77	35.03	47.29	20.21	78.04
78	31.5	108.5	2	2	3	3	3	3	155	20.69	3441	2453	1196	71.25	43.25	9.76	3.73	55.52	21.48	1.70	1.11	3.87	1.47	2.58	32.09	48.67	20.53	78.10
79	32.5	108.5	2	2	3	3	3	3	245	25.91	5439	3871	1847	71.15	42.00	10.04	3.51	54.78	22.33	1.63	1.06	3.67	1.40	2.47	36.65	47.67	20.25	78.17
80	33.5	114.5	2	2	3	3	3	3	150.5	23.50	3341	2430	1169	72.75	39.00	9.29	3.50	59.86	17.79	1.75	1.09	3.64	1.47	3.36	37.43	48.08	19.65	78.75
81	31.5	115.5	2	2	3	3	3	3	205.5	14.67	4562	3124	1442	68.50	40.75	9.57	3.88	57.48	19.53	1.88	1.09	3.80	1.41	2.94	34.33	46.16	20.53	78.10
82	32	108.5	2	2	3	3	3	3	174.5	21.70	3874	2861	1327	73.90	38.75	9.59	3.44	56.19	21.15	1.65	1.13	3.95	1.49	2.66	34.89	46.39	20.12	78.46
83	31.5	112.5	2	2	3	3	3	3	243	27.25	5395	3953	1884	73.25	39.25	9.44	3.67	57.40	20.23	1.73	1.10	3.70	1.45	2.84	37.04	47.71	19.98	78.74
84	32.5	114	2	2	3	3	3	3	150	21.46	3330	2312	1084	69.40	44.00	9.28	3.57	57.48	19.25	1.73	1.19	3.84	1.58	2.99	35.37	46.89	20.01	77.92
85	33	116.5	2	2	3	3	3	3	246	27.59	5461	4046	1926	74.10	41.50	9.40	3.65	57.00	20.33	1.79	1.13	3.79	1.47	2.80	37.99	47.61	20.10	78.46
86	33	113.5	2	2	3	3	3	3	109	15.06	2420	1484	706	61.35	40.75	9.87	3.55	55.22	21.71	1.68	1.07	3.77	1.40	2.58	34.21	47.54	20.27	77.99
87	31.5	114	2	2	3	3	3	3	171.5	20.75	3807	2859	1403	75.10	42.00	9.77	3.69	57.25	19.99	1.79	1.07	3.77	1.44	2.87	36.26	49.05	20.47	78.32
88	32	111.5	2	2	3	3	3	3	255	34.08	5661	4270	2031	75.40	44.75	9.60	3.60	56.96	20.44	1.71	1.08	3.83	1.45	2.79	35.10	47.56	20.18	78.48
89	32	114.5	2	2	3	3	3	3	251.5	26.49	5583	4101	1948	73.45	42.75	9.72	3.84	56.56	20.01	1.85	1.05	3.81	1.42	2.83	36.19	47.52	20.63	77.62
90	30.5	112.5	2	2	3	3	3	3	172	23.20	3818	2869	1373	75.15	43.00	9.65	3.65	57.87	19.38	1.82	1.08	3.80	1.50	2.99	36.15	47.88	20.43	78.33
91	32	113.5	2	2	3	3	3	3	164.5	20.55	3652	2718	1290	74.40	44.75	9.28	3.61	59.87	17.81	1.77	1.08	3.77	1.49	3.36	36.63	47.43	19.92	78.77
92	32	115.5	2	2	3	3	3	3	213.5	29.50	4740	3393	1614	71.60	42.25	9.95	3.73	56.53	20.55	1.76	1.06	3.60	1.44	2.75	34.16	47.58	20.48	78.14
93	31.5	113.5	2	2	3	3	3	3	177.5	23.00	3941	2789	1325	70.80	40.75	9.64	3.61	58.18	19.41	1.72	1.09	3.78	1.49	3.00	36.32	47.51	20.24	78.68
94	32	116.5	2	2	3	3	3	3	137.5	18.70	3053	2082	985	68.20	41.25	10.22	3.36	54.31	22.44	1.63	1.07	3.70	1.43	2.44	37.37	47.28	20.33	77.82
95	32	112.5	2	2	3	3	3	3	249	27.90	5528	3992	1977	72.25	42.75	9.49	3.63	57.85	19.15	1.83	1.10	3.81	1.49	3.04	36.57	49.52	20.25	78.10
96	33	111.5	2	2	3	3	3	3	186.5	19.08	4140	2914	1366	70.40	41.00	9.94	3.50	56.24	20.32	1.76	1.07	3.85	1.42	2.77	36.91	46.87	20.47	77.63
97	32	110.5	2	2	3	3	3	3	163.5	17.18	3630	2553	1235	70.25	42.25	9.78	3.45	56.40	20.38	1.75	1.08	3.86	1.47	2.77	34.74	48.42	20.31	77.86

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98	32	115	2	2	3	3	3	3	155	20.17	3441	2458	1165	71.60	41.50	9.39	4.28	59.15	17.86	1.99	1.10	3.68	1.45	3.31	35.35	47.46	20.79	78.11
99	32	114.5	2	2	3	3	3	3	197	18.15	4373	3114	1504	71.15	43.25	9.57	3.64	58.80	18.41	1.77	1.08	3.72	1.44	3.19	36.68	48.21	20.14	78.29
100	32	113.5	2	2	3	3	3	3	189.5	22.70	4207	2933	1442	69.75	40.25	9.69	3.35	56.89	19.84	1.73	1.11	3.72	1.48	2.87	35.96	49.15	19.97	77.84
101	31	113.5	2	2	3	3	3	3	207	21.35	4595	3317	1590	72.20	42.50	9.51	3.72	58.13	18.76	1.86	1.05	3.73	1.39	3.11	37.62	47.91	20.20	77.94
102	31.5	115.5	2	2	3	3	3	3	261	23.82	5794	4329	2022	74.70	40.75	8.52	3.97	64.00	14.89	2.02	1.00	3.60	1.37	4.30	36.11	46.69	19.47	79.89
103	32	110.5	2	2	3	3	3	3	208	24.61	4618	3300	1566	71.45	42.75	9.75	3.67	57.49	19.81	1.79	1.07	3.74	1.44	2.91	35.84	47.47	20.40	78.37
104	32.5	112.5	2	2	3	3	3	3	222.5	21.18	4940	3623	1753	73.35	40.25	9.80	3.45	55.84	21.44	1.66	1.14	3.71	1.50	2.60	34.73	48.40	20.12	78.42
105	32	113	2	2	3	3	3	3	208.5	18.52	4629	3437	1635	74.25	42.50	9.88	3.67	55.53	21.97	1.79	1.06	3.80	1.44	2.56	35.29	47.56	20.58	78.56
106	32	109.5	2	2	3	3	3	3	188.5	14.64	4185	2890	1441	69.05	40.75	9.91	3.21	56.19	20.36	1.69	1.11	3.70	1.47	2.76	36.34	49.81	19.97	77.67
107	32	109.5	2	2	3	3	3	3	242.5	20.21	5384	4016	2028	74.60	41.25	9.80	3.77	56.83	20.14	1.80	1.08	3.77	1.50	2.84	36.19	50.50	20.64	78.05
108	31.5	114.5	2	2	3	3	3	3	290.5	29.05	6449	4547	2229	70.50	41.00	8.51	4.20	63.87	14.66	2.06	1.05	3.56	1.40	4.36	37.13	49.01	19.73	79.59
109	32.5	115.5	2	2	3	3	3	3	274	24.70	6083	4471	2108	73.50	43.00	9.66	3.66	56.50	20.37	1.82	1.09	3.79	1.48	2.77	37.10	47.10	20.40	77.96
110	32	113.5	2	2	3	3	3	3	222	27.70	4928	3585	1695	72.75	44.75	10.00	3.45	55.28	22.02	1.69	1.07	3.64	1.42	2.54	35.99	47.29	20.19	78.37
111	31.5	113	2	2	3	3	3	3	136.5	11.92	3030	2172	1024	71.70	42.75	9.66	3.45	55.87	20.21	1.76	1.10	3.79	1.46	2.77	35.56	47.13	20.13	77.18
112	34	115.5	2	2	3	3	3	3	224	19.95	4973	3606	1730	72.45	41.00	9.48	3.80	57.32	20.29	1.89	1.14	3.72	1.54	2.83	34.51	48.06	20.42	78.75
113	33	113.5	2	2	3	3	3	3	280	25.60	6216	4410	2086	70.95	43.00	9.74	3.34	55.67	20.28	1.77	1.07	4.03	1.46	2.75	35.03	47.29	20.34	77.02
114	31.5	112.5	2	2	3	3	3	3	190	16.58	4218	3060	1504	72.55	39.75	8.72	3.88	63.04	15.24	1.93	1.07	3.60	1.45	4.16	35.46	49.14	19.58	79.35
115	31.5	110.5	2	2	3	3	3	3	220	24.61	4884	3661	1731	74.95	39.75	9.40	3.78	58.42	19.03	1.84	1.11	3.74	1.51	3.08	35.17	47.29	20.27	78.56
116	31.5	114	2	2	3	3	3	3	190	19.30	4218	3025	1402	71.70	43.25	9.42	3.87	57.37	19.71	1.91	1.09	3.67	1.47	2.91	34.79	46.39	20.33	78.16
117	31.5	115.5	2	2	3	3	3	3	241.5	24.23	5361	3853	1811	71.90	41.25	8.90	3.89	61.70	16.04	1.95	1.09	3.62	1.44	3.91	33.87	47.00	19.81	78.83
118	33	114.5	2	2	3	3	3	3	209	23.70	4640	3208	1496	69.15	43.75	9.10	3.86	58.89	17.92	1.84	1.09	3.69	1.45	3.31	37.06	46.62	19.95	77.90
119	31.5	115	2	2	3	3	3	3	152.5	17.75	3386	2438	1139	72.00	44.75	9.52	3.76	56.61	20.36	1.88	1.09	3.69	1.46	2.78	36.02	46.75	20.31	78.06
120	32.5	113	2	2	3	3	3	3	182	20.60	4040	2831	1342	70.05	42.75	9.41	3.66	57.12	19.78	1.76	1.11	3.77	1.45	2.89	33.28	47.39	20.05	78.01
121	32	115.5	2	2	3	3	3	3	286.5	27.34	6360	4652	2197	73.15	41.75	9.27	3.85	58.78	18.67	1.80	1.09	3.81	1.48	3.15	35.58	47.22	20.21	78.53
122	31.5	109.5	2	2	3	3	3	3	104	10.92	2309	1485	698	64.40	42.75	9.70	3.57	55.72	21.08	1.74	1.08	3.71	1.43	2.64	34.28	46.95	20.16	77.88
123	31.5	110.5	2	2	3	3	3	3	149	30.25	3308	2321	1113	70.15	41.75	9.39	3.72	58.63	18.79	1.77	1.09	3.61	1.43	3.12	36.10	48.07	19.92	78.50
124	32	111	2	2	3	3	3	3	195	30.10	4329	3092	1415	71.40	43.50	9.43	3.53	57.04	18.99	1.77	1.07	3.81	1.41	3.01	35.35	45.71	19.94	77.11
125	30	112.5	2	2	3	3	3	3	175	27.20	3885	2785	1317	71.65	43.50	9.56	3.28	57.11	19.27	1.68	1.11	3.77	1.48	2.96	34.51	47.31	19.77	77.49
126	30	111	2	2	3	3	3	3	215	25.46	4773	3277	1563	68.70	42.75	9.89	3.51	54.97	21.76	1.68	1.06	3.65	1.40	2.56	35.15	47.72	20.12	77.79
127	32.5	114.5	2	2	3	3	3	3	236	35.26	5239	3887	1817	74.20	42.50	9.12	4.08	57.70	18.95	1.93	1.05	3.73	1.43	3.06	36.19	46.75	20.30	77.70
128	31	113.5	2	2	3	3	3	3	172	20.67	3818	2661	1247	69.70	40.75	9.34	3.76	56.77	19.94	1.81	1.11	3.75	1.44	2.85	34.37	46.85	20.10	77.83
129	31.5	114	2	2	3	3	3	3	192.5	20.50	4274	3068	1423	71.80	38.25	9.58	3.73	57.62	18.94	1.81	1.06	3.74	1.41	3.04	35.01	46.38	20.27	77.62
130	31.5	115.5	2	2	3	3	3	3	262	29.11	5816	4293	2045	73.80	38.25	8.80	3.70	61.65	15.92	1.90	1.06	3.58	1.46	3.87	34.03	47.63	19.45	78.63
131	32.5	115	2	2	3	3	3	3	144.5	17.65	3208	2249	1067	70.10	40.75	8.66	3.85	62.58	16.08	1.98	1.05	3.59	1.47	3.89	34.75	47.42	19.56	79.70
132	31.5	113	2	2	3	3	3	3	215	25.15	4773	3256	1574	68.20	40.75	9.42	3.57	58.37	19.91	1.83	1.05	3.52	1.42	2.95	34.46	48.30	19.75	79.33

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133	31	114.5	2	2	3	3	3	3	119.5	13.60	2653	1853	881	69.85	39.75	9.31	3.51	58.84	19.36	1.80	1.08	3.43	1.44	3.04	34.84	47.57	19.48	79.28
134	31	109.5	2	2	3	3	3	3	252	36.50	5594	4194	2047	74.95	42.75	9.86	3.31	56.62	21.45	1.65	1.08	3.53	1.41	2.70	35.64	48.75	19.76	79.15
135	30.5	111.5	2	2	3	3	3	3	151	17.05	3352	2401	1175	71.60	43.75	9.68	3.43	56.69	20.52	1.78	1.09	3.67	1.47	2.77	32.34	48.99	20.01	78.30
136	32.5	115	2	2	3	3	3	3	165.5	19.94	3674	2676	1254	72.85	42.00	7.90	3.80	67.87	11.77	1.98	1.16	3.51	1.49	5.88	33.70	46.85	18.67	80.80
137	31.5	113	2	2	3	3	3	3	238.5	24.20	5295	3766	1724	71.10	44.00	9.34	3.57	58.30	19.82	1.84	1.09	3.50	1.48	2.96	34.30	45.78	19.73	79.20
138	32.5	114	2	2	3	3	3	3	168	20.30	3730	2677	1271	71.75	40.00	9.18	4.04	59.86	18.18	1.91	1.05	3.59	1.40	3.32	35.47	47.50	20.12	79.09
139	32	109	2	2	3	3	3	3	155.5	16.40	3452	2503	1182	72.50	38.25	10.30	3.47	52.65	24.57	1.68	1.05	3.84	1.45	2.14	34.98	47.20	20.74	78.26
140	33.5	111.5	2	2	3	3	3	3	200.5	24.55	4451	3222	1483	72.35	45.25	9.50	3.69	57.90	20.82	1.78	1.08	3.53	1.41	2.79	35.78	46.07	19.91	79.80
141	32	113.5	2	2	3	3	3	3	188.5	19.45	4185	3063	1449	73.20	41.00	9.71	3.51	57.21	20.42	1.73	1.09	3.59	1.44	2.82	36.97	47.30	19.98	78.72
142	32	109	2	2	3	3	3	3	267.5	23.58	5939	4531	2176	76.30	43.50	9.56	3.61	58.42	19.45	1.76	1.11	3.66	1.48	3.05	35.64	48.02	20.08	78.98
143	31.5	114.5	2	2	3	3	3	3	216	22.65	4795	3453	1646	72.00	41.25	9.51	3.57	58.07	20.01	1.74	1.07	3.59	1.41	2.91	35.30	47.62	19.82	79.15
144	32.5	112.5	2	2	3	3	3	3	207.5	21.84	4607	3364	1573	73.05	41.25	9.78	3.40	57.20	21.08	1.68	1.09	3.54	1.40	2.71	36.14	46.75	19.79	79.38
145	32	112.5	2	2	3	3	3	3	137	15.65	3041	2198	1070	72.20	41.50	9.49	3.75	58.18	20.03	1.80	1.07	3.73	1.48	2.94	34.69	48.61	20.26	79.28
146	32.5	111.5	2	2	3	3	3	3	189.5	23.11	4207	3028	1431	71.95	39.25	9.34	3.77	57.20	19.92	1.75	1.06	3.72	1.48	2.88	34.69	47.28	20.06	78.19
147	32	113.5	2	2	3	3	3	3	143	17.50	3175	2321	1078	73.10	41.75	9.35	3.75	58.06	19.85	1.79	1.08	3.70	1.49	2.95	36.82	46.46	20.09	78.99
148	32.5	110	2	2	3	3	3	3	167	24.65	3707	2702	1287	72.85	41.25	9.82	3.80	54.71	22.81	1.65	1.04	3.70	1.46	2.41	35.42	47.73	20.43	78.57
149	32	113.5	2	2	3	3	3	3	244	26.65	5417	3996	1911	73.70	42.75	9.06	3.74	59.50	18.42	1.77	1.11	3.56	1.45	3.27	34.08	47.83	19.58	79.04
150	32	112.5	2	2	3	3	3	3	170	15.90	3774	2795	1344	74.05	41.25	9.41	3.46	58.63	19.31	1.73	1.10	3.59	1.50	3.04	31.91	48.18	19.69	79.04
151	32.5	114	2	2	3	3	3	3	174	19.46	3863	2842	1303	73.60	42.75	9.38	3.39	57.33	20.37	1.77	1.11	3.76	1.49	2.83	36.31	45.79	19.78	78.81
152	33	116.5	2	2	3	3	3	3	204.5	24.50	4540	3362	1598	74.15	44.25	9.40	3.40	59.00	20.16	1.64	1.14	3.50	1.48	2.93	33.86	47.52	19.41	80.30
153	31	116	2	2	3	3	3	3	188.5	20.40	4185	3025	1423	72.25	44.25	9.74	3.38	58.81	20.10	1.57	1.07	3.57	1.45	2.93	35.11	47.08	19.71	79.98
154	32	114.5	2	2	3	3	3	3	169.5	19.59	3763	2797	1346	74.30	42.75	9.86	3.53	57.73	20.25	1.69	1.04	3.51	1.42	2.86	35.73	48.02	20.01	79.02
155	32	115.5	2	2	3	3	3	3	240	25.20	5328	3846	1796	72.15	44.50	10.16	3.31	55.10	22.74	1.57	1.07	3.55	1.43	2.44	34.87	46.70	20.03	78.91
156	31	116.5	2	2	3	3	3	3	157	20.50	3485	2448	1164	70.25	43.25	9.13	3.67	59.35	18.38	1.84	1.13	3.81	1.51	3.23	34.48	47.53	19.95	78.86
157	32.5	114	2	2	3	3	3	3	176.5	18.80	3918	2746	1344	70.05	42.75	9.40	3.82	57.09	20.58	1.83	1.07	3.62	1.39	2.79	33.01	49.02	20.06	78.74
158	32.5	113.5	2	2	3	3	3	3	241	23.85	5350	3905	1855	73.00	41.25	9.79	3.62	55.29	23.55	1.59	1.08	3.47	1.48	2.35	37.12	47.49	19.95	79.92
159	32.5	113	2	2	3	3	3	3	154	19.15	3419	2483	1154	72.55	42.25	9.81	3.41	56.30	20.77	1.71	1.05	3.65	1.38	2.73	34.68	46.60	19.95	78.13
160	32	113.5	2	2	3	3	3	3	208	23.40	4618	3351	1636	72.60	45.00	9.63	3.64	58.36	19.92	1.72	1.04	3.48	1.42	2.95	34.65	48.80	19.89	79.32
161	33.5	111.5	2	2	3	3	3	3	165.5	18.80	3674	2658	1246	72.25	45.25	8.66	4.18	63.10	14.64	2.03	1.07	3.65	1.42	4.31	35.10	46.84	19.95	78.81
162	32	113.5	2	2	3	3	3	3	277.5	26.54	6161	4605	2178	74.75	44.00	9.69	3.57	57.81	20.24	1.69	1.10	3.60	1.48	2.87	35.12	47.28	20.02	79.16
163	32.5	112	2	2	3	3	3	3	235	24.85	5217	3915	1849	75.05	46.50	9.24	3.83	59.71	18.09	1.80	1.02	3.62	1.42	3.43	34.93	47.24	19.91	78.82
164	31.5	110.5	2	2	3	3	3	3	156.5	17.23	3474	2545	1225	73.25	45.00	9.40	3.81	57.42	20.27	1.84	1.05	3.75	1.44	2.89	32.10	48.17	20.24	78.74
165	32	111	2	2	3	3	3	3	194	23.75	4307	3069	1464	71.20	44.25	9.50	3.56	56.35	22.01	1.69	1.11	3.73	1.45	2.56	34.99	47.66	19.93	79.48

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166	32.5	113.5	2	2	3	3	3	3	154.5	22.75	3430	2446	1150	71.30	46.75	9.91	3.45	56.18	22.08	1.59	1.07	3.51	1.42	2.58	36.40	46.98	19.89	79.33
167	32.5	112.5	2	2	3	3	3	3	182.5	18.85	4052	3017	1480	74.45	41.75	8.77	4.28	61.40	16.23	2.11	1.02	3.65	1.39	3.81	36.08	49.04	20.20	78.65
168	32	113.5	2	2	3	3	3	3	216.5	24.24	4806	3462	1629	72.10	45.00	8.89	4.10	62.27	15.88	1.99	1.05	3.58	1.43	3.93	34.12	47.06	20.00	79.20
169	32	115.5	2	2	3	3	3	3	181.5	27.30	4029	2962	1370	73.50	44.00	9.43	3.47	60.80	17.45	1.79	1.07	3.52	1.49	3.50	35.08	46.32	19.69	79.32
170	33.5	114.5	2	2	3	3	3	3	197.5	18.90	4385	3118	1459	71.10	42.25	9.04	3.91	61.21	16.29	1.96	1.06	3.64	1.44	3.79	34.91	46.81	20.00	78.56
171	32.5	114	2	2	3	3	3	3	194.5	21.95	4318	3071	1490	71.15	45.50	9.93	3.40	56.03	21.84	1.59	1.09	3.60	1.42	2.61	34.19	48.51	19.94	78.96
172	33.5	111.5	2	2	3	3	3	3	156.5	19.30	3474	2455	1164	70.60	43.25	9.38	3.53	58.70	19.36	1.77	1.11	3.63	1.44	3.03	34.59	47.47	19.75	79.17
173	32	114	2	2	3	3	3	3	205	19.65	4551	3238	1528	71.15	42.00	8.66	4.36	62.90	14.84	2.11	1.01	3.65	1.42	4.24	36.14	47.21	20.20	78.76
174	31.5	113.5	2	2	3	3	3	3	218	23.10	4840	3591	1709	74.20	42.75	9.64	3.33	58.15	19.30	1.80	1.08	3.61	1.46	3.03	34.11	47.59	19.84	78.54
175	32.5	115.5	2	2	3	3	3	3	165	19.10	3663	2677	1292	73.05	44.25	9.04	3.40	61.60	17.74	1.61	1.04	3.41	1.49	3.47	32.37	48.34	18.96	80.39
176	32	112.5	2	2	3	3	3	3	232.5	25.96	5162	3737	1762	72.40	42.25	9.42	3.59	57.97	19.58	1.83	1.10	3.63	1.47	2.97	34.66	47.17	19.94	78.65
177	33	110.5	2	2	3	3	3	3	187.5	18.75	4163	2909	1419	69.85	43.25	9.67	3.51	57.03	20.01	1.79	1.08	3.62	1.44	2.85	35.99	48.81	20.03	78.12
178	32	111.5	2	2	3	3	3	3	183	19.56	4063	2849	1344	70.10	44.25	9.40	3.75	58.22	19.78	1.82	1.10	3.66	1.47	2.96	35.23	47.13	20.09	79.10
179	33.5	113.5	2	2	3	3	3	3	220.5	26.40	4895	3445	1647	70.40	44.25	9.13	3.77	59.81	18.07	1.82	1.08	3.42	1.44	3.31	34.73	47.81	19.58	78.96
180	32	110.5	2	2	3	3	3	3	151.5	15.95	3363	2389	1116	71.00	42.75	8.79	3.96	62.75	15.22	1.69	1.08	3.31	1.44	4.12	34.94	46.73	19.20	79.04
181	32.5	111.5	2	2	3	3	3	3	206	21.90	4573	3293	1521	72.00	42.00	9.18	4.00	58.47	18.65	1.91	1.06	3.78	1.42	3.14	35.34	46.21	20.30	78.18
182	31.5	109.5	2	2	3	3	3	3	158	21.25	3508	2367	1170	67.45	41.00	9.26	3.56	58.77	18.91	1.84	1.09	3.66	1.46	3.11	35.03	49.45	19.78	78.76
183	32.5	112.5	2	2	3	3	3	3	196.5	19.25	4362	3103	1447	71.10	41.75	9.25	3.68	59.99	17.87	1.80	1.08	3.52	1.44	3.37	35.28	46.65	19.68	78.93
184	33	108.5	2	2	3	3	3	3	165.5	18.50	3674	2566	1224	69.85	39.25	9.36	4.12	61.09	17.60	1.89	0.91	3.64	1.38	3.48	34.19	47.68	20.39	79.59
185	32.5	108.5	2	2	3	3	3	3	280.5	30.15	6227	4739	2261	76.10	41.75	9.29	3.47	58.46	18.99	1.69	1.08	3.61	1.43	3.08	35.21	47.72	19.48	78.53
186	32.5	108	2	2	3	3	3	3	164.5	17.55	3652	2553	1211	69.90	38.25	9.27	3.97	61.12	17.92	1.60	1.05	3.62	1.39	3.42	34.09	47.43	19.86	80.08
187	33	107	2	2	3	3	3	3	216	21.65	4795	3445	1659	71.80	42.50	9.89	2.83	62.89	15.73	1.86	0.82	3.41	1.20	4.00	35.80	48.25	19.18	79.44
188	32.5	113.5	2	2	3	3	3	3	117	16.40	2597	1867	890	71.90	41.50	9.05	3.54	61.44	16.81	1.70	1.08	3.54	1.44	3.66	34.93	47.70	19.27	79.32
189	33	112	2	2	3	3	3	3	143	18.70	3175	2245	1069	70.70	43.25	9.49	3.75	57.78	19.58	1.87	1.07	3.74	1.46	2.95	34.47	47.61	20.31	78.43
190	33	113.5	2	2	3	3	3	3	175.5	20.00	3896	2695	1288	69.15	41.75	8.86	4.04	62.04	15.90	1.83	1.07	3.43	1.38	3.91	36.50	47.77	19.52	79.01
191	32.5	116	2	2	3	3	3	3	144	18.55	3197	2114	990	66.10	38.50	8.67	3.58	62.52	15.76	1.85	1.09	3.63	1.51	3.99	33.72	46.85	19.25	79.37
192	33.5	116.5	2	2	3	3	3	3	293.5	26.83	6516	4866	2233	74.65	40.25	8.95	3.69	62.58	16.09	1.74	1.13	3.52	1.49	3.89	36.19	45.87	19.40	79.80
193	33	113.5	2	2	3	3	3	3	154	16.16	3419	2470	1169	72.20	40.25	9.35	3.26	59.01	18.48	1.67	1.16	3.71	1.53	3.19	36.05	47.37	19.51	78.66
194	32	111.5	2	2	3	3	3	3	150	18.60	3330	2370	1111	71.15	40.50	9.31	3.59	59.09	18.63	1.73	1.12	3.66	1.45	3.18	34.37	46.94	19.74	78.85
195	32.5	116.5	2	2	3	3	3	3	228	24.60	5062	3628	1734	71.65	38.00	8.70	4.09	63.05	14.82	1.86	1.08	3.58	1.46	4.26	37.85	47.81	19.69	78.95
196	31.5	111.5	2	2	3	3	3	3	174.5	19.70	3874	2788	1324	72.00	42.00	9.27	3.64	59.33	17.92	1.76	1.11	3.68	1.45	3.32	34.82	47.50	19.80	78.36
197	32	109	2	2	3	3	3	3	253	25.65	5617	4280	2078	76.20	37.50	9.08	3.87	59.94	17.17	1.83	1.05	3.71	1.45	3.50	36.51	48.57	19.94	78.17
198	32.5	113.5	2	2	3	3	3	3	175	23.50	3885	2792	1335	71.85	39.75	8.94	4.06	61.41	16.40	1.81	1.04	3.66	1.46	3.74	33.97	47.84	19.92	78.85
199	33	109.5	2	2	3	3	3	3	269	25.50	5972	4254	2033	71.25	40.25	9.61	3.36	57.92	18.72	1.85	1.07	3.70	1.45	3.09	35.12	47.81	19.97	77.71
200	32.5	110	2	2	3	3	3	3	272	27.35	6038	4501	2232	74.55	38.25	8.73	3.92	63.38	14.77	1.86	1.09	3.48	1.43	4.30	35.44	49.58	19.41	79.24

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201	32	111.5	2	2	3	3	3	3	240.5	22.02	5339	3954	1974	74.05	36.25	9.69	3.92	55.97	21.17	1.69	1.06	3.85	1.46	2.64	32.79	49.91	20.61	78.20
202	32.5	114	2	2	3	3	3	3	125.5	18.45	2786	2029	972	72.90	39.50	9.26	3.70	59.07	18.33	1.85	1.09	3.69	1.44	3.22	35.23	47.90	19.93	78.49
203	32	113.5	2	2	3	3	3	3	177	23.20	3929	2806	1332	71.35	40.00	10.04	3.18	56.05	20.91	1.74	1.08	3.69	1.50	2.68	36.18	47.57	20.15	78.04
204	31.5	109.5	2	2	3	3	3	3	193.5	23.30	4296	3153	1466	73.45	38.75	9.43	3.55	57.90	19.21	1.73	1.10	3.76	1.44	3.01	34.69	46.50	19.91	78.21
205	33	115.5	2	2	3	3	3	3	203	22.90	4507	3283	1601	72.85	38.00	9.99	3.35	55.58	21.57	1.61	1.07	3.66	1.40	2.63	36.80	48.73	20.01	78.22
206	31.5	116	2	2	3	3	3	3	127.5	15.77	2831	1880	879	66.40	40.25	9.33	3.68	58.13	19.34	1.84	1.10	3.75	1.47	3.01	34.41	46.79	20.06	78.57
207	31.5	113	2	2	3	3	3	3	197	21.85	4373	3141	1475	71.85	40.00	9.69	3.79	55.77	20.92	1.71	1.03	3.66	1.41	2.67	33.18	46.97	20.25	77.72
208	32	109.5	2	2	3	3	3	3	119.5	14.75	2653	1824	887	68.75	43.25	9.95	3.66	54.13	21.79	1.71	1.10	3.83	1.41	2.48	35.47	48.64	20.57	77.01
209	33	113.5	2	2	3	3	3	3	228	27.60	5062	3561	1704	70.35	39.50	9.44	3.76	58.20	19.99	1.88	1.06	4.09	1.53	2.92	35.99	47.88	20.70	79.25
210	32.5	111.5	2	2	3	3	3	3	237.5	23.30	5273	3892	1846	73.80	42.75	9.66	3.50	58.66	18.73	1.74	1.13	3.66	1.48	3.13	35.74	47.45	20.06	78.52
211	32.5	111.5	2	2	3	3	3	3	208.5	19.95	4629	3372	1608	72.85	43.00	9.97	3.56	55.54	21.69	1.73	1.07	3.76	1.43	2.60	35.06	47.69	20.45	78.30
212	31.5	114.5	2	2	3	3	3	3	188	20.10	4174	3065	1445	73.45	38.50	9.23	3.54	61.62	17.53	1.87	1.09	3.62	1.52	3.52	35.84	47.13	19.78	80.24
213	33.5	109.5	2	2	3	3	3	3	215.5	22.75	4784	3479	1670	72.70	43.75	9.66	3.52	55.38	21.59	1.85	1.10	3.93	1.53	2.58	35.18	47.95	20.49	78.07
214	31.5	109.5	2	2	3	3	3	3	185	23.40	4107	3013	1481	73.35	42.75	9.51	3.62	57.39	19.80	1.81	1.12	3.84	1.48	2.90	35.12	49.13	20.26	78.31
215	32.5	111.5	2	2	3	3	3	3	234	20.05	5195	3764	1800	72.45	41.25	9.65	3.58	56.82	20.24	1.79	1.08	3.76	1.46	2.82	34.68	47.82	20.25	78.14
216	32.5	113	2	2	3	3	3	3	217	22.35	4817	3527	1670	73.20	39.50	8.17	4.37	64.91	14.19	2.06	1.06	3.70	1.44	4.57	36.26	47.38	19.74	80.16
217	33.5	108.5	2	2	3	3	3	3	254.5	28.56	5650	4131	2011	73.10	39.25	9.12	3.92	60.00	17.43	1.70	1.13	3.70	1.46	3.44	35.00	48.66	19.88	78.56
218	32	109.5	2	2	3	3	3	3	213	19.27	4729	3528	1673	74.55	40.50	9.01	4.11	59.62	18.34	1.91	1.07	3.79	1.44	3.26	34.45	47.46	20.25	79.02
219	33	111.5	2	2	3	3	3	3	197	22.65	4373	3144	1515	71.90	41.25	9.32	4.08	59.06	18.21	1.89	1.04	3.60	1.38	3.24	31.79	48.17	20.27	78.31
220	32	110	2	2	3	3	3	3	212	23.56	4706	3290	1577	69.90	44.25	9.26	3.73	60.43	17.19	1.81	1.08	3.65	1.45	3.52	34.07	47.94	19.90	78.71
221	33	109.5	2	2	3	3	3	3	204.5	22.00	4540	3240	1524	71.35	45.75	9.27	3.65	59.10	18.39	1.81	1.09	3.78	1.45	3.21	34.74	47.03	19.95	78.58
222	31	112.5	2	2	3	3	3	3	187	22.15	4151	2997	1425	72.15	44.25	9.64	3.46	58.70	18.63	1.76	1.09	3.62	1.47	3.16	35.31	47.47	19.95	78.41
223	33	114	2	2	3	3	3	3	157	22.43	3485	2538	1200	72.80	45.75	8.78	4.31	63.90	13.87	1.85	1.05	3.52	1.52	4.63	34.80	47.26	19.98	78.82
224	34	114.5	2	2	3	3	3	3	176.5	21.35	3918	2832	1343	72.30	46.00	8.95	4.14	61.35	16.34	2.02	1.05	3.73	1.40	3.76	34.49	47.42	20.23	78.75
225	34	111.5	2	2	3	3	3	3	250	21.80	5550	4093	2043	73.75	45.25	9.36	3.95	57.51	19.62	1.87	1.07	3.84	1.46	2.93	35.32	49.92	20.47	78.20
226	32.5	115	2	2	3	3	3	3	221	24.75	4906	3616	1783	73.70	44.25	9.16	3.77	59.99	18.08	1.81	1.10	3.63	1.46	3.32	33.88	49.31	19.83	79.17
227	31	114	2	2	3	3	3	3	211	22.25	4684	3350	1607	71.50	40.50	9.18	4.04	58.82	18.24	1.90	1.09	3.74	1.41	3.23	34.45	47.90	20.26	78.15
228	29.5	112	2	2	3	3	3	3	243.5	22.24	5406	3922	1934	72.50	43.25	9.09	3.83	60.70	16.79	1.84	1.10	3.72	1.45	3.62	31.99	49.24	19.91	78.59
229	31	113.5	2	2	3	3	3	3	225.5	17.42	5006	3487	1671	69.65	44.25	9.72	3.57	57.17	20.53	1.65	1.07	3.59	1.41	2.90	35.05	47.96	19.94	78.77
230	34	115	2	2	3	3	3	3	271.5	27.15	6027	4457	2134	73.95	43.25	9.05	3.74	61.96	15.37	1.78	1.11	3.63	1.47	4.04	34.10	47.87	19.68	78.44
231	32.5	111	2	2	3	3	3	3	203.5	22.64	4518	3225	1531	71.35	45.25	8.82	4.02	60.71	16.84	2.00	1.06	3.82	1.42	3.61	33.63	47.44	20.07	78.61
232	32.5	109.5	2	2	3	3	3	3	181.5	23.50	4029	2795	1355	69.35	43.75	9.36	3.53	58.39	18.29	1.71	1.14	3.85	1.47	3.19	33.75	48.51	19.93	77.82
233	33.5	108	2	2	3	3	3	3	167.5	22.55	3719	2656	1248	71.40	44.75	8.86	4.29	61.49	15.96	1.91	1.05	3.79	1.42	3.86	34.92	47.07	20.27	78.50

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234	31	108.5	4	4	5	5.5	5.5	6.5	176	21.75	3907	2749	1199	70.35	29.50	9.83	3.42	61.14	17.87	1.48	1.02	3.11	1.31	3.42	32.33	43.69	19.14	80.02
235	28	109	3	4	5	5.5	6	7	120.5	12.80	2675	1821	849	68.05	26.75	9.09	3.83	60.70	16.79	1.84	1.10	3.72	1.45	3.62	30.39	46.83	19.91	78.59
236	28.5	111.5	3.5	4	5	6	6.5	7.5	144	15.85	3197	2171	956	67.85	31.25	9.85	3.43	58.99	19.18	1.53	1.03	3.41	1.34	3.37	31.03	44.31	19.56	79.20
237	28.5	110.5	3.5	4	5	6	6	7	146.5	15.38	3252	2207	1034	67.85	27.50	9.90	3.64	62.44	16.77	1.47	1.00	3.10	1.27	3.75	29.78	46.70	19.37	80.20
238	29.5	110.5	3	4	5	6	6	7.5	174.5	14.85	3874	2734	1120	70.60	27.25	9.66	3.68	59.11	19.08	1.48	1.01	3.18	1.29	3.10	28.67	40.93	19.29	79.20
239	28	113.5	3	4	5	5.5	6	8	136.5	13.93	3030	2080	922	68.60	28.75	9.91	3.44	60.47	18.33	1.39	1.03	3.11	1.33	3.30	32.75	44.43	19.17	79.84
240	29.5	109.5	4	4	5	6	6	7	139.5	15.50	3097	2068	885	66.80	28.75	9.53	3.83	62.02	16.93	1.50	1.03	3.19	1.32	3.67	29.00	42.80	19.37	79.98
241	29	109.5	3.5	4	5	6	7	7.5	148	19.05	3286	2233	938	67.90	31.25	8.89	3.69	63.51	15.71	1.80	1.06	3.30	1.35	4.07	27.50	41.95	19.04	80.29
242	28.5	108	4	4	4	6	7	7.5	138	11.80	3064	1784	816	58.15	29.25	9.13	3.79	64.41	14.88	1.79	1.04	3.35	1.33	4.33	29.67	46.10	19.39	80.33
243	29.5	108.5	4	4	5	6	6	7	122.5	11.95	2720	1844	753	67.80	29.25	9.99	3.79	59.57	19.35	1.45	1.00	3.33	1.29	3.08	27.53	40.81	19.85	79.92
244	28	109	4	4	5	6	6	7	128.5	14.44	2853	1983	811	69.50	38.75	10.35	3.43	58.90	20.04	1.34	1.03	3.16	1.32	2.94	29.09	40.96	19.60	79.97
245	29	108	4	4	5	6	6	7.5	125	12.63	2775	1854	757	66.80	33.50	9.47	3.25	62.37	17.58	1.39	1.07	3.14	1.33	3.55	27.53	40.81	18.58	81.02
246	30.5	108.5	3	3.5	4.5	5.5	7	7.5	113.5	11.90	2520	1700	780	67.45	35.50	10.08	3.71	58.66	20.03	1.47	1.00	3.20	1.28	2.93	30.58	46.17	19.73	79.69
247	30	114	3	4	4	5.5	6	7	95	11.35	2109	1399	600	66.35	37.50	8.15	4.49	64.26	12.78	2.08	1.02	3.69	1.32	5.11	30.88	42.86	19.72	78.06
248	29.5	109.5	3	3.5	4	5.5	6	7	152.5	20.36	3386	2233	889	65.95	41.75	9.06	3.67	63.72	15.53	1.78	1.10	3.21	1.37	4.13	28.73	39.75	19.09	80.34
249	30	108.5	3	4	5	6	6	7	127.5	16.20	2831	1865	880	65.85	42.00	9.46	3.67	58.96	18.37	1.70	1.07	3.64	1.38	3.21	30.63	46.97	19.84	78.40
250	32.5	111.5	2	2	3	3	3	3	149.5	18.71	3319	2360	1103	71.10	41.50	9.83	3.74	58.47	19.92	1.64	1.03	3.36	1.37	2.94	31.47	46.50	19.94	79.42
251	33.5	111	2	2	3	3	3	3	190	22.85	4218	2937	1428	69.65	44.75	9.11	3.95	58.40	18.19	1.94	1.07	3.84	1.43	3.21	35.68	48.63	20.26	77.67
252	32	108.5	2	2	3	3	3	3	284.5	29.45	6316	4531	2205	71.75	42.75	9.31	3.72	58.54	19.59	1.78	1.03	3.56	1.42	3.22	35.08	48.67	19.79	79.16
253	32	114	2	2	3	3	3	3	224.5	24.20	4984	3613	1714	72.50	41.50	8.75	4.12	61.80	15.90	1.88	1.03	3.53	1.42	3.91	35.13	47.44	19.71	78.74
254	33.5	114.5	2	2	3	3	3	3	144.5	17.20	3208	2276	1069	71.10	43.75	9.53	3.42	57.68	18.90	1.79	1.07	3.66	1.41	3.05	36.52	46.97	19.80	77.65
255	32.5	113.5	2	2	3	3	3	3	177.5	17.89	3941	2890	1397	73.30	43.25	8.74	4.44	62.06	14.73	1.91	0.94	3.54	1.38	4.21	37.31	48.30	20.01	77.73
256	34	111	2	2	3	3	3	3	169.5	21.20	3763	2782	1309	73.95	42.75	9.07	3.77	60.85	16.80	1.80	1.11	3.58	1.45	3.62	36.01	47.11	19.68	78.76
257	33	114.5	2	2	3	3	3	3	222	24.84	4928	3567	1695	72.40	43.25	9.39	3.91	58.94	17.53	1.78	1.06	3.68	1.41	3.36	35.64	47.51	20.18	77.54
258	33.5	115.5	2	2	3	3	3	3	163.5	16.47	3630	2631	1263	72.50	43.75	8.73	4.07	62.71	13.85	1.83	1.08	3.72	1.45	4.53	34.83	48.01	19.81	77.64
259	32.5	113.5	2	2	3	3	3	3	171	16.20	3796	2772	1318	73.00	44.25	9.17	3.75	59.76	17.28	1.84	1.08	3.66	1.41	3.46	34.65	47.51	19.83	78.12
260	34	112.5	2	2	3	3	3	3	253.5	23.25	5628	3866	1873	68.70	42.75	8.70	4.14	61.35	16.30	1.93	1.08	3.64	1.42	3.77	37.93	48.45	19.84	78.73
261	32	111.5	2	2	3	3	3	3	184	16.73	4085	2957	1444	72.35	42.25	9.57	3.56	58.25	19.03	1.78	1.09	3.66	1.47	3.06	36.11	48.89	20.04	78.37
262	34.5	112	2	2	3	3	3	3	230	25.90	5106	3627	1740	71.05	41.50	9.61	3.53	57.23	19.28	1.78	1.10	3.68	1.43	2.97	36.29	47.99	20.04	77.62
263	32	108.5	2	2	3	3	3	3	233	25.99	5173	3687	1760	71.30	44.50	9.02	3.88	61.33	17.81	1.76	0.92	3.76	1.40	3.45	34.14	47.74	19.83	80.07
264	31.5	108.5	2	2	3	3	3	3	221	21.14	4906	3468	1634	70.70	43.00	10.08	3.49	55.52	21.61	1.65	1.06	3.64	1.42	2.62	35.77	47.11	20.29	78.19
265	32.5	112.5	2	2	3	3	3	3	166.5	15.75	3696	2552	1236	69.10	43.75	8.92	3.84	61.01	16.52	1.82	1.09	3.62	1.42	3.70	34.34	48.45	19.62	78.61
266	31.5	109	2	2	3	3	3	3	160.5	19.03	3563	2543	1189	71.35	43.25	8.75	3.82	62.22	15.00	1.86	1.00	3.93	1.42	4.15	35.01	46.76	19.80	78.22
267	32	111.5	2	2	3	3	3	3	184.5	21.20	4096	2940	1388	71.85	44.00	9.32	3.53	58.76	18.14	1.81	1.08	3.64	1.43	3.24	36.46	47.16	19.73	77.98
268	32.5	112.5	2	2	3	3	3	3	179	17.90	3974	2765	1310	69.60	42.25	9.44	3.61	59.45	17.79	1.76	1.10	3.67	1.44	3.34	34.65	47.37	19.93	78.34

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269	32.5	109.5	2	2	3	3	3	3	183	18.00	4063	2895	1383	71.25	39.75	9.28	3.46	59.19	17.68	1.78	1.12	3.70	1.47	3.35	35.25	47.76	19.68	77.99
270	32	109	3	4	4	5	6	7	158	19.40	3508	2403	1177	68.55	36.25	11.12	3.74	44.46	29.53	1.87	0.91	4.10	1.26	1.51	30.88	49.06	22.08	74.90
271	31.5	108.5	3	4	5	6	6	7.5	151	16.12	3352	2258	1105	67.45	38.75	10.66	4.03	49.10	26.13	1.80	0.93	3.95	1.27	1.88	35.00	48.91	21.71	76.17
272	30	111	3	4.5	5	6	5	7.5	127	14.15	2819	1884	885	66.80	36.50	10.33	3.85	52.48	24.56	1.76	0.97	3.67	1.31	2.14	34.20	47.02	20.91	78.01
273	31.5	108	3	4	5	6	5.5	7	132	15.05	2930	1915	897	65.30	37.75	10.69	3.93	46.49	28.24	1.84	0.91	4.02	1.27	1.65	34.21	46.83	21.75	75.65
274	31.5	111	3	4	5	6	6	7.5	111	13.88	2464	1688	803	68.40	38.50	10.71	3.98	49.70	26.07	1.87	0.89	3.84	1.25	1.91	35.27	47.66	21.65	76.66
275	30	113.5	3	4	4	5.5	5	8	124	12.35	2753	1775	868	64.40	39.75	10.74	4.11	48.81	26.37	1.82	0.90	4.05	1.25	1.85	32.46	48.81	21.97	76.08
276	29.5	111	3	4	4	6	6	7.5	110	14.65	2442	1583	767	64.80	36.75	10.43	4.12	50.26	24.68	1.92	0.91	3.95	1.27	2.04	31.86	48.57	21.69	75.85
277	31	114.5	3	3.5	4	5.5	6	7	144	19.90	3197	2139	985	66.95	38.75	10.65	4.00	49.80	25.65	1.87	0.91	3.87	1.26	1.95	32.47	46.06	21.64	76.36
278	32	109	2	2	3	3	3	3	212	22.55	4706	3335	1574	70.85	43.25	9.60	3.60	57.69	19.79	1.68	1.04	3.78	1.44	2.92	34.14	47.19	20.10	78.52
279	33	110.5	2	2	3	3	3	3	216	19.71	4795	3606	1705	75.20	41.75	9.78	3.46	56.52	21.00	1.73	1.04	3.76	1.43	2.78	33.59	47.25	20.17	78.56
280	32.5	111	2	2	3	3	3	3	175.5	19.90	3896	2743	1309	70.40	45.25	9.48	3.62	56.75	20.77	1.83	1.07	3.87	1.48	2.74	34.65	47.73	20.28	78.59
281	32.5	108	2	2	3	3	3	3	210	27.35	4662	3287	1538	70.50	42.75	9.08	3.39	62.46	16.68	1.58	0.90	3.55	1.32	3.75	36.35	46.81	18.91	80.04
282	32	110	2	2	3	3	3	3	185	15.42	4107	2942	1394	71.60	42.50	9.53	3.49	58.86	19.31	1.72	1.05	3.59	1.42	3.05	34.86	47.35	19.74	79.22
283	31	111.5	2	2	3	3	3	3	142.5	17.00	3164	2259	1054	71.35	42.25	9.30	3.56	59.54	17.86	1.79	1.06	3.76	1.44	3.33	33.67	46.77	19.85	78.45
284	31.5	112.5	2	2	3	3	3	3	123	12.30	2731	1907	897	69.90	39.25	9.11	3.51	61.33	17.38	1.80	1.08	3.63	1.49	3.54	33.80	47.07	19.53	79.78
285	32.5	109	2	2	3	3	3	3	203.5	22.40	4518	3275	1587	72.40	41.75	8.98	3.60	60.90	18.89	1.96	1.07	3.51	1.48	3.23	35.57	48.51	19.53	80.85
286	31	111.5	2	2	3	3	3	3	161.5	24.00	3585	2522	1187	70.35	42.75	9.48	4.00	57.98	18.63	1.83	1.04	3.81	1.38	3.11	34.40	47.05	20.49	77.65
287	32	108	2	2	3	3	3	3	189	22.20	4196	2980	1391	71.00	43.00	9.84	3.30	57.14	20.26	1.86	1.06	3.54	1.45	2.82	33.71	46.63	20.00	78.47
288	31.5	113.5	2	2	3	3	3	3	158	13.17	3508	2186	1044	62.35	40.00	9.64	3.80	60.29	18.63	1.86	1.05	3.43	1.48	3.24	34.66	47.78	20.20	79.96
289	32	108.5	2	2	3	3	3	3	173	18.18	3841	2755	1235	71.70	43.50	9.29	3.71	63.69	14.52	1.88	0.82	3.46	1.21	4.43	37.13	44.89	19.55	79.03
290	31	109.5	2	2	3	3	3	3	237	25.05	5261	3930	1889	74.70	45.25	9.63	3.28	57.80	19.22	1.79	1.08	3.70	1.47	3.01	35.02	48.11	19.86	78.10
291	31.5	111	2	2	3	3	3	3	153.5	12.23	3408	2485	1176	72.85	44.75	9.18	3.63	58.17	18.97	1.75	1.10	3.74	1.41	3.07	35.69	47.28	19.71	78.24
292	33	112	2	2	3	3	3	3	171.5	15.75	3807	2806	1340	73.70	40.25	9.12	3.76	58.30	18.53	1.93	1.08	3.76	1.48	3.15	34.66	47.73	20.05	77.91
293	34.5	108.5	2	2	3	3	3	3	174.5	16.80	3874	2527	1197	65.25	40.25	9.43	3.75	59.59	20.47	1.48	1.01	3.53	1.26	2.93	35.97	47.36	19.46	81.07
294	34.5	109.5	2	2	3	3	3	3	160.5	14.40	3563	2466	1149	69.30	42.25	9.19	3.69	58.03	19.02	1.83	1.09	3.80	1.43	3.05	35.88	46.60	19.95	78.15
295	32.5	110.5	2	2	3	3	3	3	193	21.51	4285	3198	1550	74.60	45.00	9.23	3.68	56.76	19.81	1.86	1.04	3.70	1.38	2.86	34.33	48.39	19.85	77.61
296	31.5	108	2	2	3	3	3	3	185.5	23.19	4118	3081	1457	74.80	42.25	9.28	3.89	56.32	19.39	1.90	1.07	4.05	1.50	2.91	35.03	47.29	20.62	76.78
297	32	109.5	2	2	3	3	3	3	152	12.19	3374	2371	1161	70.25	42.75	9.01	3.44	59.50	17.49	1.68	1.11	3.71	1.46	3.40	34.42	48.98	19.30	78.10
298	33	111.5	2	2	3	3	3	3	173.5	16.63	3852	2715	1263	70.45	43.50	9.49	3.56	57.42	19.47	1.84	1.09	3.75	1.50	2.95	36.46	46.52	20.14	77.98
299	32	108.5	2	2	3	3	3	3	191.5	16.15	4251	3005	1437	70.70	38.75	9.18	3.89	57.88	19.50	1.88	1.08	3.77	1.48	2.97	34.43	47.80	20.20	78.46
300	32.5	112.5	2	2	3	3	3	3	280.5	24.36	6227	4472	2176	71.80	41.50	9.80	3.54	55.51	21.32	1.76	1.10	3.75	1.45	2.66	36.34	48.62	20.30	77.92
301	34	110	2	2	3	3	3	3	198	18.21	4396	3143	1482	71.55	41.25	9.78	3.42	57.55	19.64	1.79	1.08	3.52	1.45	2.93	34.19	47.14	19.96	78.27

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302	34.5	116.5	2	2	3	3	3	3	195	22.88	4329	3229	1529	74.60	41.75	8.93	3.68	63.11	15.83	1.72	1.07	3.29	1.38	4.01	33.64	47.37	19.00	80.01
303	34	112	2	2	3	3	3	3	181	18.10	4018	3007	1412	74.80	42.25	10.12	3.89	55.04	20.54	1.86	0.98	3.95	1.45	2.68	36.69	47.00	21.27	76.56
304	33	112.5	2	2	3	3	3	3	136.5	11.15	3030	2283	1109	75.35	42.25	9.60	3.67	57.70	19.67	1.82	1.11	3.67	1.46	2.95	35.20	48.54	20.23	78.48
305	34	113	2	2	3	3	3	3	173	17.05	3841	2664	1267	69.40	45.25	9.67	3.57	57.55	19.97	1.80	1.10	3.62	1.47	2.89	36.16	47.56	20.13	78.63
306	33.5	113	2	2	3	3	3	3	169.5	21.10	3763	2490	1229	66.20	44.25	9.55	3.48	57.96	19.42	1.77	1.10	3.72	1.47	3.01	36.24	49.35	19.99	78.48
307	34.5	114.5	2	2	3	3	3	3	173.5	17.00	3852	2852	1369	74.05	44.25	9.45	3.60	57.98	19.94	1.81	1.08	3.84	1.51	2.91	35.15	47.96	20.22	79.00
308	33	113	2	2	3	3	3	3	131.5	9.93	2919	2257	1073	77.40	44.00	9.24	3.68	58.79	18.11	1.72	1.09	3.81	1.47	3.25	35.30	47.53	19.92	78.00
309	34.5	113.5	2	2	3	3	3	3	188	15.10	4174	3076	1446	73.70	44.25	9.62	3.66	58.66	19.19	1.75	1.09	3.76	1.48	3.06	36.25	47.02	20.28	78.94
310	32.5	111.5	2	2	3	3	3	3	130.5	15.25	2897	1952	933	67.30	44.00	9.87	3.51	56.00	21.85	1.73	1.07	3.57	1.42	2.60	35.51	47.69	20.11	78.93
311	34.5	116.5	2	2	3	3	3	3	184.5	19.45	4096	2987	1393	72.85	43.50	9.52	3.55	57.90	19.34	1.77	1.11	3.65	1.48	2.99	33.62	46.65	19.97	78.36
312	32	113.5	2	2	3	3	3	3	131	12.80	2908	1947	931	66.95	43.25	9.31	3.59	59.81	17.81	1.82	1.07	3.72	1.44	3.37	34.01	47.79	19.89	78.70
313	34	114.5	2	2	3	3	3	3	257	23.15	5705	4344	2062	76.15	42.75	9.44	3.83	57.50	19.48	1.90	1.04	3.89	1.41	2.95	36.28	47.45	20.48	78.02
314	33	115	2	2	3	3	3	3	173	16.43	3841	2734	1344	71.15	43.50	9.49	3.36	56.95	19.85	1.82	1.11	3.80	1.50	2.89	35.07	49.21	19.98	77.91
315	31.5	115.5	2	2	3	3	3	3	240.5	20.04	5339	3844	1858	72.00	42.50	8.83	4.28	59.13	16.48	1.92	1.10	3.93	1.40	3.59	34.90	48.33	20.36	76.71
316	33.5	114.5	2	2	3	3	3	3	202	17.77	4484	3285	1548	73.25	46.75	9.47	3.84	56.58	19.99	1.84	1.05	3.78	1.44	2.83	35.38	47.11	20.37	77.62
317	32	108.5	2	2	3	3	3	3	225	19.64	4995	3683	1761	73.75	43.75	9.78	3.90	54.94	21.14	1.83	1.04	3.88	1.44	2.61	37.36	47.78	20.82	77.12
318	33.5	110.5	2	2	3	3	3	3	197	19.70	4373	3135	1435	71.70	44.50	9.89	3.87	54.11	22.17	1.71	1.05	3.72	1.38	2.46	35.05	45.79	20.57	77.33
319	32.5	108.5	2	2	3	3	3	3	207.5	21.05	4607	3389	1655	73.55	44.75	10.19	3.59	52.01	22.13	1.78	1.05	4.03	1.47	2.35	34.52	48.81	21.06	75.19
320	33.5	113	2	2	3	3	3	3	217	19.09	4817	3511	1691	72.85	43.50	9.45	4.12	57.51	19.17	1.87	1.07	3.58	1.43	3.00	31.48	48.15	20.45	77.75
321	32.5	114.5	2	2	3	3	3	3	183.5	15.96	4074	2835	1320	69.55	43.25	8.99	3.88	61.25	16.76	1.87	1.05	3.57	1.44	3.66	33.71	46.59	19.76	79.06
322	32.5	114	2	2	3	3	3	3	204.5	20.35	4540	3323	1567	73.10	46.00	9.52	3.73	57.06	19.42	1.81	1.09	3.67	1.47	2.94	34.75	47.11	20.20	77.58
323	32	112.5	2	2	3	3	3	3	132	17.27	2930	2098	1017	71.60	44.25	9.35	3.79	58.28	19.42	1.74	1.08	3.70	1.44	3.02	35.45	48.47	20.02	78.78
324	33	113.5	2	2	3	3	3	3	156.5	18.69	3474	2539	1257	73.10	44.25	9.04	4.10	58.35	17.02	1.90	1.12	4.04	1.49	3.43	35.55	49.49	20.57	76.49
325	32.5	114	2	2	3	3	3	3	238.5	24.55	5295	3830	1816	72.40	43.50	9.59	3.35	56.20	20.61	1.92	1.05	3.80	1.46	2.73	32.20	47.41	20.12	77.85
326	31.5	114.5	2	2	3	3	3	3	174	20.80	3863	2729	1313	70.65	43.00	9.83	3.76	56.33	20.69	1.68	1.05	3.67	1.40	2.82	35.30	48.12	20.33	78.07
327	31.5	112.5	2	2	3	3	3	3	150.5	18.05	3341	2257	1060	67.55	43.50	9.39	3.78	59.07	17.83	1.80	1.07	3.75	1.45	3.31	35.05	46.98	20.16	77.98
328	34	112	2	2	3	3	3	3	168.5	27.70	3741	2631	1248	70.35	45.00	9.44	3.86	58.29	18.55	1.89	1.05	3.69	1.41	3.15	34.30	47.46	20.29	77.89
329	32.5	109	2	2	3	3	3	3	177	21.50	3929	2818	1325	71.65	41.75	10.03	3.76	55.46	20.53	1.84	1.06	3.87	1.47	2.72	34.40	47.08	20.97	77.05
330	33	114	2	2	3	3	3	3	179	21.95	3974	2807	1332	70.65	39.75	10.18	3.52	53.77	23.25	1.72	1.07	3.71	1.46	2.32	35.57	47.45	20.60	78.09
331	32	113.5	2	2	3	3	3	3	226	20.68	5017	3413	1626	68.05	42.75	10.10	3.50	55.61	19.66	1.80	1.10	3.75	1.48	2.83	34.09	47.65	20.63	76.36
332	32	114	2	2	3	3	3	3	230	24.75	5106	3372	1597	66.00	46.50	9.55	3.68	57.91	19.24	1.80	1.12	3.84	1.52	3.01	31.90	47.39	20.39	78.27
333	34.5	113	2	2	3	3	3	3	284.5	20.26	6315	4297	2030	68.05	43.00	9.88	3.60	56.58	19.56	1.82	1.09	3.77	1.48	2.90	35.63	47.26	20.55	77.22
334	33.5	110.5	2	2	3	3	3	3	223.5	25.95	4962	3531	1689	71.15	38.00	9.45	3.88	59.16	18.39	1.80	1.07	3.60	1.45	3.22	33.39	47.83	20.19	78.62
335	30	114	2	2	3	3	3	3	209.5	23.60	4651	3283	1653	70.60	42.00	8.98	4.10	61.24	16.58	1.90	1.05	3.62	1.42	3.70	35.14	50.35	20.03	78.87
336	31.5	116.5	2	2	3	3	3	3	165	17.95	3663	2547	1212	69.50	39.75	9.95	3.82	55.47	22.01	1.72	1.03	3.60	1.38	2.55	34.45	47.58	20.46	78.51

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337	31.5	115.5	2	2	3	3	3	3	3	191.5	16.23	4251	3040	1468	71.50	43.50	9.43	3.85	59.49	17.46	1.74	1.04	3.51	1.40	3.42	34.59	48.32	19.93	78.00
338	32	113.5	2	2	3	3	3	3	3	209	19.25	4640	3098	1505	66.80	41.50	9.85	3.72	55.05	20.12	1.88	1.11	3.69	1.52	2.74	33.97	48.51	20.66	76.28
339	33.5	113.5	2	2	3	3	3	3	3	247.5	19.81	5495	3875	1898	70.55	43.25	9.56	3.85	58.77	18.64	1.75	1.06	3.66	1.43	3.15	31.85	48.97	20.26	78.47
340	31.5	114	2	2	3	3	3	3	3	205.5	19.80	4562	3287	1562	72.05	43.00	9.08	3.97	59.94	16.73	1.88	1.06	3.61	1.44	3.60	35.72	47.50	19.97	77.73
341	33	115	2	2	3	3	3	3	3	169.5	13.39	3763	2792	1343	74.20	39.75	9.29	4.11	58.29	18.76	1.89	1.03	3.66	1.41	3.14	34.71	48.06	20.37	78.08
342	33.5	112	2	2	3	3	3	3	3	225	19.73	4995	3447	1658	69.00	40.50	9.94	3.39	54.06	21.05	1.73	1.10	3.77	1.48	2.57	34.61	48.08	20.30	76.21
343	34	113	2	2	3	3	3	3	3	169.5	18.05	3763	2538	1218	67.40	41.50	8.78	4.24	61.92	16.72	1.94	1.03	3.43	1.36	3.70	33.19	47.94	19.74	79.67
344	32.5	114.5	2	2	3	3	3	3	3	213.5	18.73	4740	3265	1478	68.90	38.00	9.66	3.48	57.80	20.47	1.76	1.08	3.43	1.41	2.82	29.12	45.30	19.74	79.35
345	34	117	2	2	3	3	3	3	3	167	18.75	3707	2680	1257	72.30	39.25	9.62	3.55	57.77	20.54	1.68	1.06	3.46	1.45	2.94	33.46	46.88	19.77	79.38
346	32.5	114.5	2	2	3	3	3	3	3	181.5	19.20	4029	2930	1401	72.70	43.00	9.10	3.84	61.11	17.43	1.82	1.08	3.50	1.45	3.52	31.23	47.80	19.71	79.62
347	31.5	113.5	2	2	3	3	3	3	3	106.5	11.45	2364	1671	777	70.65	39.75	9.45	3.84	57.60	19.47	1.85	1.07	3.68	1.42	2.96	34.66	46.57	20.24	78.14
348	32	108.5	2	2	3	3	3	3	3	232	23.20	5150	3693	1811	71.70	36.25	8.77	3.95	62.10	16.58	1.81	1.09	3.50	1.42	3.75	32.77	48.99	19.44	79.77
349	31.5	115.5	2	2	3	3	3	3	3	231	21.38	5128	3789	1797	73.90	39.75	9.03	3.87	65.00	14.93	1.70	1.02	3.26	1.35	4.36	35.87	47.41	19.21	80.96
350	32.5	113.5	2	2	3	3	3	3	3	199	15.48	4418	3235	1587	73.20	43.75	9.45	3.81	59.04	18.24	1.77	1.06	3.57	1.39	3.24	35.97	49.09	19.98	78.35
351	32.5	114.5	2	2	3	3	3	3	3	226	20.74	5017	3703	1770	73.80	44.25	9.22	3.70	60.78	17.04	1.81	1.06	3.67	1.46	3.57	33.84	47.81	19.86	78.88
352	34	109.5	2	2	3	3	3	3	3	207	23.15	4595	3339	1561	72.65	41.25	9.50	3.79	57.00	20.19	1.79	1.08	3.78	1.46	2.82	33.73	46.74	20.33	78.27
353	32.5	114.5	2	2	3	3	3	3	3	191	17.05	4240	3009	1467	70.95	38.00	9.40	3.70	58.18	19.93	1.68	1.06	3.64	1.44	3.11	32.17	48.78	19.86	79.18
354	32	111.5	2	2	3	3	3	3	3	171	20.55	3796	2747	1307	72.40	41.25	9.11	4.10	59.50	18.13	1.86	1.04	3.67	1.40	3.28	35.76	47.57	20.14	78.66
355	32.5	113.5	2	2	3	3	3	3	3	191	19.85	4240	3178	1486	74.95	38.75	8.85	4.00	59.83	17.51	1.86	1.09	3.68	1.46	3.42	36.41	46.78	19.84	78.43
356	34.5	109.5	2	2	3	3	3	3	3	181	16.85	4018	2919	1381	72.65	37.75	9.17	3.81	63.78	15.81	1.68	1.03	3.29	1.33	4.04	36.96	47.29	19.27	80.62
357	34.5	113.5	2	2	3	3	3	3	3	176	17.30	3907	2813	1334	72.10	40.75	9.41	3.79	57.94	19.18	1.83	1.05	3.89	1.44	3.02	34.57	47.45	20.37	78.17
358	31	110.5	2	2	3	3	3	3	3	224.5	18.38	4984	3560	1719	71.45	40.25	9.27	3.62	59.30	18.26	1.76	1.08	3.58	1.43	3.28	35.18	48.27	19.66	78.64
359	30.5	109	2	2	3	3	3	3	3	173.5	18.25	3852	2627	1243	68.20	41.50	9.94	3.58	55.21	22.16	1.67	1.07	3.69	1.43	2.52	31.45	47.33	20.32	78.43
360	31.5	112	2	2	3	3	3	3	3	192	19.95	4262	3064	1454	71.90	40.50	9.50	4.06	57.03	19.97	1.85	1.05	3.84	1.44	2.86	34.36	47.43	20.69	78.04
361	33.5	115.5	2	2	3	3	3	3	3	182	18.10	4040	2705	1286	66.95	39.50	8.78	4.02	58.48	17.74	1.97	1.12	4.05	1.48	3.30	35.72	47.56	20.29	77.33
362	34.5	112.5	2	2	3	3	3	3	3	230.5	27.01	5117	3705	1742	72.40	40.00	9.23	3.82	58.57	18.57	1.86	1.06	3.75	1.42	3.16	30.62	46.99	20.08	78.20
363	31	115.5	2	2	3	3	3	3	3	283	22.71	6283	4167	2001	66.30	37.75	9.12	4.01	58.16	19.14	1.87	1.06	3.93	1.43	3.04	34.64	48.04	20.36	78.36
364	29	106	4	4	5	6	6	7	64	12.25	1421	858	402	60.35	34.75	10.47	3.85	50.86	24.64	1.77	0.92	3.86	1.25	2.07	32.51	46.81	21.20	76.43	
365	28.5	105.5	3.5	4	5	6	6	7	55	11.00	1221	746	355	60.95	32.25	10.60	4.37	48.40	27.03	1.87	0.85	3.92	1.18	1.79	30.70	47.28	21.93	76.29	
366	27.5	109.5	3	3.5	5	6	6.5	7.5	43	7.91	955	570	263	59.50	31.75	10.71	4.20	49.04	26.80	1.80	0.85	3.79	1.16	1.83	33.50	46.05	21.67	76.69	
367	28.5	104.5	3	4	5	5.5	6	7	51.5	10.21	1143	710	328	62.50	31.00	10.65	4.25	48.65	25.98	1.81	0.89	3.95	1.21	1.87	29.62	46.21	21.87	75.52	
368	29.5	104	3	4	5	5.5	5.5	7	53	8.80	1177	605	282	51.50	32.25	10.54	3.77	50.87	25.14	1.69	0.97	3.80	1.31	2.03	32.95	46.57	21.11	76.98	
369	29.5	107	3	4	6	5	6.5	6.5	40.5	6.34	899	517	242	57.50	32.50	10.76	4.29	44.72	29.33	1.79	0.89	4.05	1.20	1.53	29.04	46.61	22.10	74.93	

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370	28.5	105	3	4	5	6	6	7	31	8.20	688	413	191	59.75	35.75	10.63	4.38	48.76	26.54	1.85	0.87	3.78	1.18	1.84	29.58	45.98	21.81	76.18
371	29.5	107.5	3	4	5	6	6	7	38.5	6.00	855	470	222	55.25	29.75	10.98	4.04	43.71	29.70	1.78	0.90	4.13	1.23	1.47	31.55	46.78	22.15	74.31
372	29.5	104	3	4	5	6	6	7	90.5	14.04	2009	1182	574	58.80	36.50	9.99	4.80	48.64	26.15	2.02	0.85	4.14	1.21	1.86	30.87	48.55	22.17	75.64
373	29	105.5	3	4.5	5	6	5	7	78	14.20	1732	1156	553	66.70	35.00	9.84	4.80	50.26	24.79	2.02	0.86	4.16	1.22	2.03	29.65	47.83	22.05	75.92
374	28	108.5	3	4.5	4	6	6	7.5	97	11.90	2153	1282	612	59.50	30.50	9.83	4.84	51.14	23.69	1.97	0.86	4.06	1.21	2.16	30.83	47.72	21.90	75.69
375	29.5	111	3	4.5	4	6	5	7	115	15.07	2553	1669	787	65.45	33.75	9.37	4.48	52.48	22.93	1.95	0.94	4.11	1.27	2.29	33.22	47.20	21.19	76.35
376	30.5	106	3	4.5	4	6	5	7.5	77	9.20	1709	1010	494	59.00	31.00	10.06	4.90	48.11	26.44	2.04	0.82	4.13	1.17	1.82	32.16	48.73	22.30	75.37
377	31.5	112.5	3	4.5	4	6	5.5	7.5	105	12.20	2331	1475	721	63.30	28.00	10.17	3.97	52.03	24.06	1.76	0.95	3.86	1.30	2.16	30.02	48.85	21.06	77.05
378	29	111	3	4.5	5.5	5.5	7	7	70	8.24	1554	1023	481	65.85	32.00	9.99	4.73	50.86	24.44	1.93	0.88	4.01	1.22	2.08	33.80	46.96	21.87	76.18
379	28	114.5	3	4.5	5.5	5.5	7	7.5	90.5	13.55	2009	1284	620	63.70	28.50	10.54	4.49	49.45	25.73	1.82	0.90	4.01	1.27	1.92	30.09	48.23	22.13	76.08
380	29	114	3.5	4	5.5	6.5	6	7.5	101.5	15.74	2253	1472	706	65.30	32.50	10.50	4.40	49.69	24.84	1.91	0.87	4.15	1.26	2.00	31.19	47.97	22.23	75.41
381	29.5	114.5	3.5	4.5	5	6	6.5	7	77	11.65	1709	1088	525	63.55	32.75	10.42	4.33	47.81	26.41	1.86	0.92	4.14	1.29	1.81	30.95	48.52	22.05	75.13
382	28.5	109	3	4	5	6	6	8	88.5	11.05	1965	1264	598	64.10	29.75	9.77	4.54	53.63	22.76	1.92	0.91	4.01	1.29	2.36	32.43	47.39	21.52	77.30
383	29.5	106.5	3	4	5	6	5	7	78	11.64	1732	1038	496	60.15	32.00	10.14	4.11	49.45	24.54	1.83	0.95	4.18	1.34	2.01	32.83	47.90	21.59	74.94
384	28.5	111	3	4	5	6	6	7.5	61	9.46	1354	825	409	60.55	32.50	10.01	4.72	50.99	24.61	1.94	0.88	4.05	1.23	2.07	31.85	49.39	21.94	76.47
385	32.5	109.5	2	4	6	6	7	8	110	14.82	2442	1687	802	69.00	41.00	9.70	4.00	56.36	20.05	1.67	1.06	3.93	1.43	2.81	37.35	47.49	20.72	77.46
386	32.5	114	2	2	3	3	3	3	131.5	14.71	2919	2077	978	71.20	42.00	9.77	3.91	57.13	20.12	1.75	1.08	3.73	1.47	2.84	35.61	47.09	20.62	78.33
387	32.5	113.5	2	2	3	3	3	3	194	20.67	4307	3122	1479	72.45	41.00	9.43	4.02	57.12	19.38	1.80	1.08	3.82	1.45	2.95	34.64	47.34	20.52	77.58
388	32	112.5	2	2	3	3	3	3	183	22.10	4063	2915	1359	71.75	40.00	9.44	3.85	57.69	18.77	1.77	1.08	3.75	1.43	3.08	35.88	46.63	20.25	77.54
389	32.5	115.5	2	2	3	3	3	3	154	17.29	3419	2475	1202	72.45	42.75	10.12	3.55	54.27	22.15	1.64	1.07	3.76	1.45	2.47	33.85	48.54	20.52	77.49
390	32.5	113.5	2	2	3	3	3	3	152	16.33	3374	2376	1131	70.35	42.75	9.59	3.82	56.60	20.06	1.85	1.07	3.79	1.44	2.82	35.49	47.69	20.49	77.73
391	34.5	116.5	2	2	3	3	3	3	187.5	21.25	4163	3037	1484	72.95	38.00	9.14	4.06	60.27	17.23	1.88	1.04	3.59	1.38	3.50	35.00	48.91	20.05	78.54
392	31.5	113.5	2	2	3	3	3	3	160.5	16.31	3563	2602	1226	73.00	41.25	9.67	4.10	57.03	19.57	1.80	1.03	3.72	1.36	2.92	35.58	47.16	20.64	77.63
393	31.5	111.5	2	2	3	3	3	3	205	18.93	4551	3315	1636	72.85	43.25	9.74	3.73	55.32	19.95	1.71	1.09	4.03	1.48	2.77	35.91	49.35	20.69	76.36
394	33.5	114.5	2	2	3	3	3	3	140.5	14.52	3119	2245	1067	72.00	41.50	9.37	3.87	61.43	15.41	1.75	1.09	3.64	1.50	3.99	34.73	47.52	20.13	77.93
395	32	110.5	2	2	3	3	3	3	170	21.75	3774	2624	1244	69.50	40.75	9.36	4.03	58.75	17.93	1.84	1.01	3.67	1.34	3.28	36.59	47.33	20.24	77.69
396	33	111.5	2	2	3	3	3	3	151	16.50	3352	2276	1067	67.90	41.25	9.59	3.73	57.15	19.39	1.76	1.11	3.77	1.51	2.96	35.79	46.88	20.34	77.65
397	32	112.5	2	2	3	3	3	3	133	14.55	2953	2076	1006	70.40	44.00	9.67	4.12	56.16	20.16	1.85	1.06	3.86	1.48	2.79	34.63	48.42	20.97	77.38
398	33	114.5	2	2	3	3	3	3	145.5	12.66	3230	2275	1081	70.45	43.25	9.12	4.00	59.27	17.75	1.80	1.07	3.91	1.48	3.35	33.31	47.55	20.31	78.08
399	34	114.5	2	2	3	3	3	3	209.5	21.70	4651	3294	1540	70.75	42.50	9.75	3.77	55.79	21.15	1.72	1.05	3.72	1.41	2.71	34.92	46.77	20.35	77.98
400	34.5	114.5	2	2	3	3	3	3	143.5	12.63	3186	1907	941	59.85	45.00	9.54	3.88	57.88	19.67	1.89	1.06	3.71	1.44	2.95	34.47	49.31	20.46	78.60
401	33.5	108	2	2	3	3	3	3	186	16.44	4129	2928	1414	70.90	44.25	10.08	3.37	55.47	21.15	1.90	1.05	3.81	1.50	2.62	34.67	48.27	20.66	77.67
402	32.5	109.5	2	2	3	3	3	3	183	20.30	4063	2689	1254	66.30	42.50	9.85	3.92	55.28	19.69	1.92	1.08	3.93	1.53	2.81	36.33	46.66	21.14	76.04
403	32.5	111	2	2	3	3	3	3	195	22.60	4329	3157	1491	72.95	39.75	9.70	3.92	56.64	20.73	1.92	1.05	3.67	1.47	2.73	34.10	47.23	20.68	78.41
404	32	110.5	2	2	3	3	3	3	176.5	16.17	3918	2933	1380	74.85	41.50	9.30	4.08	57.93	19.75	2.00	1.05	3.57	1.41	2.96	35.57	47.05	20.36	78.73

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405	32.5	111.5	2	2	3	3	3	3	148	18.70	3286	2366	1119	72.00	44.50	9.72	3.75	55.25	21.42	1.95	1.06	3.87	1.50	2.60	33.63	47.30	20.80	77.72
406	32.5	113.5	2	2	3	3	3	3	185	20.45	4107	2949	1363	71.80	42.25	9.66	3.63	57.31	20.12	1.90	1.07	3.73	1.49	2.85	34.56	46.24	20.41	78.50
407	32.5	109	2	2	3	3	3	3	172.5	19.25	3830	1505	739	41.00	41.75	9.61	3.84	55.78	21.26	1.90	1.06	3.92	1.51	2.64	35.90	49.46	20.78	78.11
408	32.5	112.5	2	2	3	3	3	3	173	17.30	3841	2686	1274	70.00	43.50	9.65	3.66	56.32	21.66	1.79	1.06	3.67	1.43	2.65	34.93	47.39	20.19	79.05
409	33.5	110	2	2	3	3	3	3	179	20.03	3974	3020	1465	75.95	38.75	9.98	3.67	54.98	21.16	1.81	1.05	3.86	1.45	2.60	36.44	48.55	20.77	77.19
410	32.5	110.5	2	2	3	3	3	3	172.5	20.76	3830	2926	1361	76.40	40.75	9.62	3.98	58.13	17.78	1.85	1.03	3.69	1.41	3.27	35.50	46.51	20.56	76.95
411	32.5	108.5	2	2	3	3	3	3	182	20.55	4040	2891	1363	71.55	42.50	9.17	3.81	63.78	15.81	1.68	1.03	3.29	1.33	4.04	35.77	47.15	19.27	80.62
412	34	112	2	2	3	3	3	3	212	24.00	4706	3477	1709	73.85	43.00	9.71	3.72	57.42	20.09	1.86	1.05	3.64	1.44	2.87	32.32	49.19	20.37	78.57
413	34	114	2	2	3	3	3	3	170	15.50	3774	2630	1249	69.65	42.75	9.50	3.79	57.98	18.78	1.81	1.06	3.76	1.42	3.09	33.61	47.51	20.27	77.82
414	32.5	108.5	2	2	3	3	3	3	143	21.30	3175	2317	1081	73.00	40.25	9.82	3.73	56.05	20.78	1.80	1.02	3.74	1.41	2.70	34.87	46.66	20.51	77.86
415	32	108.5	2	2	3	3	3	3	137.5	11.46	3053	2354	1110	77.10	42.50	9.59	3.40	57.64	19.43	1.79	1.10	3.80	1.54	2.99	34.14	47.15	20.11	78.18
416	33.5	115	2	2	3	3	3	3	162	15.70	3596	2523	1179	70.20	44.00	8.52	4.26	64.65	14.90	1.91	1.00	3.39	1.49	4.34	35.94	46.74	19.58	80.55
417	34.5	115.5	2	2	3	3	3	3	165	17.50	3663	2652	1254	72.45	40.50	9.71	3.71	56.81	20.01	1.71	1.04	3.72	1.41	3.00	36.09	47.30	20.26	77.86
418	32.5	115.5	2	2	3	3	3	3	146.5	16.80	3252	2418	1189	74.35	44.00	9.01	3.88	61.09	16.05	1.89	1.04	3.73	1.50	3.86	34.61	49.18	20.00	78.18
419	33.5	114.5	2	2	3	3	3	3	187.5	21.00	4163	3142	1512	75.50	43.25	9.37	3.84	57.56	19.25	1.87	1.07	3.79	1.43	2.99	33.47	48.12	20.31	77.88
420	32.5	113.5	2	2	3	3	3	3	162.5	18.80	3608	2535	1183	70.20	39.50	9.63	3.54	58.30	18.93	1.75	1.09	3.64	1.47	3.08	33.87	46.69	20.03	78.31
421	32	115.5	2	2	3	3	3	3	185	22.85	4107	3068	1469	74.70	41.50	9.41	3.57	58.91	18.16	1.75	1.08	3.63	1.43	3.24	35.61	47.94	19.79	78.15
422	31.5	113.5	2	2	3	3	3	3	121	16.25	2686	1812	852	67.40	43.25	9.62	3.68	57.91	18.09	1.71	1.09	3.56	1.47	3.20	36.22	47.01	20.03	77.09
423	33.5	112.5	2	2	3	3	3	3	206	21.65	4573	3295	1610	72.05	42.25	9.28	3.98	57.86	18.04	1.85	1.02	3.73	1.37	3.21	32.31	48.93	20.20	76.92
424	33.5	113	2	2	3	3	3	3	188.5	19.89	4185	3072	1484	73.40	43.25	9.44	3.31	63.37	15.20	1.90	0.88	3.27	1.24	4.18	35.72	48.34	19.17	79.46
425	34.5	112.5	2	2	3	3	3	3	198.5	23.25	4407	3242	1566	73.55	41.50	9.43	3.79	58.41	18.52	1.81	1.06	3.76	1.47	3.15	34.63	48.36	20.26	77.99
426	31.5	111.5	2	2	3	3	3	3	184	16.02	4085	2981	1413	73.00	43.00	9.25	4.01	58.11	18.54	1.85	1.06	3.70	1.39	3.13	34.62	47.39	20.20	77.72
427	33.5	109	2	2	3	3	3	3	156.5	19.10	3474	2481	1169	71.40	41.75	9.39	3.72	57.25	19.04	1.80	1.10	3.84	1.46	3.01	34.01	47.11	20.21	77.39
428	33	108.5	2	2	3	3	3	3	186	22.45	4129	2958	1370	71.65	43.00	10.29	3.41	53.98	22.57	1.65	1.09	3.75	1.47	2.40	34.94	46.31	20.57	77.64
429	33.5	110.5	2	2	3	3	3	3	94	11.75	2087	1448	693	69.30	39.00	9.45	3.65	58.28	18.50	1.77	1.06	3.80	1.43	3.16	33.60	47.92	20.10	77.84
430	33	113.5	2	2	3	3	3	3	179.5	15.25	3985	2864	1383	71.90	39.50	9.29	3.92	58.24	18.81	1.83	1.06	3.81	1.45	3.15	33.50	48.29	20.31	78.11
431	31	115.5	2	2	3	3	3	3	136	16.15	3019	2242	1065	74.35	43.50	9.39	3.60	58.93	18.16	1.77	1.10	3.77	1.51	3.26	35.30	47.52	20.03	78.19
432	32	114.5	2	2	3	3	3	3	126	17.55	2797	2077	989	74.25	42.00	8.85	4.10	61.09	16.83	1.89	1.05	3.89	1.49	3.63	34.26	47.64	20.22	78.97
433	32	113.5	2	2	3	3	3	3	222.5	26.50	4940	3565	1690	72.20	39.25	9.40	3.88	58.11	19.05	1.78	1.03	3.59	1.38	3.06	34.46	47.42	20.02	78.19
434	31.5	109.5	2	2	3	3	3	3	174	18.85	3863	2726	1297	70.55	38.25	9.50	3.65	58.40	18.05	1.80	1.10	3.93	1.55	3.24	36.07	47.54	20.42	77.56
435	33	109.5	2	2	3	3	3	3	204	24.05	4529	3292	1566	72.65	42.50	9.23	3.81	58.98	18.30	1.75	1.07	3.71	1.38	3.23	34.30	47.61	19.89	78.35
436	32	108	2	2	3	3	3	3	220.5	30.00	4895	3720	1780	76.00	42.50	9.18	3.46	59.06	18.52	1.82	1.09	3.66	1.42	3.19	34.92	47.84	19.54	78.68
437	33	115.5	2	2	3	3	3	3	138	18.40	3064	2296	1097	74.95	40.50	9.33	3.81	59.25	17.50	1.82	1.04	3.64	1.40	3.39	35.59	47.82	20.00	77.79

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438	32	107.5	2	2	3	3	3	3	252.5	26.95	5606	3977	1945	70.95	40.25	8.49	3.86	66.08	13.47	1.89	0.88	3.41	1.26	4.90	34.86	48.90	18.92	80.43
439	32	112	2	2	3	3	3	3	137	17.10	3041	2174	1003	71.55	40.75	8.86	4.02	61.71	15.73	1.83	1.09	3.75	1.43	3.92	35.25	46.09	19.89	78.53
440	32.5	107.5	2	2	3	3	3	3	186.5	20.95	4140	3030	1441	73.10	40.00	8.80	3.99	64.91	13.61	1.93	0.88	3.56	1.25	4.92	34.61	47.53	19.54	79.40
441	32	108.5	2	2	3	3	3	3	144.5	14.20	3208	2363	1128	73.60	41.75	8.93	3.65	62.89	16.27	1.72	1.07	3.39	1.36	3.87	35.18	47.69	19.04	80.23
442	32.5	113	2	2	3	3	3	3	218	17.90	4840	3584	1718	74.05	39.75	8.82	3.86	61.95	16.10	1.85	1.07	3.66	1.37	3.86	34.89	47.93	19.57	79.12
443	32	113.5	2	2	3	3	3	3	202.5	22.65	4496	3260	1563	72.55	40.50	8.60	4.23	64.02	15.23	1.90	1.02	3.50	1.45	4.20	34.86	47.99	19.68	80.26
444	33.5	113.5	2	2	3	3	3	3	223	22.35	4951	3610	1724	72.90	36.25	9.41	3.66	59.25	18.26	1.74	1.07	3.75	1.46	3.25	34.57	47.77	20.02	78.58
445	34.5	111.5	2	2	3	3	3	3	220	26.50	4884	3522	1687	72.10	43.00	9.17	4.17	59.69	17.32	1.87	1.03	3.70	1.43	3.45	34.05	47.93	20.34	78.03
446	33	114.5	2	2	3	3	3	3	140.5	16.58	3119	2080	1026	66.60	43.50	9.50	3.63	58.12	18.55	1.80	1.09	3.75	1.43	3.15	35.95	49.30	20.11	77.75
447	31.5	114.5	2	2	3	3	3	3	167	18.45	3707	2661	1234	71.75	45.25	9.53	3.88	58.74	19.72	1.76	1.00	3.49	1.45	3.20	34.43	46.31	20.12	79.45
448	33.5	114.5	2	2	3	3	3	3	177.5	19.81	3941	2962	1429	75.15	41.00	9.13	3.98	59.87	17.42	1.89	1.06	3.75	1.38	3.44	32.33	48.19	20.13	78.34
449	31	114.5	2	2	3	3	3	3	302	29.50	6704	4687	2280	69.95	43.00	9.26	3.60	61.53	15.43	1.74	1.10	3.69	1.47	3.99	34.42	48.63	19.76	78.06
450	32.5	108.5	2	2	3	3	3	3	245.5	19.75	5450	3901	1859	71.60	45.25	8.66	4.17	64.37	14.42	1.88	0.99	3.65	1.49	4.48	35.95	47.65	19.85	79.78
451	32	109.5	2	2	3	3	3	3	250.5	23.10	5561	3837	1822	69.00	43.50	9.47	3.55	58.02	18.84	1.83	1.10	3.76	1.46	3.08	33.59	47.50	20.08	77.96
452	34	109.5	2	2	3	3	3	3	254	28.65	5639	4155	1963	73.70	42.75	9.61	3.84	57.31	19.09	1.80	1.07	3.87	1.45	3.06	34.65	47.25	20.57	77.47
453	33.5	111.5	2	2	3	3	3	3	170	21.75	3774	2697	1297	71.45	42.00	9.23	3.93	59.29	17.49	1.78	1.10	3.81	1.45	3.39	34.59	48.10	20.19	77.88
454	33.5	113.5	2	2	3	3	3	3	217	18.08	4817	3471	1685	72.05	42.25	9.32	3.96	57.83	18.30	1.84	1.09	3.88	1.45	3.17	35.06	48.59	20.46	77.22
455	34.5	112.5	2	2	3	3	3	3	172	18.10	3818	2758	1368	72.10	37.75	9.40	3.92	58.54	18.14	1.80	1.05	3.62	1.38	3.23	36.65	49.66	20.11	77.73
456	32.5	114.5	2	2	3	3	3	3	244	22.19	5417	3934	1876	72.70	38.25	9.82	3.78	55.52	21.65	1.71	1.07	3.79	1.42	2.61	35.12	47.76	20.52	78.23
457	32	115.5	2	2	3	3	3	3	175.5	21.15	3896	2781	1335	71.35	44.25	9.25	4.33	59.27	17.58	1.74	1.04	3.74	1.38	3.37	34.27	48.02	20.43	77.89
458	31	109	2	2	3	3	3	3	112	13.03	2486	1773	852	70.95	44.25	9.49	4.15	56.49	19.23	1.89	1.04	3.90	1.40	2.94	31.95	48.57	20.83	76.75
459	32.5	109.5	2	2	3	3	3	3	199	23.89	4418	3274	1528	74.00	40.75	9.49	4.13	59.45	16.98	1.79	1.04	3.72	1.38	3.50	33.49	46.55	20.51	77.47
460	32.5	111	2	2	3	3	3	3	121	15.15	2686	1906	895	71.20	42.00	9.15	4.20	59.01	16.84	1.90	1.09	3.92	1.43	3.50	35.11	46.97	20.60	76.94
461	31	112.5	2	2	3	3	3	3	253	23.09	5617	4211	2040	74.95	45.50	9.48	3.97	57.59	19.03	1.83	1.06	3.87	1.45	3.05	35.91	48.36	20.59	77.68
462	32	113.5	2	2	3	3	3	3	235.5	21.68	5228	3831	1815	73.25	45.25	8.74	4.41	63.32	14.60	1.94	0.96	3.46	1.44	4.35	33.69	47.36	19.98	78.89
463	30.5	113	2	2	3	3	3	3	145	12.95	3219	2387	1180	74.15	46.25	9.32	4.15	57.45	18.12	1.90	1.06	4.24	1.49	3.17	34.68	49.46	21.11	76.63
464	31.5	114.5	2	2	3	3	3	3	155	21.10	3441	2400	1167	69.75	42.75	9.31	3.84	58.92	18.05	1.78	1.07	3.78	1.47	3.27	35.80	48.54	20.18	78.05
465	32.5	111.5	2	2	3	3	3	3	233.5	20.29	5184	3674	1805	70.90	41.25	9.78	3.79	55.66	21.51	1.74	1.05	3.71	1.40	2.64	34.91	49.11	20.41	78.22
466	32.5	113.5	2	2	3	3	3	3	141.5	19.95	3141	2162	1054	68.80	44.00	9.30	4.39	57.07	19.83	1.86	1.03	3.74	1.39	2.88	34.43	48.77	20.68	77.93
467	32	115.5	2	2	3	3	3	3	214	21.40	4751	3421	1653	72.00	40.75	8.79	4.48	61.78	15.50	1.94	0.99	3.73	1.39	4.04	35.57	48.26	20.32	78.27
468	32	114.5	2	2	3	3	3	3	230	19.17	5106	3611	1757	70.70	39.25	9.22	4.17	59.22	18.09	1.76	1.05	3.73	1.44	3.29	32.19	48.71	20.31	78.36
469	32.5	114	2	2	3	3	3	3	218.5	17.48	4851	3611	1735	74.45	39.75	9.53	3.87	56.34	19.80	1.80	1.05	3.90	1.45	2.86	35.66	48.03	20.55	77.19
470	32.5	113.5	2	2	3	3	3	3	289.5	28.95	6427	4926	2354	76.65	40.75	9.59	3.96	58.69	18.27	1.62	1.03	3.65	1.39	3.22	35.60	47.78	20.21	77.99
471	32	111.5	2	2	3	3	3	3	200.5	18.45	4451	3199	1555	71.85	38.75	10.06	3.49	56.10	20.76	1.55	1.06	3.64	1.42	2.70	34.21	48.61	20.15	77.92
472	32.5	113.5	2	2	3	3	3	3	135	15.05	2997	2032	978	67.90	43.00	9.83	3.79	57.24	19.43	1.70	1.06	3.70	1.42	2.96	36.10	48.07	20.43	77.74

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473	34.5	114	2	2	3	3	3	3	196.5	19.85	4362	3255	1560	74.60	40.25	10.23	3.41	54.68	22.48	1.55	1.06	3.62	1.41	2.45	36.14	47.89	20.21	78.22
474	34	116.5	2	2	3	3	3	3	236.5	19.45	5250	3693	1811	70.35	40.00	9.35	3.45	59.10	18.25	1.69	1.11	3.71	1.50	3.24	35.21	49.04	19.70	78.46
475	33	113.5	2	2	3	3	3	3	202.5	21.10	4496	3268	1566	72.65	41.75	9.93	3.00	57.16	19.41	1.57	1.07	3.73	1.47	2.95	34.25	47.91	19.71	77.65
476	32.5	115.5	2	2	3	3	3	3	243.5	24.30	5406	3936	1912	72.80	42.00	9.53	3.78	58.40	18.69	1.73	1.06	3.76	1.44	3.12	36.55	48.63	20.24	78.16
477	31.5	114.5	2	2	3	3	3	3	202	24.65	4484	3232	1511	72.10	38.50	9.64	3.61	56.74	19.75	1.74	1.08	3.82	1.46	2.89	34.42	46.75	20.27	77.56
478	33.5	114.5	2	2	3	3	3	3	167.5	20.05	3719	2694	1266	72.45	41.50	9.69	3.65	58.05	19.08	1.66	1.06	3.69	1.42	3.05	35.58	47.01	20.12	78.19
479	34.5	114.5	2	2	3	3	3	3	219.5	23.11	4873	3560	1691	73.05	42.25	9.52	3.55	58.61	18.25	1.69	1.08	3.66	1.44	3.24	33.25	47.49	19.87	77.94
480	31.5	110	2	2	3	3	3	3	226.5	23.30	5028	3188	1542	63.40	42.00	9.59	3.79	57.16	19.80	1.76	1.07	3.77	1.42	2.89	35.17	48.34	20.33	78.03
481	34.5	111.5	2	2	3	3	3	3	212	23.15	4706	3455	1616	73.40	42.00	9.77	3.31	57.06	19.62	1.60	1.12	3.70	1.50	2.91	34.84	46.76	19.88	77.79
482	29.5	112.5	2	2	3	3	3	3	148.5	20.20	3297	2344	1095	71.05	43.50	9.36	3.85	58.16	18.58	1.78	1.03	3.73	1.33	3.13	35.34	46.77	20.06	77.78
483	30.5	114.5	2	2	3	3	3	3	126	12.60	2797	1974	941	70.55	40.00	10.08	3.44	55.66	21.31	1.59	1.07	3.68	1.43	2.67	34.56	47.68	20.22	78.04
484	29.5	115.5	2	2	3	3	3	3	222	22.90	4928	3674	1749	74.55	45.75	9.41	3.55	60.11	17.57	1.66	1.10	3.67	1.49	3.42	35.36	47.61	19.77	78.78
485	30.5	113.5	2	2	3	3	3	3	160.5	21.00	3563	2614	1272	73.35	39.75	10.05	3.00	57.25	19.62	1.53	1.11	3.76	1.48	2.92	33.97	48.70	19.82	77.98
486	29	115.5	2	2	3	3	3	3	299	28.60	6638	4781	2253	72.00	42.50	9.13	3.77	59.05	17.93	1.82	1.06	3.78	1.45	3.29	33.65	47.14	19.95	78.04
487	30	115.5	2	2	3	3	3	3	165	22.50	3663	2509	1172	68.50	40.75	9.40	3.66	58.34	18.51	1.77	1.12	3.76	1.50	3.22	35.29	46.72	20.08	77.98
488	31	116	2	2	3	3	3	3	213	21.95	4729	3428	1628	72.55	44.00	10.04	3.21	55.32	20.56	1.60	1.10	3.78	1.49	2.69	35.30	47.53	20.11	76.98
489	32.5	108.5	2	2	3	3	3	3	184	20.65	4085	2968	1414	72.65	42.50	9.28	3.78	57.67	18.69	1.79	1.06	3.77	1.39	3.09	35.54	47.66	20.00	77.42
490	32	111.5	2	2	3	3	3	3	198	22.20	4396	3269	1541	74.30	42.75	9.54	3.49	58.42	18.91	1.63	1.08	3.73	1.45	3.09	34.96	47.09	19.84	78.41
491	32	104.5	2	2	3	3	3	3	194.5	20.45	4318	3102	1505	71.85	42.75	10.24	3.03	55.36	20.97	1.53	1.12	3.95	1.52	2.64	34.70	48.52	20.27	77.45
492	30	113.5	2	2	3	3	3	3	212.5	29.25	4718	3458	1659	73.30	43.00	9.86	3.79	56.02	20.86	1.75	1.05	3.69	1.39	2.77	34.48	47.97	20.48	77.93
493	34	115	2	2	3	3	3	3	193	22.85	4285	3047	1437	71.05	43.25	9.81	3.36	56.02	20.10	1.58	1.07	3.93	1.47	2.79	35.56	47.12	20.16	77.19
494	30.5	108	2	2	3	3	3	3	153	20.95	3397	2523	1177	74.20	43.25	10.10	3.35	56.15	20.25	1.61	1.06	3.91	1.56	2.78	36.70	46.67	20.52	77.47
495	32.5	112.5	2	2	3	3	3	3	156	22.20	3463	2557	1228	73.90	40.75	9.70	3.59	57.98	18.65	1.71	1.08	3.74	1.46	3.24	32.18	48.04	20.21	77.72
496	32.5	113.5	2	2	3	3	3	3	241.5	29.70	5361	3944	1883	73.55	44.75	9.01	4.15	60.41	17.18	1.87	1.05	3.81	1.43	3.52	35.82	47.70	20.27	78.64
497	32.5	112.5	2	2	3	3	3	3	232	22.24	5150	3791	1804	73.50	44.75	9.75	3.82	56.82	19.75	1.72	1.07	3.74	1.44	2.88	34.62	47.54	20.47	77.65
498	33	113.5	2	2	3	3	3	3	153	18.15	3397	2612	1290	76.90	44.25	9.05	4.24	60.52	16.64	1.88	1.04	3.66	1.39	3.64	35.91	49.38	20.22	78.20
499	32	114.5	2	2	3	3	3	3	165	21.90	3663	2825	1332	77.15	41.75	9.06	4.33	60.63	16.65	1.91	1.02	3.65	1.37	3.64	35.76	47.15	20.32	78.30
500	32.5	113.5	2	2	3	3	3	3	200	24.03	4440	3365	1571	75.80	45.00	9.17	4.36	59.02	19.08	1.87	0.97	3.69	1.37	3.09	34.39	46.70	20.46	79.08
501	32	111	2	2	3	3	3	3	179.5	20.40	3985	2809	1338	70.50	42.25	9.14	4.29	58.19	19.05	1.91	1.02	3.80	1.38	3.05	33.97	47.65	20.50	78.26
502	33.5	111	2	2	3	3	3	3	232	23.35	5150	3719	1732	72.20	42.50	9.87	3.50	56.03	20.53	1.67	1.06	3.82	1.39	2.73	33.08	46.57	20.24	77.62
503	32	107.5	2	2	3	3	3	3	215	24.20	4773	3422	1666	71.70	42.75	8.97	3.85	61.34	16.79	1.91	0.92	3.59	1.31	3.66	31.78	48.69	19.62	79.06
504	31	110	2	2	3	3	3	3	236	26.55	5239	3784	1868	72.20	39.75	9.87	3.58	57.03	20.45	1.65	1.05	3.60	1.41	2.91	35.20	49.35	20.10	78.52
505	31	111.5	2	2	3	3	3	3	203.5	23.30	4518	3165	1511	70.00	41.50	9.68	3.79	56.12	19.89	1.78	1.06	3.88	1.42	2.82	33.84	47.75	20.55	77.06

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506	32	113.5	2	2	3	3	3	3	166	20.60	3685	2689	1287	72.95	38.75	9.33	4.65	59.31	17.50	1.94	0.95	3.59	1.24	3.39	34.90	47.89	20.74	77.77
507	31	113.5	2	2	3	3	3	3	176.5	19.25	3918	2949	1403	75.30	43.25	10.23	2.91	54.60	21.47	1.58	1.13	3.81	1.51	2.54	35.28	47.59	20.05	77.21
508	33.5	111.5	2	2	3	3	3	3	209.5	20.85	4651	3355	1590	72.15	40.50	9.55	3.82	57.72	19.43	1.72	1.08	3.83	1.47	2.97	35.38	47.38	20.39	78.23
509	32	114.5	2	2	3	3	3	3	160.5	16.40	3563	2731	1334	76.60	38.75	9.42	3.86	58.00	19.33	1.80	1.07	3.91	1.49	3.02	35.18	48.80	20.48	78.39
510	32.5	114.5	2	2	3	3	3	3	222.5	24.80	4940	3659	1730	74.10	41.75	10.09	3.14	54.60	21.05	1.58	1.09	3.70	1.48	2.59	34.12	47.24	19.99	76.74
511	32.5	113.5	2	2	3	3	3	3	66.5	5.60	1476	1088	527	73.60	38.25	10.21	3.49	55.46	21.28	1.57	1.12	3.80	1.52	2.61	35.11	48.55	20.59	77.86
512	32	113	2	2	3	3	3	3	215	24.05	4773	3650	1719	76.55	43.00	9.79	3.79	55.54	21.58	1.72	1.07	3.70	1.42	2.62	35.68	47.11	20.42	78.19
513	31	113	2	2	3	3	3	3	164.5	18.90	3652	2664	1280	72.85	37.75	10.33	3.02	54.33	21.89	1.51	1.10	3.73	1.46	2.48	35.58	47.92	20.04	77.32
514	31.5	113.5	2	2	3	3	3	3	158	15.89	3508	2674	1256	76.15	38.50	9.59	3.93	57.66	19.31	1.74	1.05	3.69	1.42	3.00	35.43	47.07	20.38	78.02
515	33.5	114.5	2	2	3	3	3	3	156	20.70	3463	2532	1190	73.10	36.75	9.55	3.72	58.56	18.28	1.71	1.10	3.63	1.46	3.21	35.58	46.99	20.07	77.93
516	32.5	114.5	2	2	3	3	3	3	204.5	22.48	4540	3402	1591	74.75	38.75	10.25	3.20	56.54	20.94	1.42	1.11	3.66	1.50	2.70	33.53	46.79	20.03	78.59
517	32.5	113.5	2	2	3	3	3	3	130.5	13.60	2897	2170	1029	74.90	41.00	9.30	3.96	58.54	18.90	1.75	1.11	3.79	1.50	3.10	30.36	47.38	20.31	78.55
518	32.5	115.5	2	2	3	3	3	3	172.5	32.05	3830	2782	1359	72.60	42.75	9.42	3.79	58.51	18.82	1.79	1.06	3.75	1.43	3.14	35.52	48.82	20.17	78.40
519	32.5	115	2	2	3	3	3	3	188	24.90	4174	2708	1274	64.85	39.00	9.69	3.65	56.25	20.61	1.71	1.09	3.77	1.46	2.73	35.73	47.06	20.28	77.95
520	32	114.5	2	2	3	3	3	3	250	30.15	5550	4094	1941	73.80	36.50	9.71	3.81	57.25	19.73	1.68	1.05	3.70	1.43	2.92	36.02	47.41	20.34	78.03
521	32	114.5	2	2	3	3	3	3	154	17.75	3419	2478	1178	72.55	38.25	9.71	3.48	57.28	20.07	1.74	1.08	3.67	1.44	2.87	34.84	47.55	20.05	78.43
522	32	114.5	2	2	3	3	3	3	181.5	23.20	4029	2986	1417	74.05	40.50	9.67	3.75	57.47	20.21	1.75	1.04	3.61	1.40	2.87	36.46	47.39	20.18	78.72
523	32.5	113	2	2	3	3	3	3	188	22.05	4174	3174	1526	76.05	42.50	9.96	3.36	56.49	21.67	1.60	1.08	3.57	1.44	2.66	34.38	48.07	19.94	79.23
524	32	113.5	2	2	3	3	3	3	154.5	15.94	3430	2464	1167	71.80	39.75	9.39	3.51	56.65	20.11	1.80	1.14	3.84	1.53	2.82	36.02	47.41	20.07	77.90
525	31	111.5	2	2	3	3	3	3	230.5	24.35	5117	3722	1771	72.75	40.25	9.02	3.89	58.92	17.91	1.89	1.08	3.81	1.43	3.29	36.61	47.57	20.04	77.91
526	32.5	114	2	2	3	3	3	3	145	17.29	3219	2305	1116	71.55	37.50	9.08	3.78	60.77	16.86	1.82	1.07	3.65	1.45	3.61	34.66	48.46	19.77	78.71
527	31	111.5	2	2	3	3	3	3	173.5	22.95	3852	2758	1293	71.80	42.75	10.05	3.13	55.46	22.45	1.57	1.11	3.50	1.49	2.47	35.42	46.88	19.74	79.02
528	32	113.5	2	2	3	3	3	3	145	13.10	3219	2347	1147	72.90	40.75	9.73	3.24	57.75	20.49	1.63	1.07	3.50	1.45	2.82	35.71	48.90	19.54	79.32
529	32.5	113.5	2	2	3	3	3	3	215	19.15	4773	3550	1664	74.35	41.75	9.73	3.10	57.74	19.22	1.71	1.09	3.67	1.48	3.01	35.11	46.87	19.68	78.05
530	33	114	2	2	3	3	3	3	145	13.35	3219	2226	1072	69.20	43.75	9.09	3.66	59.22	17.81	1.82	1.11	3.81	1.47	3.33	34.63	48.15	19.84	78.14
531	32.5	111.5	2	2	3	3	3	3	194.5	19.45	4318	3043	1477	70.50	40.75	10.28	3.17	54.73	22.61	1.52	1.05	3.62	1.41	2.44	34.79	48.56	20.00	78.39
532	32.5	113.5	2	2	3	3	3	3	148.5	14.28	3297	2270	1100	68.85	42.00	9.38	3.53	58.17	18.99	1.70	1.11	3.73	1.47	3.08	35.08	48.49	19.82	78.27
533	32	108.5	2	2	3	3	3	3	182.5	20.38	4052	2910	1354	71.75	42.75	8.65	3.61	58.82	19.38	2.03	0.98	4.04	1.37	3.04	34.44	46.53	19.72	79.18
534	32	112	2	2	3	3	3	3	102	11.27	2264	1580	741	69.65	42.00	9.72	3.49	57.22	20.15	1.59	1.08	3.69	1.50	2.84	34.19	46.89	19.99	78.45
535	31.5	111.5	2	2	3	3	3	3	120	17.25	2664	1968	951	73.80	41.25	9.48	3.29	57.72	20.27	1.64	1.12	3.86	1.48	2.85	34.09	48.38	19.76	79.11
536	32.5	112.5	2	2	3	3	3	3	194	25.40	4307	3117	1468	72.35	44.25	9.67	3.00	57.53	19.95	1.53	1.08	3.66	1.41	2.89	36.67	47.12	19.28	78.57
537	32.5	108.5	2	2	3	3	3	3	168.5	22.45	3741	2695	1262	72.05	39.75	9.21	3.38	59.65	17.99	1.83	1.09	3.57	1.46	3.32	34.75	46.84	19.45	78.73
538	32	110.5	2	2	3	3	3	3	178.5	19.75	3963	2948	1432	74.40	45.25	9.86	3.31	56.10	21.20	1.65	1.08	3.81	1.49	2.65	35.02	48.55	20.12	78.37
539	34	113.5	2	2	3	3	3	3	162	15.90	3596	2593	1213	72.10	41.50	9.41	3.33	58.40	19.23	1.75	1.07	3.60	1.41	3.04	35.10	46.79	19.50	78.70
540	31.5	114.5	2	2	3	3	3	3	148.5	14.85	3297	2199	1059	66.75	43.00	9.31	3.20	60.51	18.14	1.86	1.08	3.39	1.49	3.34	34.43	48.16	19.25	79.73

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541	32	109.5	2	2	3	3	3	3	163	12.95	3619	2544	1190	70.30	42.50	9.33	3.67	58.42	19.55	1.74	1.05	3.65	1.41	3.02	36.14	46.74	19.80	79.02
542	32	111.5	2	2	3	3	3	3	204	19.05	4529	3235	1561	71.50	40.75	9.52	3.56	56.32	21.48	1.75	1.07	3.65	1.45	2.63	35.40	48.27	19.94	78.88
543	34	114	2	2	3	3	3	3	128.5	15.30	2853	2034	947	71.30	41.25	9.41	3.37	57.76	19.71	1.62	1.13	3.77	1.50	2.93	35.01	46.55	19.67	78.59
544	32	110.5	2	2	3	3	3	3	117.5	14.50	2609	2012	953	77.15	43.00	9.95	3.32	55.40	22.19	1.60	1.08	3.74	1.44	2.52	33.96	47.36	20.05	78.67
545	33	112.5	2	2	3	3	3	3	120	17.90	2664	1700	835	63.65	40.25	9.59	3.50	58.13	20.01	1.52	1.10	3.56	1.43	2.91	32.36	48.82	19.61	79.23
546	31.5	113	2	2	3	3	3	3	103	12.34	2287	1571	746	68.30	40.25	9.58	3.38	57.21	20.09	1.60	1.09	3.60	1.48	2.85	34.86	47.61	19.65	78.40
547	32.5	112	2	2	3	3	3	3	139.5	16.78	3097	2240	1105	72.30	43.25	9.55	3.37	56.98	20.62	1.68	1.10	3.53	1.46	2.77	35.29	49.28	19.59	78.70
548	32	114	2	2	3	3	3	3	134	16.06	2975	2075	1000	69.65	42.25	9.64	3.51	57.64	19.73	1.67	1.07	3.54	1.43	2.94	35.21	48.19	19.79	78.43
549	31.5	112	2	2	3	3	3	3	135	21.88	2997	2209	1045	73.70	43.00	9.40	3.60	58.08	19.78	1.76	1.10	3.66	1.43	2.95	35.80	47.33	19.84	78.96
550	32	112	2	2	3	3	3	3	124.5	14.89	2764	2092	988	75.75	45.25	9.89	3.66	55.59	21.43	1.71	1.05	3.67	1.42	2.60	34.39	47.19	20.36	78.07
551	32.5	113.5	2	2	3	3	3	3	134	15.80	2975	2035	967	68.40	44.75	9.51	3.67	57.82	19.90	1.76	1.07	3.73	1.43	2.91	34.82	47.55	20.11	78.79
552	32.5	114.5	2	2	3	3	3	3	141.5	13.11	3141	2230	1045	70.95	44.75	9.73	3.10	57.97	20.32	1.47	1.12	3.38	1.47	2.85	37.23	46.84	19.15	79.42
553	32.5	112.5	2	2	3	3	3	3	155.5	18.20	3452	2527	1165	73.20	43.25	10.05	3.41	55.62	22.03	1.52	1.06	3.54	1.39	2.56	34.29	46.07	19.91	78.71
554	32.5	115.5	2	2	3	3	3	3	137.5	13.90	3053	2137	1015	69.95	40.50	9.66	3.88	58.94	18.70	1.87	1.03	3.66	1.41	3.15	36.31	47.58	20.47	78.67
555	32	113.5	2	2	3	3	3	3	127	16.43	2819	1945	959	68.95	41.00	9.69	3.28	56.28	21.27	1.66	1.08	3.67	1.44	2.66	35.42	49.24	19.73	78.63
556	32	113	2	2	3	3	3	3	116.5	11.80	2586	1650	779	63.85	41.50	9.97	3.10	55.05	22.06	1.52	1.08	3.68	1.41	2.50	35.57	47.26	19.69	78.19
557	31.5	113.5	2	2	3	3	3	3	128	16.85	2842	1983	957	69.75	39.50	9.32	3.04	58.35	19.09	1.52	1.09	3.75	1.52	3.06	35.91	48.13	19.15	78.53
558	32.5	113.5	2	2	3	3	3	3	129.5	12.80	2875	2032	978	70.65	40.25	10.04	3.18	55.11	22.10	1.53	1.09	3.75	1.45	2.49	34.13	48.12	19.95	78.30
559	31.5	114.5	2	2	3	3	3	3	122	13.15	2708	1904	891	70.30	43.00	9.64	3.63	58.80	19.10	1.66	1.06	3.58	1.42	3.08	35.91	46.76	19.92	78.96
560	32.5	108.5	2	2	3	3	3	3	132	12.13	2930	2040	963	69.60	43.25	10.08	3.03	55.93	21.14	1.48	1.11	3.59	1.50	2.65	33.94	47.22	19.67	78.18
561	31	108	2	2	3	3	3	3	133	13.05	2953	2097	989	71.05	43.75	10.06	3.88	54.06	21.89	1.85	1.08	3.81	1.47	2.47	34.94	47.15	21.07	77.03
562	32.5	109.5	2	2	3	3	3	3	223.5	22.35	4962	3513	1687	70.80	41.75	9.96	3.67	54.24	22.89	1.71	1.05	3.73	1.39	2.38	34.65	47.98	20.46	78.18
563	32.5	114.5	2	2	3	3	3	3	174	19.47	3863	2793	1328	72.35	44.75	9.51	3.62	57.61	20.63	1.76	1.09	3.60	1.48	2.80	35.34	47.52	19.96	79.32
564	32.5	113.5	2	2	3	3	3	3	164	14.93	3641	2586	1259	70.90	43.75	9.37	3.65	57.07	21.28	1.81	1.05	3.69	1.45	2.68	34.64	48.51	19.97	79.40
565	33.5	113	2	2	3	3	3	3	142.5	15.80	3164	2186	1022	69.15	42.75	9.62	3.71	57.52	20.88	1.70	1.03	3.54	1.41	2.77	36.04	46.80	19.99	79.43
566	32	113	2	2	3	3	3	3	194	17.31	4307	3100	1465	72.05	41.50	9.31	3.77	59.13	17.71	1.91	1.06	3.65	1.48	3.34	36.75	47.24	20.12	77.90
567	31.5	111.5	2	2	3	3	3	3	227	20.30	5039	3762	1798	74.60	44.25	9.72	3.33	57.34	21.10	1.67	1.06	3.56	1.44	2.72	34.65	47.80	19.72	79.49
568	32.5	114.5	2	2	3	3	3	3	225.5	24.10	5006	3761	1789	75.05	44.50	9.61	3.43	58.50	19.68	1.69	1.09	3.51	1.46	3.00	35.24	47.51	19.69	79.27
569	33.5	115.5	2	2	3	3	3	3	115.5	12.15	2564	1811	890	70.55	42.75	9.22	3.94	59.64	18.18	1.81	1.08	3.57	1.41	3.28	34.97	49.10	19.96	78.90
570	33.5	108.5	2	2	3	3	3	3	115.5	13.09	2564	1886	905	73.65	45.50	9.95	2.98	56.69	21.67	1.59	1.07	3.56	1.45	2.62	34.40	47.97	19.54	79.44
571	31.5	111	2	2	3	3	3	3	183.5	17.53	4074	3125	1536	76.70	42.75	9.95	2.89	58.32	21.25	1.47	1.05	3.24	1.40	2.74	33.94	49.12	18.95	80.62
572	32.5	112	2	2	3	3	3	3	122.5	12.99	2720	1885	888	69.15	37.75	9.80	3.69	56.91	20.23	1.75	1.04	3.63	1.40	2.81	33.86	47.16	20.26	78.17
573	31.5	108.5	2	2	3	3	3	3	196.5	19.65	4362	3152	1504	72.25	43.75	9.99	3.20	56.59	21.86	1.52	1.07	3.51	1.44	2.63	35.65	47.76	19.65	79.51

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574	33.5	113.5	2	2	3	3	3	3	186.5	19.80	4140	3007	1423	72.60	43.25	9.80	3.76	57.39	20.57	1.68	1.05	3.52	1.42	2.82	35.16	47.29	20.18	79.01
575	31.5	108.5	2	2	3	3	3	3	170.5	15.01	3785	2821	1345	74.45	39.75	10.33	3.54	54.01	24.61	1.59	1.02	3.75	1.40	2.19	34.02	47.68	20.60	79.63
576	32.5	109.5	2	2	3	3	3	3	157	12.51	3485	2572	1216	73.80	41.75	9.87	3.50	56.71	20.94	1.68	1.05	3.60	1.42	2.72	35.51	47.24	20.08	78.71
577	31.5	111	2	2	3	3	3	3	198	17.64	4396	3296	1586	75.05	41.00	9.73	3.69	57.87	20.65	1.69	1.06	3.55	1.46	2.83	34.26	48.09	20.11	79.58
578	32	112	2	2	3	3	3	3	178	19.68	3952	2681	1292	67.90	37.75	9.77	3.58	56.88	20.84	1.61	1.04	3.59	1.40	2.76	34.28	48.20	19.94	78.76
579	31.5	112.5	2	2	3	3	3	3	217.5	18.84	4829	3614	1767	74.90	39.25	9.53	3.55	57.69	21.56	1.56	1.07	3.60	1.44	2.68	35.12	48.87	19.68	80.32
580	32	112.5	2	2	3	3	3	3	143	15.30	3175	2358	1104	74.30	40.75	9.34	3.69	57.88	20.28	1.68	1.10	3.64	1.45	2.86	34.44	46.83	19.80	79.26
581	31	108.5	2	2	3	3	3	3	188	17.38	4174	3040	1491	72.80	42.75	9.69	3.57	56.83	20.48	1.73	1.05	3.62	1.41	2.78	34.48	49.03	20.02	78.36
582	32	110.5	2	2	3	3	3	3	198.5	17.40	4407	3198	1488	72.55	42.50	10.02	3.31	55.47	22.97	1.51	1.02	3.50	1.35	2.42	34.16	46.54	19.68	79.45
583	32.5	111	2	2	3	3	3	3	114.5	9.35	2542	1756	828	69.10	42.50	10.16	3.33	55.09	23.03	1.54	1.05	3.55	1.39	2.40	34.28	47.15	19.96	79.17
584	31	110	2	2	3	3	3	3	218.5	21.85	4851	3679	1722	75.85	43.25	9.47	4.09	56.99	20.30	1.88	1.06	3.69	1.44	2.81	34.87	46.80	20.56	78.34
585	32.5	108.5	2	2	3	3	3	3	156	16.31	3463	2477	1175	71.55	39.25	9.72	3.27	57.03	20.74	1.68	1.08	3.62	1.46	2.75	34.08	47.40	19.75	78.86
586	31.5	111	2	2	3	3	3	3	211.5	26.44	4695	3536	1656	75.30	43.25	9.82	3.65	54.69	22.80	1.76	1.04	3.82	1.46	2.42	34.04	46.82	20.51	78.54
587	31.5	108.5	2	2	3	3	3	3	150	16.80	3330	2384	1143	71.60	45.75	9.99	3.57	55.48	22.55	1.62	1.05	3.64	1.42	2.46	34.24	47.96	20.24	79.07
588	32	108	2	2	3	3	3	3	223.5	29.85	4962	3804	1773	76.60	43.50	9.93	3.74	55.35	21.86	1.74	1.03	3.70	1.42	2.55	36.18	46.66	20.53	78.25
589	31.5	110.5	2	2	3	3	3	3	277.5	23.13	6161	4778	2367	77.55	42.50	9.66	3.64	57.52	20.41	1.72	1.05	3.71	1.43	2.85	36.78	49.55	20.17	78.98
590	31	109.5	2	2	3	3	3	3	240.5	22.35	5339	4124	1922	77.25	42.00	9.80	3.59	56.37	21.24	1.73	1.06	3.84	1.48	2.66	35.17	46.60	20.44	78.67
591	31.5	107.5	2	2	3	3	3	3	169	19.20	3752	2789	1332	74.35	44.25	10.12	3.44	53.76	24.58	1.49	1.05	3.66	1.36	2.19	33.87	47.75	20.08	79.40
592	33.5	110.5	2	2	3	3	3	3	112	12.15	2486	1803	848	72.65	42.00	9.99	3.57	55.25	22.02	1.70	1.06	3.70	1.43	2.53	37.40	46.96	20.38	78.33
593	31.5	112.5	2	2	3	3	3	3	191.5	17.80	4251	3095	1504	72.80	45.75	9.22	4.19	58.13	19.43	1.79	1.00	3.67	1.37	3.00	35.33	48.51	20.25	78.56
594	32	113.5	2	2	3	3	3	3	196.5	23.30	4362	3208	1522	73.55	44.50	9.95	3.62	55.62	22.43	1.58	1.05	3.70	1.42	2.50	35.50	47.46	20.27	79.10
595	31.5	114.5	2	2	3	3	3	3	211.5	25.10	4695	3082	1471	65.55	41.75	9.42	3.97	58.21	19.35	1.69	1.02	3.69	1.41	3.01	33.85	47.67	20.19	78.58
596	32	107.5	2	2	3	3	3	3	208.5	24.60	4629	3420	1683	73.90	46.50	9.44	3.88	57.66	20.09	1.70	1.02	3.66	1.42	2.87	32.22	49.20	20.11	78.77
597	33.5	108.5	2	2	3	3	3	3	214	21.45	4751	3530	1677	74.25	47.50	10.44	3.10	54.63	23.36	1.45	1.09	3.63	1.45	2.34	35.35	47.46	20.07	79.07
598	32	109.5	2	2	3	3	3	3	176	17.60	3907	2609	1253	66.75	43.75	9.94	4.06	54.98	22.59	1.77	1.03	3.83	1.41	2.44	34.34	48.11	21.00	78.61
599	30	110.5	2	2	3	3	3	3	144.5	18.40	3208	2288	1100	71.30	47.75	9.97	3.55	55.57	21.49	1.69	1.08	3.71	1.45	2.59	34.84	48.07	20.37	78.13
600	33.5	111.5	2	2	3	3	3	3	298.5	26.33	6627	4664	2213	70.40	45.75	9.34	4.05	57.67	19.97	1.75	1.02	3.74	1.42	2.89	34.15	47.45	20.30	78.66
601	32	112.5	2	2	3	3	3	3	207	19.05	4595	3338	1634	72.60	43.50	9.97	3.29	54.94	24.31	1.64	1.06	3.42	1.38	2.26	35.15	48.90	19.71	80.31
602	30	108.5	2	2	3	3	3	3	172	20.95	3818	2526	1210	66.20	44.50	10.24	3.13	53.43	24.33	1.61	1.07	3.67	1.44	2.20	36.15	47.88	20.09	78.83
603	33.5	109.5	2	2	3	3	3	3	156.5	16.80	3474	2475	1216	71.25	44.00	9.98	3.37	55.11	24.31	1.61	1.05	3.56	1.41	2.27	34.37	49.13	19.92	80.47
604	30	110.5	2	2	3	3	3	3	214.5	22.70	4762	3479	1651	73.05	40.00	10.31	3.28	53.65	24.36	1.59	1.06	3.62	1.42	2.20	35.89	47.46	20.22	79.06
605	32	107.5	2	2	3	3	3	3	207	15.93	4595	3394	1605	73.85	41.00	10.10	3.17	54.86	24.34	1.58	1.05	3.61	1.43	2.25	34.28	47.28	19.89	80.25
606	33.5	109.5	2	2	3	3	3	3	215	17.92	4773	3451	1702	72.30	40.25	9.50	3.59	57.97	21.04	1.64	1.04	3.52	1.37	2.76	34.51	49.33	19.62	80.05
607	32	108.5	2	2	3	3	3	3	195	19.05	4329	3184	1551	73.55	37.50	10.27	3.14	55.10	23.33	1.49	1.05	3.42	1.37	2.36	34.18	48.70	19.68	79.48
608	33	107.5	2	2	3	3	3	3	197.5	20.27	4385	3225	1533	73.60	36.25	10.01	3.34	55.10	23.31	1.58	1.04	3.60	1.38	2.36	33.52	47.52	19.91	79.45

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609	33.5	107.5	2	2	3	3	3	3	174.5	18.39	3874	2840	1336	73.35	38.25	10.03	3.68	55.08	22.12	1.68	1.07	3.74	1.44	2.51	35.43	47.06	20.57	78.27
610	33	110	2	2	3	3	3	3	271	30.38	6016	4642	2208	77.15	42.00	9.77	3.79	56.21	21.15	1.75	1.06	3.76	1.43	2.67	34.18	47.57	20.49	78.42
611	31	112.5	2	2	3	3	3	3	190.5	19.50	4229	2949	1464	69.75	39.25	9.93	3.12	56.85	22.61	1.56	1.05	3.55	1.47	2.51	31.90	49.60	19.65	80.51
612	32	113.5	2	2	3	3	3	3	105.5	15.70	2342	1582	742	67.55	38.25	9.65	3.35	57.72	22.04	1.57	1.07	3.53	1.45	2.62	35.43	46.95	19.55	80.83
613	31.5	110.5	2	2	3	3	3	3	207.5	19.25	4607	3507	1652	76.10	36.75	10.09	3.36	52.92	24.66	1.59	1.07	3.71	1.43	2.15	36.03	47.05	20.17	78.65
614	33.5	109.5	2	2	3	3	3	3	212.5	17.05	4718	3550	1739	75.25	37.25	10.00	3.28	54.43	24.08	1.55	1.08	3.60	1.42	2.26	34.88	49.02	19.84	79.59
615	32	110	2	2	3	3	3	3	279	25.46	6194	4565	2160	73.70	40.25	10.24	3.30	54.50	23.66	1.52	1.06	3.51	1.41	2.30	35.46	47.31	19.98	79.22
616	33.5	110.5	2	2	3	3	3	3	158	16.00	3508	2628	1277	74.90	41.50	10.11	3.31	55.53	23.25	1.54	1.05	3.60	1.44	2.39	36.13	48.62	20.01	79.84
617	33.5	113.5	2	2	3	3	3	3	191	14.53	4240	3035	1426	71.60	37.25	9.48	3.57	59.25	19.72	1.55	1.08	3.45	1.41	3.00	35.96	46.99	19.46	80.05
618	31.5	111	2	2	3	3	3	3	195.5	15.23	4340	3300	1559	76.00	39.75	10.38	3.21	54.25	24.08	1.47	1.06	3.54	1.39	2.25	35.41	47.28	20.00	79.40
619	31.5	111	2	2	3	3	3	3	191.5	18.42	4251	3126	1456	73.50	37.25	9.96	3.45	54.90	23.46	1.56	1.08	3.59	1.45	2.34	34.17	46.57	20.00	79.44
620	32.5	111.5	2	2	3	3	3	3	182.5	18.75	4052	2917	1370	72.00	39.75	9.72	3.36	57.43	21.07	1.56	1.07	3.57	1.41	2.73	36.82	46.96	19.63	79.57
621	33.5	108	2	2	3	3	3	3	163	18.70	3619	2518	1212	69.60	40.00	9.82	3.75	55.76	22.11	1.56	1.05	3.68	1.37	2.52	33.81	48.13	20.18	78.93
622	32	107.5	2	2	3	3	3	3	170	14.65	3774	2863	1361	75.85	37.75	10.17	3.30	55.42	23.36	1.47	1.04	3.56	1.41	2.37	36.18	47.58	19.91	79.81
623	30.5	107.5	2	2	3	3	3	3	208	16.17	4618	3464	1605	75.00	38.75	10.44	3.17	54.54	23.72	1.45	1.08	3.54	1.41	2.30	35.04	46.34	20.01	79.33
624	31	106.5	2	2	3	3	3	3	219	19.98	4862	3511	1657	72.20	40.00	10.16	3.52	53.77	24.59	1.59	1.09	3.79	1.48	2.19	34.70	47.17	20.54	79.45
625	33	107.5	2	2	3	3	3	3	158.5	15.85	3519	2464	1152	70.00	38.75	10.54	3.25	53.04	24.46	1.51	1.06	3.68	1.44	2.17	36.03	46.73	20.41	78.57
626	31	105.5	2	2	3	3	3	3	147	13.53	3263	2165	1055	66.25	39.25	10.08	3.30	55.59	23.32	1.52	1.06	3.53	1.43	2.38	35.86	48.81	19.86	79.98
627	33.5	107.5	2	2	3	3	3	3	126.5	12.55	2808	2045	970	72.85	40.00	10.20	3.16	55.49	22.41	1.47	1.08	3.54	1.42	2.48	33.64	47.44	19.81	78.99
628	32.5	114.5	2	2	3	3	3	3	238	19.83	5284	3898	1844	73.75	40.25	10.28	2.95	55.28	23.44	1.49	1.07	3.51	1.48	2.36	35.58	47.29	19.70	79.79
629	32.5	109.5	2	2	3	3	3	3	197.5	22.18	4385	2736	1302	62.45	43.00	10.24	3.54	54.59	22.97	1.57	0.99	3.57	1.39	2.38	35.63	47.54	20.32	78.56
630	31.5	111	2	2	3	3	3	3	200.5	18.34	4451	3313	1562	74.45	40.00	10.36	3.31	53.46	24.21	1.49	1.06	3.66	1.40	2.21	35.27	47.16	20.22	78.73
631	33.5	107.5	2	2	3	3	3	3	181	16.58	4018	3016	1451	75.05	42.75	10.27	3.16	54.42	23.39	1.53	1.06	3.68	1.44	2.33	34.51	48.11	20.09	78.87
632	31.5	106.5	2	2	3	3	3	3	167.5	13.51	3719	2668	1324	71.75	38.25	10.17	3.30	55.42	23.36	1.47	1.04	3.56	1.41	2.37	36.15	49.61	19.91	79.81
633	33.5	107.5	2	2	3	3	3	3	196	32.60	4351	3264	1540	75.00	40.25	10.33	3.42	53.66	23.84	1.45	1.04	3.66	1.35	2.25	35.46	47.23	20.21	78.54
634	32	107	2	2	3	3	3	3	209.5	22.15	4651	3337	1604	71.75	38.00	10.46	3.53	51.33	25.75	1.61	1.04	3.76	1.40	1.99	34.85	48.04	20.77	78.11
635	32.5	108.5	2	2	3	3	3	3	142.5	13.39	3164	2359	1100	74.45	41.25	10.08	3.38	55.48	22.78	1.45	1.05	3.55	1.37	2.44	37.08	46.62	19.82	79.31
636	32.5	108.5	2	2	3	3	3	3	144.5	17.70	3208	2400	1127	74.70	42.25	10.31	3.33	52.69	24.48	1.56	1.05	3.69	1.39	2.15	36.10	46.92	20.29	78.21
637	31.5	110	2	2	3	3	3	3	79.5	8.40	1765	1126	536	63.75	41.00	9.51	3.72	57.43	21.39	1.57	1.06	3.71	1.40	2.69	35.29	47.54	19.91	79.88
638	32	110.5	2	2	3	3	3	3	176	19.73	3907	2844	1379	72.80	44.75	9.97	3.58	53.52	24.35	1.61	1.05	3.69	1.38	2.20	35.87	48.45	20.24	78.92
639	31.5	108.5	2	2	3	3	3	3	126	11.79	2797	1807	869	64.60	39.75	10.22	3.20	53.49	24.67	1.48	1.07	3.55	1.43	2.17	34.01	48.11	19.88	79.23
640	34	108.5	2	2	3	3	3	3	113	13.00	2509	1788	850	71.35	38.25	9.98	3.50	55.38	22.98	1.51	1.06	3.59	1.42	2.41	36.12	47.59	20.02	79.42
641	34.5	110.5	2	2	3	3	3	3	178	34.80	3952	2993	1424	75.75	37.00	9.84	3.30	55.36	22.47	1.49	1.05	3.44	1.39	2.46	35.19	47.58	19.47	78.87

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642	31.5	110.5	2	2	3	3	3	3	217.5	24.35	4829	3155	1468	65.20	44.00	10.05	3.24	54.11	23.58	1.51	1.03	3.55	1.38	2.30	36.71	46.57	19.74	78.73
643	32.5	107.5	2	2	3	3	3	3	151	13.94	3352	2551	1217	76.10	37.25	10.27	3.73	51.94	25.60	1.58	1.00	3.52	1.25	2.03	35.05	47.68	20.34	78.54
644	32	110.5	2	2	3	3	3	3	174.5	19.56	3874	2860	1370	73.90	43.75	9.93	3.13	53.92	23.60	1.52	1.11	3.88	1.53	2.28	35.27	47.90	19.99	78.63
645	33.5	107.5	2	2	3	3	3	3	121.5	11.00	2697	2004	974	74.40	40.50	10.43	3.17	53.91	23.59	1.42	1.09	3.68	1.51	2.29	34.71	48.57	20.20	78.59
646	32	106.5	2	2	3	3	3	3	133.5	13.50	2964	2090	987	70.55	38.00	10.13	3.29	54.74	22.99	1.50	1.05	3.57	1.38	2.39	33.95	47.20	19.86	78.78
647	32.5	107	2	2	3	3	3	3	112	19.90	2486	1574	772	63.35	37.50	10.22	3.20	53.49	24.67	1.48	1.07	3.55	1.43	2.17	34.61	49.06	19.88	79.23
648	33	108	2	2	3	3	3	3	139.5	14.55	3097	2279	1091	73.60	41.25	9.05	3.76	62.79	15.80	1.78	0.93	3.68	1.43	4.01	35.00	47.90	19.68	79.52
649	32	105.5	2	2	3	3	3	3	105	12.00	2331	1668	799	71.45	37.00	9.70	3.49	55.53	22.37	1.56	1.02	3.58	1.39	2.48	34.18	47.98	19.73	78.91
650	33	104.5	2	2	3	3	3	3	110	11.29	2442	1341	626	53.55	40.50	10.04	3.55	54.33	22.95	1.55	1.05	3.73	1.39	2.37	36.00	46.97	20.27	78.33
651	32	107.5	2	2	3	3	3	3	148.5	13.65	3297	2299	1074	69.70	38.25	10.10	3.43	53.01	24.55	1.55	1.06	3.69	1.39	2.16	36.06	46.69	20.16	78.61
652	33.5	106.5	2	2	3	3	3	3	112.5	12.79	2498	1689	809	67.50	35.00	9.95	2.92	54.50	23.82	1.42	1.12	3.67	1.47	2.29	35.58	47.88	19.42	79.45
653	31.5	112.5	2	2	3	3	3	3	84.5	7.79	1876	1219	572	65.10	41.00	9.85	3.02	57.15	21.35	1.50	1.08	3.50	1.44	2.68	36.18	46.92	19.30	79.58
654	33.5	114.5	2	2	3	3	3	3	107	14.45	2375	1649	788	69.30	42.25	9.65	2.84	58.50	20.91	1.44	1.05	3.39	1.45	2.80	34.64	47.93	18.77	80.46
655	32	114.5	2	2	3	3	3	3	74	7.54	1643	827	398	49.90	42.00	9.63	3.07	58.55	20.56	1.51	1.16	3.59	1.55	2.85	35.61	48.21	19.34	80.27
656	32.5	115	2	2	3	3	3	3	125.5	21.65	2786	1941	915	69.50	41.00	9.73	3.15	56.95	21.22	1.52	1.07	3.58	1.42	2.68	35.13	47.04	19.40	79.24
657	31.5	108.5	2	2	3	3	3	3	71	8.30	1576	845	404	53.60	42.50	10.31	3.25	53.72	23.98	1.51	1.07	3.56	1.43	2.24	35.77	47.68	20.06	78.77
658	33.5	114.5	2	2	3	3	3	3	124.5	15.45	2764	2214	1052	80.10	39.75	9.86	3.49	57.33	21.09	1.47	1.05	3.41	1.39	2.72	35.48	47.53	19.62	79.47
659	33.5	105	2	2	3	3	3	3	201	20.50	4462	3262	1598	73.05	40.50	9.50	3.99	56.07	22.12	1.60	1.08	3.66	1.44	2.54	34.89	48.99	20.19	79.27
660	33	107.5	2	2	3	3	3	3	99.5	9.95	2209	1606	752	72.65	39.25	9.58	3.45	54.36	22.72	1.64	1.12	3.89	1.46	2.39	36.40	46.80	20.02	78.20
661	33	107.5	2	2	3	3	3	3	76	12.65	1687	1061	512	63.00	39.75	9.96	3.57	53.63	23.89	1.61	1.09	3.68	1.41	2.25	35.23	48.29	20.23	78.61
662	33.5	108	2	2	3	3	3	3	50.5	5.77	1121	787	364	70.00	41.75	9.56	3.71	54.31	22.50	1.77	1.00	3.77	1.34	2.41	35.73	46.22	20.15	77.81
663	31.5	113	2	2	3	3	3	3	200	20.70	4440	3262	1549	73.45	41.25	9.66	3.45	56.12	21.59	1.58	1.08	3.61	1.45	2.60	34.20	47.51	19.75	78.79
664	33.5	110.5	2	2	3	3	3	3	237	26.31	5261	3665	1690	69.60	38.00	10.12	3.53	53.98	23.93	1.59	1.05	3.56	1.37	2.26	35.45	46.08	20.17	78.96
665	34	109.5	2	2	3	3	3	3	201.5	21.05	4473	3212	1556	71.80	41.00	10.07	3.31	54.62	23.18	1.48	1.08	3.59	1.43	2.36	34.25	48.44	19.88	78.89
666	31	109	2	2	3	3	3	3	130.5	10.47	2897	2099	1039	72.45	38.00	10.26	3.12	52.88	25.98	1.64	1.07	3.56	1.44	2.04	35.44	49.50	20.01	79.93
667	32	111	2	2	3	3	3	3	122	13.55	2708	1963	918	72.40	40.25	10.08	3.14	56.38	23.05	1.62	1.03	3.42	1.38	2.45	36.22	46.83	19.63	80.45
668	31.5	115.5	2	2	3	3	3	3	206.5	20.65	4584	3438	1639	75.00	39.75	9.57	3.29	58.35	22.37	1.67	1.02	3.30	1.37	2.61	35.66	47.69	19.20	81.74
669	32.5	108.5	2	2	3	3	3	3	169.5	23.45	3763	2812	1354	74.65	37.50	10.32	2.54	55.13	24.61	1.61	1.09	3.59	1.50	2.24	34.45	48.25	19.58	80.84
670	33.5	108.5	2	2	3	3	3	3	182.5	17.32	4052	2996	1406	73.90	37.75	10.24	3.30	54.79	23.63	1.58	1.03	3.47	1.39	2.32	35.71	46.88	19.98	79.45
671	34	110.5	2	2	3	3	3	3	229.5	30.25	5095	3633	1717	71.30	41.00	9.99	3.23	57.16	22.63	1.56	1.04	3.32	1.35	2.53	34.34	47.27	19.45	80.84
672	31.5	109.5	2	2	3	3	3	3	123.5	20.15	2742	2047	973	74.65	38.75	9.69	3.20	53.80	24.63	1.67	1.10	3.76	1.48	2.18	35.50	47.54	19.80	79.53
673	31	112.5	2	2	3	3	3	3	193.5	22.75	4296	3271	1545	76.10	38.50	10.00	3.29	54.95	24.30	1.65	1.04	3.61	1.40	2.26	36.50	47.27	19.95	80.29
674	31.5	113	2	2	3	3	3	3	165	30.05	3663	2796	1211	76.30	42.00	10.32	2.54	55.13	24.61	1.61	1.09	3.59	1.50	2.24	32.49	43.20	19.58	80.84
675	33	113	2	2	3	3	3	3	221	24.75	4906	3565	1703	72.65	39.75	9.98	3.24	55.82	23.66	1.60	1.06	3.49	1.38	2.36	35.82	47.82	19.68	80.54
676	31	112.5	2	2	3	3	3	3	137.5	19.55	3053	2282	1075	74.75	37.75	10.02	3.15	55.54	22.78	1.59	1.05	3.60	1.38	2.44	35.34	47.11	19.75	79.37

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677	31.5	113	2	2	3	3	3	3	149	26.60	3308	2424	1154	73.30	37.75	10.11	2.95	56.05	23.72	1.56	1.06	3.50	1.42	2.36	34.62	47.60	19.54	80.83
678	31.5	114.5	2	2	3	3	3	3	170	17.50	3774	2764	1310	73.30	37.75	10.26	3.10	55.13	23.81	1.55	1.09	3.43	1.45	2.32	35.64	47.37	19.78	80.02
679	31	113.5	2	2	3	3	3	3	145.5	19.40	3230	2218	1042	68.65	37.00	9.77	3.60	54.83	23.32	1.67	1.06	3.70	1.34	2.35	35.32	46.99	20.07	79.21
680	31.5	108.5	2	2	3	3	3	3	207	17.53	4595	3241	1521	70.55	35.50	9.56	3.55	55.23	23.21	1.74	1.03	3.65	1.37	2.38	35.59	46.94	19.87	79.47
681	29.5	113.5	2	3	4	5	6	7	70.5	6.29	1565	1012	433	64.65	31.50	9.83	3.46	56.03	22.63	1.62	1.05	3.58	1.38	2.49	28.91	42.51	19.87	79.71
682	28.5	108.5	2.5	3.5	5	5.5	6	6.5	134	17.90	2975	1933	895	65.00	30.25	10.89	2.82	49.85	30.06	1.23	1.03	3.33	1.35	1.66	29.21	46.27	19.62	80.94
683	29.5	108	3	4	5	6	6	7	122	15.57	2708	1837	751	67.80	27.00	11.02	2.69	50.07	29.79	1.14	1.03	3.33	1.38	1.68	28.65	40.96	19.55	80.89
684	29.5	108	3	4	5	6	5.5	7	82	10.96	1820	1030	475	56.50	26.50	9.14	3.62	57.39	23.89	1.59	0.93	3.42	1.20	2.40	28.73	46.07	18.98	82.21
685	29	107.5	3	4	5	6.5	6	7.5	77	7.32	1709	1138	540	66.80	25.25	10.25	2.88	53.64	27.20	1.27	0.97	3.21	1.35	1.97	29.43	46.96	18.95	81.81
686	29	107	3	3.5	4	5.5	6	7.5	72	6.86	1598	1063	430	66.50	26.00	10.55	2.80	55.76	25.15	1.18	1.04	3.11	1.36	2.22	29.83	40.40	19.00	81.95
687	28.5	109.5	3	4	4	6.5	6	7.5	47.5	6.15	1055	699	303	66.50	26.50	10.16	2.94	57.14	23.79	1.25	1.02	3.20	1.38	2.40	27.24	43.37	18.92	81.94
688	30	110.5	3	4	4	6	6	7	78	10.13	1732	1121	528	64.80	23.50	9.96	3.22	59.07	21.41	1.34	1.02	3.20	1.31	2.76	28.74	46.72	19.03	81.51
689	29	109.5	3	4	4	6.5	6	8	91	11.38	2020	1233	500	61.05	26.00	10.66	3.04	56.34	24.67	1.22	0.98	3.23	1.32	2.28	28.53	40.60	19.48	81.98
690	30	107.5	3	4	5	6	6	7	83	12.96	1843	1240	553	67.45	30.75	10.21	2.97	58.15	21.80	1.26	0.98	2.82	1.24	2.69	28.65	44.91	18.49	80.93
691	28.5	108.5	3	4	5	6.5	6	7.5	132	14.56	2930	1904	872	64.95	24.65	10.29	2.86	56.73	24.66	1.19	1.04	3.19	1.37	2.30	29.61	45.59	18.91	82.43
692	29	109	3	4	4	5.5	5.5	7	52	4.90	1154	773	357	66.70	28.75	10.93	3.05	50.10	29.45	1.40	1.05	3.32	1.39	1.71	30.44	44.69	20.10	80.60
693	29	114.5	3	4	4	5.5	5	7	98.5	11.09	2187	1285	579	58.75	25.00	10.00	3.27	56.11	22.98	1.61	1.01	3.37	1.41	2.45	28.85	45.07	19.65	80.10
694	29.5	104.5	3	4.5	4.5	6	5.5	7.5	160	21.65	3552	2093	938	58.95	27.00	10.37	2.79	57.12	23.50	1.33	1.08	3.10	1.44	2.44	28.97	44.93	19.03	81.70
695	29.5	103.5	3	4	5	6	7	7.5	171	27.55	3796	2232	985	58.80	29.50	10.43	3.10	55.13	25.04	1.43	1.02	3.25	1.39	2.21	33.04	44.09	19.60	81.19
696	30	103	3	4	5	6	6	7	132.5	15.85	2942	1773	777	60.25	26.75	10.29	3.04	56.25	23.91	1.41	1.01	3.23	1.40	2.35	32.60	43.69	19.35	81.17
697	31	102.5	3	4	5	6	6.5	7.5	111.5	15.25	2475	1456	650	58.75	24.75	10.19	2.97	56.61	24.42	1.25	1.00	3.21	1.33	2.32	31.77	44.99	18.95	82.04
698	28	103	3	4	4	6	6	7.5	75	14.25	1665	930	392	56.10	24.75	10.34	3.29	54.14	26.19	1.25	1.02	3.38	1.34	2.07	30.93	41.69	19.61	81.35
699	28.5	104.5	3	4	4	5.5	5	7	66	7.03	1465	947	455	65.20	27.50	10.14	3.32	52.76	26.22	1.48	0.99	3.43	1.33	2.01	30.38	47.69	19.71	79.97
700	28.5	101.5	3	4	4	5.5	5	7	152.5	18.40	3386	2300	1037	67.95	29.00	10.16	3.08	52.83	26.57	1.43	1.00	3.30	1.30	2.01	30.27	45.01	19.27	80.40
701	28	104.5	3	4	4	6	5	7	120	14.24	2664	1922	886	72.05	30.50	10.74	2.73	51.86	28.97	1.30	1.00	3.12	1.35	1.79	29.89	45.61	19.25	81.83
702	28.5	109	3	4	5	6	6	7	105	11.56	2331	1567	640	67.10	28.75	10.41	3.11	56.34	23.72	1.45	1.00	3.12	1.36	2.39	29.80	41.10	19.45	81.06
703	30	108	2	2	3	3	3	3	243	25.20	5395	4108	2001	76.15	42.00	10.13	3.62	54.79	22.07	1.71	1.05	3.74	1.42	2.51	36.65	48.74	20.61	77.92
704	30.5	108	2	2	3	3	3	3	141	16.05	3130	2224	1047	71.15	42.50	10.36	3.27	53.00	24.97	1.67	1.05	3.65	1.43	2.12	33.90	47.00	20.38	79.02
705	32.5	108	2	2	3	3	3	3	249	24.65	5528	4045	1930	65.35	40.50	10.03	3.41	55.75	22.95	1.68	1.04	3.59	1.42	2.43	34.98	47.60	20.12	79.75
706	32.5	110.5	2	2	3	3	3	3	160	15.34	3552	2629	1234	74.05	43.75	9.99	3.63	55.14	23.24	1.71	1.06	3.61	1.43	2.38	35.28	46.92	20.37	79.44
707	31.5	111	2	2	3	3	3	3	176	19.70	3907	2670	1256	68.35	42.00	9.87	3.47	55.94	23.44	1.59	1.06	3.45	1.34	2.39	36.39	47.03	19.71	80.44
708	33.5	111.5	2	2	3	3	3	3	138.5	13.85	3075	2262	1074	73.60	44.00	9.90	3.59	55.69	22.84	1.73	1.04	3.60	1.40	2.44	34.82	47.38	20.23	79.57
709	31	108.5	2	2	3	3	3	3	145.5	14.55	3230	2444	1162	75.65	48.75	10.19	3.64	55.45	23.25	1.76	1.05	3.67	1.42	2.24	35.30	47.57	20.65	78.45

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710	32.5	111	2	2	3	3	3	3	170.5	14.21	3785	2572	1213	67.95	40.75	9.90	3.34	54.68	23.10	1.69	1.06	3.71	1.44	2.39	35.41	47.15	20.07	78.84
711	31	108.5	2	2	3	3	3	3	261	20.10	5794	4182	1954	72.20	44.25	9.97	3.02	57.02	23.39	1.41	1.03	3.40	1.41	2.44	36.12	46.72	19.21	81.44

712	31	110.5	2	2	3	3	3	3	188.5	17.35	4185	3125	1530	74.70	44.75	9.71	3.58	56.52	22.05	1.70	1.04	3.53	1.43	2.57	35.28	48.92	19.95	79.62
713	30.5	111	2	2	3	3	3	3	209.5	20.80	4651	3420	1587	73.50	43.75	9.94	3.29	56.27	23.03	1.51	1.07	3.43	1.38	2.44	34.61	46.47	19.56	80.37
714	32.5	108	2	2	3	3	3	3	220.5	17.60	4895	3439	1669	70.25	44.25	10.23	3.17	54.04	23.89	1.57	1.07	3.69	1.45	2.26	35.12	48.53	20.11	79.00
715	33.5	111.5	2	2	3	3	3	3	199.5	15.95	4429	3334	1569	75.25	44.75	9.74	3.75	55.07	22.57	1.80	1.05	3.71	1.42	2.45	36.42	47.08	20.43	78.69
716	31	109.5	2	2	3	3	3	3	273	23.19	6061	4374	2086	72.15	43.25	9.84	3.54	56.54	21.56	1.67	1.07	3.65	1.45	2.63	36.11	47.72	20.15	79.18
717	31	112.5	2	2	3	3	3	3	160	16.00	3552	2597	1220	73.10	43.25	9.91	3.30	56.94	22.38	1.52	1.05	3.41	1.42	2.56	34.33	47.00	19.56	80.36
718	30.5	108.5	2	2	3	3	3	3	291	29.10	6460	4219	2008	73.15	42.25	9.81	3.40	57.64	22.17	1.56	1.03	3.50	1.40	2.62	35.52	47.75	19.67	80.85
719	31.5	111	2	2	3	3	3	3	217	20.15	4817	3529	1725	73.25	45.50	9.71	3.33	57.63	21.69	1.50	1.06	3.45	1.37	2.66	35.12	48.91	19.36	80.37
720	29.5	108.5	2	2	3	3	3	3	238	22.79	5284	3903	1851	73.85	42.00	9.85	3.37	57.55	21.92	1.50	1.05	3.42	1.42	2.65	35.75	47.48	19.57	80.52
721	32.5	109.5	2	2	3	3	3	3	171.5	17.15	3807	2736	1281	71.85	43.00	9.72	3.48	56.50	22.69	1.49	1.04	3.56	1.37	2.49	33.75	46.85	19.62	80.22
722	29.5	108	2	2	3	3	3	3	273	28.69	6061	4408	2107	72.70	43.25	9.83	3.78	56.25	21.80	1.67	1.04	3.56	1.39	2.58	34.81	47.79	20.23	79.09
723	30	108	2	2	3	3	3	3	283	24.65	6283	4455	2099	70.90	47.25	10.04	3.60	54.47	22.89	1.69	1.04	3.63	1.37	2.38	36.39	47.13	20.33	78.40
724	30	107.5	2	2	3	3	3	3	139	11.30	3086	2269	1042	73.50	39.75	10.06	3.52	54.03	23.95	1.57	1.06	3.64	1.38	2.26	35.12	45.92	20.17	79.04
725	31	110	2	2	3	3	3	3	166	18.90	3685	2564	1210	69.55	44.00	9.65	3.83	58.67	19.58	1.82	1.09	3.82	1.54	3.00	36.62	47.20	20.66	79.34
726	29.5	109	2	2	3	3	3	3	238	26.58	5284	3643	1763	68.95	41.75	9.62	3.72	56.93	21.77	1.72	1.06	3.67	1.40	2.65	35.17	48.41	20.13	79.75
727	30	107.5	2	2	3	3	3	3	158	13.17	3508	2599	1223	74.15	41.00	9.88	3.50	55.73	22.35	1.65	1.04	3.67	1.40	2.49	36.13	47.04	20.10	79.12
728	31	108.5	2	2	3	3	3	3	149	13.85	3308	2452	1163	74.15	41.50	9.81	3.97	55.10	21.93	1.78	1.04	3.78	1.40	2.54	35.66	47.41	20.73	78.07
729	31	109	2	2	3	3	3	3	187.5	21.25	4163	3042	1435	73.10	39.25	10.04	3.38	57.22	21.79	1.52	1.03	3.41	1.40	2.66	34.39	47.15	19.76	80.04
730	34	108	2	2	3	3	3	3	149.5	13.63	3319	2344	1017	70.65	41.75	9.97	3.22	56.68	22.04	1.50	1.05	3.38	1.41	2.59	32.46	43.16	19.49	79.76
731	34.5	106.5	2	2	3	3	3	3	183.5	16.90	4074	2911	1400	71.40	43.25	10.12	3.24	54.28	23.94	1.48	1.01	3.49	1.35	2.27	34.68	48.00	19.68	79.23
732	33.5	109.5	2	2	3	3	3	3	186	19.71	4129	2912	1380	70.45	42.50	9.77	3.73	57.44	20.53	1.64	1.03	3.53	1.38	2.82	35.36	47.32	20.04	79.00
733	31	110	2	2	3	3	3	3	192	16.00	4262	3137	1496	73.55	42.75	9.86	3.35	56.03	23.08	1.49	1.06	3.65	1.44	2.43	34.96	47.68	19.80	80.17
734	32.5	109	2	2	3	3	3	3	159.5	13.61	3541	2440	1153	68.90	44.50	10.34	3.14	53.91	24.07	1.53	1.05	3.60	1.41	2.24	35.87	47.30	20.01	79.04
735	33	109.5	2	2	3	3	3	3	191	15.92	4240	3019	1431	71.20	40.75	10.03	3.43	55.04	23.02	1.54	1.05	3.58	1.40	2.40	35.02	47.41	19.99	79.10
736	31	110.5	2	2	3	3	3	3	203	21.47	4507	3312	1599	73.50	43.75	10.27	3.04	55.08	23.28	1.43	1.08	3.55	1.44	2.37	34.33	48.29	19.72	79.44
737	32.5	108.5	2	2	3	3	3	3	156	19.05	3463	2409	1187	69.55	43.00	9.36	4.12	58.94	18.50	1.84	1.04	3.72	1.42	3.19	34.82	49.24	20.44	78.47
738	34.5	109.5	2	2	3	3	3	3	225	24.90	4995	3621	1698	72.50	39.50	9.35	3.86	58.09	20.35	1.71	1.04	3.71	1.39	2.85	35.80	46.88	20.02	79.48
739	33	113	2	2	3	3	3	3	184.5	20.64	4096	2865	1323	70.00	40.00	10.04	3.23	56.77	22.08	1.45	1.08	3.48	1.41	2.57	34.57	46.16	19.62	79.92
740	34.5	109.5	2	2	3	3	3	3	136	13.60	3019	2176	1032	72.00	39.00	9.77	3.93	55.46	22.41	1.73	1.05	3.81	1.41	2.48	34.20	47.38	20.65	78.91
741	33.5	110.5	2	2	3	3	3	3	215.5	22.19	4784	3469	1706	72.50	43.50	9.81	3.59	56.15	22.26	1.56	1.03	3.56	1.30	2.52	35.17	49.22	19.81	79.44
742	34.5	111.5	2	2	3	3	3	3	105	11.70	2331	1724	822	73.80	43.75	10.13	3.29	56.58	22.71	1.48	1.05	3.51	1.37	2.49	34.08	47.76	19.78	80.33
743	34.5	108	2	2	3	3	3	3	138	11.38	3064	2254	1052	73.55	42.00	9.81	3.76	56.36	21.13	1.69	1.03	3.69	1.42	2.68	36.20	46.66	20.37	78.52
744	34	108.5	2	2	3	3	3	3	172	16.00	3818	2751	1292	72.00	43.00	9.94	3.81	55.39	22.00	1.67	1.06	3.72	1.41	2.52	35.69	46.93	20.55	78.45

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745	31.5	107.5	2	2	3	3	3	3	133	17.95	2953	2072	972	70.25	40.25	9.98	3.92	54.21	22.34	1.74	1.03	3.83	1.40	2.44	36.41	46.92	20.88	77.59
746	34	109	2	2	3	3	3	3	193.5	20.73	4296	3094	1492	72.00	42.00	9.94	3.60	55.05	22.32	1.65	1.07	3.71	1.42	2.47	35.55	48.24	20.32	78.44
747	33.5	110.5	2	2	3	3	3	3	122.5	11.27	2720	1903	895	70.00	44.25	9.46	3.63	57.18	21.31	1.68	1.02	3.74	1.33	2.69	34.74	47.01	19.83	79.51
748	33	111.5	2	2	3	3	3	3	286.5	28.65	6360	4707	2267	74.00	40.50	9.74	3.33	56.40	22.26	1.50	1.06	3.43	1.38	2.53	36.60	48.25	19.38	79.72
749	32	107.5	2	2	3	3	3	3	110.5	9.21	2453	1686	796	68.75	44.25	9.87	3.63	55.59	21.72	1.68	1.07	3.75	1.45	2.59	36.16	47.18	20.37	78.37
750	33	108	2	2	3	3	3	3	252.5	23.40	5606	4065	1921	72.50	44.25	10.21	3.16	54.36	23.85	1.49	1.06	3.69	1.41	2.28	34.49	47.20	19.96	79.27
751	30.5	108	2	2	3	3	3	3	208	21.46	4618	3395	1634	73.50	40.75	8.44	6.28	63.15	17.82	2.88	0.75	4.18	0.78	3.54	36.01	48.23	22.57	81.72
752	32.5	111.5	2	2	3	3	3	3	192	22.30	4262	3035	1453	71.20	42.00	10.35	3.01	52.45	25.39	1.69	1.05	3.71	1.45	2.07	34.82	47.87	20.21	78.89
753	32	112.5	2	2	3	3	3	3	151.5	13.98	3363	2303	1086	68.50	43.00	9.87	3.42	56.74	23.09	1.63	1.01	3.35	1.40	2.46	35.43	47.13	19.66	80.84
754	30.5	114	2	2	3	3	3	3	185.5	20.64	4118	2900	1354	70.50	37.75	9.42	4.12	58.03	18.44	1.84	1.08	3.68	1.46	3.15	36.69	46.71	20.53	77.56
755	31	113.5	2	2	3	3	3	3	139.5	11.63	3097	2320	1087	74.95	38.50	10.16	3.69	55.01	23.79	1.66	1.03	3.39	1.30	2.31	35.08	46.85	20.21	79.82
756	32	114	2	2	3	3	3	3	208	24.10	4618	3314	1592	71.80	39.75	9.99	3.25	55.14	24.30	1.59	1.09	3.56	1.46	2.27	33.70	48.07	19.85	80.54
757	30	114.5	2	2	3	3	3	3	158	17.73	3508	2421	1163	69.00	38.00	10.34	3.19	53.21	24.50	1.62	1.05	3.67	1.43	2.17	34.49	48.03	20.25	78.77
758	32.5	113	2	2	3	3	3	3	197	25.50	4373	3302	1572	75.50	38.25	9.86	3.70	55.50	22.25	1.75	1.07	3.65	1.43	2.50	35.69	47.63	20.40	78.82
759	32.5	112.5	2	2	3	3	3	3	204	20.96	4529	3326	1553	73.40	38.50	9.47	4.09	57.51	19.71	1.86	1.04	3.68	1.40	2.92	34.80	46.68	20.50	78.25
760	33.5	109.5	2	2	3	3	3	3	173	13.88	3841	2805	1328	73.00	35.50	10.03	3.25	55.94	23.23	1.63	1.05	3.54	1.45	2.41	34.50	47.37	19.91	80.22
761	32.5	110	2	2	3	3	3	3	175.5	24.00	3896	2765	1300	71.00	35.00	9.83	3.51	55.64	23.48	1.75	1.01	3.63	1.35	2.37	35.19	47.02	20.07	80.12
762	32.5	114.5	2	2	3	3	3	3	186	15.50	4129	3016	1440	73.00	39.00	9.85	3.31	56.54	22.79	1.59	1.05	3.37	1.37	2.48	35.76	47.81	19.49	80.39
763	32.5	108.5	2	2	3	3	3	3	138	13.80	3064	2088	990	68.15	37.00	9.84	3.97	54.19	22.77	1.76	1.07	3.72	1.39	2.38	34.50	47.37	20.69	78.03
764	33	107.5	2	2	3	3	3	3	113	9.42	2509	1743	840	69.50	39.00	10.03	3.25	55.94	23.23	1.63	1.05	3.54	1.45	2.41	31.89	48.32	19.91	80.22
765	31.5	107.5	2	2	3	3	3	3	219	21.90	4862	3476	1674	71.50	42.50	9.79	3.58	56.04	21.49	1.66	1.04	3.62	1.39	2.64	35.47	48.14	20.04	78.57
766	32	107.5	2	2	3	3	3	3	198.5	24.50	4407	3215	1498	73.00	39.00	10.01	3.69	54.45	22.55	1.69	1.06	3.65	1.43	2.43	35.70	46.59	20.46	78.07
767	28.5	105	3	4	4	6	5	7	100	15.48	2220	1370	649	61.75	35.50	11.23	4.03	46.13	29.67	1.66	0.90	3.84	1.24	1.55	32.98	47.38	22.00	76.69
768	28.5	104.5	3	4	4.5	6.5	6	7.5	142.5	23.75	3164	2029	972	64.15	31.00	11.06	4.09	45.45	30.34	1.71	0.94	3.91	1.28	1.50	33.77	47.92	22.06	76.73
769	29.5	109	3	4	4.5	6.5	6	7.5	71	8.80	1576	1020	487	65.00	30.50	10.10	3.16	54.19	23.70	1.58	1.05	3.75	1.39	2.29	31.64	47.69	19.99	78.94
770	28.5	107	3	4	4.5	6	6	7	66.5	10.45	1476	821	386	55.50	28.75	11.03	3.91	47.37	29.56	1.61	0.90	3.87	1.19	1.60	34.55	46.91	21.62	77.83
771	29	104.5	3	4	4.5	6	6	8	25	16.00	555	334	157	59.50	29.25	11.18	3.76	45.80	30.45	1.59	0.94	3.92	1.26	1.50	30.95	46.96	21.70	77.19
772	28.5	104.5	3	4	4	5.5	5	6.5	74	12.00	1643	1013	478	61.75	30.50	11.10	3.94	45.35	30.77	1.60	0.95	4.00	1.26	1.47	33.77	47.27	21.89	77.06
773	28.5	104	3	4	4	5.5	6.5	7	111.5	18.50	2475	1733	840	70.05	25.75	11.23	3.99	46.36	29.45	1.64	0.91	3.83	1.26	1.57	31.85	48.64	21.97	76.71
774	28.5	107.5	3	4	4	6	7	7	104	11.40	2309	1450	704	62.75	32.50	10.60	3.97	48.47	29.01	1.68	0.86	3.86	1.22	1.67	31.02	48.42	21.33	78.33
775	29	104	3	4	4.5	6	7.5	7.5	62.5	9.20	1388	877	431	63.05	28.75	11.10	3.77	43.81	31.56	1.70	0.91	4.03	1.27	1.39	30.81	48.95	21.86	76.28
776	30	107	3	4	5	6	6.5	7	41	6.00	910	588	282	64.55	26.25	10.13	4.25	50.83	26.21	1.79	0.88	3.79	1.22	1.96	31.24	47.99	21.18	77.92
777	30.5	104.5	3	4	5	6	7.5	7.5	93	13.05	2065	1333	623	64.50	33.00	10.93	3.98	47.57	29.16	1.66	0.92	3.77	1.23	1.63	31.10	46.83	21.57	77.64

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778	27.5	104.5	3	4	5	6	7	7.5	104	12.93	2309	1558	734	67.50	32.25	10.89	4.13	46.78	29.50	1.70	0.92	3.92	1.26	1.59	32.96	47.09	21.90	77.20
779	28.5	107.5	3	4	4	5.5	6	6.5	100	13.45	2220	1497	719	67.50	32.00	10.62	4.19	48.02	27.98	1.71	0.94	3.89	1.28	1.72	33.04	48.03	21.69	76.94
780	28.5	107.5	3	4	5	5.5	6.5	7	118.5	13.19	2631	1671	828	63.50	32.75	10.53	3.47	50.99	26.42	1.56	0.98	3.64	1.33	1.95	31.64	49.52	20.54	78.39

781	28.5	108.5	3	4	4	5.5	7	7	75	12.55	1665	940	445	56.50	35.25	11.02	4.03	47.85	28.44	1.61	0.92	3.77	1.24	1.68	31.75	47.32	21.68	77.21
782	29	104.5	3	4	4	5.5	6.5	6.5	103	14.50	2287	1499	723	65.50	38.25	10.64	3.66	49.18	28.68	1.58	0.90	3.74	1.25	1.72	31.79	48.26	20.87	78.76
783	28.5	109.5	3	4	4	5.5	5	6	105.5	18.75	2342	1403	674	59.90	37.00	9.94	4.29	53.32	22.94	1.93	0.91	3.87	1.29	2.33	32.11	48.05	21.32	77.17
784	29.5	108.5	3	4	5	5.5	5	6.5	90	11.45	1998	1348	653	67.50	38.00	10.75	3.91	48.81	28.05	1.74	0.93	3.78	1.27	1.75	31.21	48.57	21.45	77.79
785	27.5	105.5	3	4	4	5	5	6	97.5	13.70	2165	1351	656	62.50	31.00	10.60	3.52	51.39	25.91	1.58	0.98	3.65	1.31	2.00	33.24	48.46	20.66	78.27
786	28	105.5	3	4	4	5	6	6	98	16.85	2176	1449	694	66.50	34.00	11.16	3.71	42.81	32.16	1.68	0.92	4.11	1.26	1.33	31.62	47.90	21.92	75.89
787	29.5	104.5	3	4	5	5.5	6	7	122.5	15.55	2720	1734	833	63.75	35.50	10.76	3.72	47.64	28.56	1.62	0.91	3.83	1.21	1.67	31.77	47.94	21.14	77.11
788	29.5	104	3	4	4.5	5.5	6	6.5	109.5	12.26	2431	1682	802	69.25	35.50	10.46	3.77	51.04	26.37	1.59	0.98	3.72	1.31	1.96	31.94	47.66	20.84	78.39
789	28.5	108.5	3	4	4.5	5.5	5	6	137.5	20.15	3053	2107	1006	69.00	36.50	9.79	3.74	56.52	22.19	1.59	0.98	3.45	1.27	2.55	30.82	47.85	19.84	79.69
790	27.5	105.5	3	4	4.5	5	5	6.5	117	19.50	2597	1596	791	61.45	31.50	11.07	3.77	47.11	28.56	1.73	0.90	3.88	1.26	1.65	32.10	49.54	21.70	76.57
791	28.5	106	3	4	4	5.5	5	7	113.5	19.05	2520	1753	857	69.50	33.00	11.08	4.10	45.70	30.13	1.65	0.86	3.90	1.12	1.52	31.62	48.75	21.85	76.69
792	27	106.5	3	4	4	5	5	6.5	172.5	22.05	3830	2671	1336	69.75	37.50	10.59	3.70	51.29	25.95	1.57	0.96	3.68	1.27	1.99	31.14	50.04	20.82	78.20
793	27.5	105.5	3	4	5	5.5	6	7	112.5	13.37	2498	1672	793	66.85	32.50	11.06	3.92	46.28	30.21	1.59	0.89	3.97	1.19	1.53	34.26	47.51	21.72	77.39
794	27.5	105.5	3	4	5	5.5	6	7	99.5	16.10	2209	1441	684	65.15	37.00	11.26	3.66	45.32	30.02	1.63	0.93	3.98	1.27	1.51	30.81	47.51	21.81	76.27
795	30	103.5	3	4	5	5.5	6	7	109	15.40	2420	1492	737	61.70	38.00	11.15	3.88	45.09	30.43	1.71	0.92	3.97	1.26	1.48	31.43	49.41	21.97	76.44
796	28.5	106	3	4	4.5	6	6	7	82.5	7.15	1832	1057	514	57.50	37.25	10.89	4.05	47.93	28.54	1.69	0.94	3.78	1.29	1.68	31.46	48.77	21.69	77.42
797	29	105.5	3	4	4	6	5	7	57.5	8.95	1277	773	376	60.50	36.75	10.69	3.70	51.29	25.72	1.59	0.95	3.72	1.29	2.01	30.71	48.80	20.99	77.96
798	29	109.5	3	4	4.5	6	5.5	7	84	9.92	1865	1094	537	58.60	34.50	10.24	3.64	50.62	26.09	1.68	0.96	3.80	1.34	1.94	30.74	48.83	20.70	77.67
799	29.5	109.5	3	4	4.5	6	6	7.5	98.5	11.80	2187	1407	694	64.25	37.50	9.99	4.00	51.30	25.61	1.71	0.88	3.96	1.21	2.00	31.12	49.21	20.87	77.79
800	28	104.5	3	4	4.5	6	5.5	7	146.5	22.50	3252	2132	1007	65.50	38.75	11.13	3.68	43.90	30.87	1.66	0.91	4.22	1.23	1.42	30.71	47.24	21.92	75.68
801	29.5	108.5	3	4	5	5.5	5.5	6.5	153.5	23.65	3408	2008	990	58.90	39.50	10.37	3.81	49.89	26.33	1.76	0.93	3.88	1.28	1.91	31.49	49.33	21.09	77.15
802	29.5	109.5	3	4	4.5	5.5	5.5	6.5	118	17.65	2620	1745	852	66.55	41.75	9.88	3.68	55.01	22.75	1.64	0.98	3.68	1.38	2.42	30.80	48.93	20.26	78.73
803	28	113	3	4	4.5	5.5	5.5	6.5	82.5	11.25	1832	1088	510	59.35	39.50	8.95	3.36	59.04	20.23	1.69	1.12	3.76	1.51	2.92	33.16	46.89	19.27	80.38
804	29	105.5	3	4	4	5	5	6	123.5	16.20	2742	1570	761	57.20	41.50	10.26	3.50	52.18	24.84	1.63	1.00	3.70	1.37	2.10	32.23	48.60	20.45	78.02
805	28.5	107.5	3	4	4.5	5.5	5.5	6.5	171.5	19.15	3807	2644	1261	69.45	40.00	9.10	3.51	66.00	14.08	1.67	0.95	3.23	1.29	4.70	35.15	47.71	18.81	81.03
806	28.5	106.5	3	4	4.5	5.5	5.5	7	198.5	28.85	4407	3203	1591	72.70	38.25	8.99	3.48	60.30	18.80	1.71	1.12	3.62	1.51	3.23	32.02	49.66	19.31	80.23
807	29	111	3	4	5	6	6	8.5	160	22.25	3552	2579	1209	72.70	41.50	9.61	3.93	56.36	21.93	1.71	1.02	3.59	1.38	2.57	35.37	46.90	20.21	79.32
808	30.5	109.5	3	3	4	5	6	7	124	16.05	2753	1994	964	72.50	39.50	10.13	3.38	54.68	23.36	1.57	1.05	3.65	1.40	2.35	32.34	48.57	20.13	79.09
809	29.5	111	3	4	5	6	6	7	100	8.15	2220	1581	748	71.10	42.25	9.16	3.21	58.87	21.29	1.69	1.02	3.66	1.41	2.77	35.81	47.38	19.13	81.18
810	29.5	114.5	2.5	3	5	5.5	6	7	122.5	10.60	2720	1875	904	69.00	43.00	9.80	3.49	56.45	22.17	1.66	1.00	3.66	1.41	2.55	31.73	48.25	20.02	79.62
811	30.5	114	2.5	3.5	5	6	6	7.5	113	13.15	2509	1629	771	65.00	41.75	9.96	3.52	55.68	22.30	1.55	1.07	3.57	1.43	2.52	35.76	47.35	20.03	79.05
812	28.5	104.5	2.5	3.5	4	5	6	8	171.5	19.65	3807	2667	1272	70.10	40.25	8.24	3.31	70.45	9.24	1.65	1.11	3.41	1.50	7.90	31.30	47.75	18.12	80.80

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813	28	105	2.5	4	5	6	6	9	117.5	25.40	2609	1772	860	67.95	41.00	8.21	3.97	66.00	13.85	1.84	1.06	3.49	1.42	4.78	36.13	48.53	18.93	80.91
814	29.5	107.5	3	3.5	4.5	5.5	5.5	8	172.5	20.59	3830	2549	1189	66.50	38.75	10.03	3.22	56.07	22.28	1.53	1.09	3.67	1.51	2.52	35.59	46.70	19.96	79.43
815	28.5	106	2	4	5	6	5.5	8	122.5	19.55	2720	1927	893	70.85	38.50	8.15	4.03	66.24	13.29	1.97	1.00	3.62	1.42	5.03	36.67	46.31	19.20	80.53
816	28.5	105	2	3.5	5	6	5	6	105	13.20	2331	1615	743	69.30	38.00	8.33	3.83	66.94	11.60	1.86	1.03	3.45	1.35	5.81	33.50	45.97	18.84	79.57
GPBD4	30.5	110.5	2	2	3	3	3	3	226.5	22.60	5028	3610	1711	71.80	41.75	10.19	3.78	50.54	27.02	1.99	0.95	3.59	1.25	1.87	31.41	47.39	20.80	78.51
GM4-3	32	113.5	2	2	3	3	3	3	170.5	18.66	3785	2752	1378	72.70	43.50	7.75	3.88	69.48	11.39	1.99	1.01	3.52	1.29	6.12	32.36	50.07	18.42	81.88
TMV-2	28.5	102.5	5	5	6	6.5	8	8.5	175	18.50	3885	2743	1223	70.50	43.75	11.70	3.69	44.22	33.68	1.85	0.81	3.98	1.24	1.31	22.69	44.65	22.47	78.71
GM6-1	31.5	109.5	2	2	3	3	3	3	167	20.50	3707	2540	1172	68.50	40.25	8.11	3.43	69.00	12.08	1.77	0.96	3.65	1.18	5.77	33.80	46.12	18.15	82.04
GL-84	29.5	107	5	5	6	6.5	8	8.5	222	20.31	4928	3573	1722	72.50	44.00	10.74	3.65	48.37	29.28	2.14	0.71	4.03	1.13	1.67	27.52	48.23	21.68	78.36
DH-86	32	104	5	5.5	6	7	8	9	116.5	13.75	2586	1953	991	75.50	44.25	11.57	3.40	47.32	30.38	1.75	0.82	3.52	1.14	1.57	29.99	50.76	21.38	78.52
G2-52	30.5	110.5	2	2	3	3	3	3	244	22.75	5417	3874	1849	71.50	43.25	9.81	3.39	54.41	24.85	1.92	1.00	4.04	1.38	2.19	31.27	47.85	20.54	80.26
Mean	31.77	111.1	2.16	2.30	3.25	3.41	3.46	3.62	174.3	19.39	3870.0	2763.3	1314.8	70.75	40.51	9.69	3.65	56.86	20.73	1.73	1.05	3.67	1.41	2.87	34.47	47.50	20.14	78.63
C.V.	2.73	0.89	3.78	4.91	3.93	6.45	4.92	6.21	5.33	9.88	5.33	6.43	7.30	3.47	2.99	3.22	8.10	2.64	7.14	6.96	3.35	3.60	3.55	12.37	3.39	3.52	1.82	1.00
S.E.	0.61	0.70	0.06	0.08	0.09	0.16	0.12	0.16	6.57	1.35	145.93	125.57	67.89	1.74	0.86	0.22	0.21	1.06	1.05	0.08	0.02	0.09	0.04	0.25	0.83	1.18	0.26	0.56
C.D. 5%	1.70	1.95	0.16	0.22	0.25	0.43	0.33	0.44	18.25	3.76	405.10	348.57	188.45	4.82	2.38	0.61	0.58	2.95	2.90	0.24	0.07	0.26	0.10	0.70	2.30	3.28	0.72	1.55
C.D. 1%	2.24	2.56	0.21	0.29	0.33	0.57	0.44	0.58	24.00	4.95	532.84	458.49	247.87	6.34	3.13	0.81	0.76	3.88	3.82	0.31	0.09	0.34	0.13	0.92	3.02	4.31	0.95	2.04

Appendix III: Mean performance of recombinant inbred lines in *kharif* 2012

RIL No.	D to 50 %	Maturity	70 R	70LLS	80R	80LLS	90R	90LLS	pd.y/d	y/d/ plt	y/d/ ha	k.y/d/ ha	oil y/d/	S %	100 SM	PAL	STE	OLE	LIN	ARA	ECO	BEH	LIG	O/ L	protein	oil conte	SFA	USFA
1	32.0	107.5	2	2	3	3	3	3	209.00	20.86	4640	3346	1571	72.00	39.75	9.98	3.38	54.50	24.53	1.66	1.04	3.62	1.27	2.22	33.68	46.80	19.91	80.08
2	30.0	109.5	2	2	3	3	3	3	177.50	20.10	3941	2906	1367	73.75	39.25	10.24	3.70	51.92	26.24	1.78	1.00	3.63	1.29	1.98	32.24	47.05	20.63	79.15
3	29.5	110.5	2	2	3	3	3	3	188.50	22.26	4185	2908	1379	69.50	38.75	10.80	3.30	47.99	29.61	1.77	1.04	3.96	1.35	1.63	33.41	47.39	21.18	78.64
4	29.5	109.0	2	2	3	3	3	3	208.50	22.90	4629	3354	1578	72.50	40.75	10.57	3.24	51.33	26.53	1.68	0.96	3.65	1.24	1.94	33.11	47.06	20.38	78.82
5	30.0	110.5	2	2	3	3	3	3	167.00	25.68	3707	2570	1202	69.25	41.75	9.95	3.21	53.20	25.68	1.71	0.99	3.64	1.33	2.07	33.51	46.77	19.83	79.88
6	30.0	105.5	2	2	3	3	3	3	102.50	13.69	2276	1587	728	69.75	39.50	9.98	3.42	53.10	25.71	1.75	0.96	3.76	1.32	2.07	32.48	45.86	20.23	79.76
7	28.0	111.5	2	2	3	3	3	3	145.50	22.39	3230	2264	1063	70.25	37.75	10.85	2.93	48.40	28.28	1.70	1.00	3.84	1.35	1.71	33.54	46.93	20.67	77.68
8	30.0	106.0	2	2	3	3	3	3	156.50	22.01	3474	2449	1161	70.50	40.75	10.47	3.96	51.95	26.33	1.81	0.86	3.64	1.23	1.99	32.60	47.49	21.10	79.14
9	30.5	109.5	2	2	3	3	3	3	193.50	24.13	4296	3240	1482	75.25	40.50	10.47	3.31	51.71	25.68	1.72	0.95	3.67	1.25	2.02	33.86	45.74	20.42	78.34
10	30.5	110.5	2	2	3	3	3	3	221.00	27.89	4906	3626	1759	74.00	40.25	10.68	3.55	50.58	27.33	1.56	1.00	3.45	1.24	1.85	34.67	48.49	20.47	78.91
11	29.5	108.0	2	2	3	3	3	3	129.00	21.80	2864	2145	1001	75.00	40.25	10.63	3.12	50.77	27.67	1.65	0.99	3.72	1.35	1.84	33.67	46.69	20.47	79.43
12	30.5	108.5	2	2	3	3	3	3	172.50	15.78	3830	2786	1284	72.75	41.50	10.27	3.32	54.03	23.69	1.74	0.93	3.68	1.22	2.28	32.21	46.06	20.22	78.65
13	30.5	106.5	2	2	3	3	3	3	124.50	12.38	2764	1915	886	69.25	39.50	8.90	3.86	62.60	16.10	1.85	0.96	3.72	1.41	3.89	31.68	46.26	19.73	79.67
14	30.5	106.0	2	2	3	3	3	3	148.50	20.03	3297	2309	1114	69.75	43.75	10.60	3.43	50.91	26.56	1.79	0.97	3.93	1.36	1.92	32.70	48.01	21.12	78.44
15	31.5	110.5	2	2	3	3	3	3	189.00	26.06	4196	2927	1370	69.75	40.50	11.10	3.19	47.14	29.22	1.65	0.96	3.88	1.29	1.62	33.97	46.77	21.11	77.32
16	30.5	111.0	2	2	3	3	3	3	145.00	21.25	3219	2347	1112	73.00	40.25	10.42	3.43	51.79	25.55	1.66	0.97	3.65	1.26	2.03	32.05	47.25	20.42	78.32
17	31.0	110.5	2	2	3	3	3	3	162.50	23.52	3608	2560	1207	71.00	41.00	10.29	3.29	53.36	24.79	1.69	0.98	3.65	1.30	2.16	33.66	47.08	20.21	79.13
18	30.5	111.0	2	2	3	3	3	3	153.50	20.15	3408	2439	1103	71.50	38.00	10.53	3.41	51.05	26.29	1.66	0.98	3.83	1.34	1.94	30.11	45.28	20.78	78.32
19	31.0	112.0	2	2	3	3	3	3	203.00	19.67	4507	3324	1606	73.75	41.25	10.85	2.92	48.41	27.72	1.68	0.99	4.00	1.31	1.75	32.69	48.28	20.76	77.13
20	32.0	111.5	2	2	3	3	3	3	138.50	18.08	3075	2289	1088	74.50	42.00	10.58	3.25	50.69	26.68	1.63	0.99	3.87	1.33	1.90	32.62	47.62	20.67	78.35
21	30.5	105.5	2	2	3	3	3	3	167.00	20.88	3707	2723	1267	73.50	38.50	9.16	4.18	61.06	17.16	1.80	0.95	3.72	1.43	3.58	33.32	46.46	20.30	79.17
22	31.5	107.0	2	2	3	3	3	3	187.00	21.01	4151	3135	1455	75.50	41.50	10.41	3.22	53.98	24.57	1.66	0.93	3.68	1.30	2.20	31.72	46.41	20.27	79.48
23	31.5	106.5	2	2	3	3	3	3	242.00	23.44	5372	4001	1902	74.50	41.50	10.36	2.81	52.54	25.06	1.65	1.03	3.90	1.40	2.10	29.69	47.56	20.12	78.63
24	31.0	109.5	2	2	3	3	3	3	141.00	19.03	3130	2182	1037	69.50	39.25	10.59	3.27	53.16	24.87	1.56	1.00	3.61	1.28	2.14	32.94	47.29	20.31	79.03
25	31.5	105.5	2	2	3	3	3	3	184.00	18.73	4085	2950	1406	72.00	38.00	10.41	3.22	53.98	24.57	1.66	0.93	3.68	1.30	2.20	32.67	47.58	20.27	79.48
26	32.0	105.0	2	2	3	3	3	3	239.50	24.50	5317	3930	1877	74.00	40.75	9.04	3.28	63.87	16.34	1.75	0.92	3.56	1.40	3.96	32.51	47.75	19.03	81.13
27	31.0	106.5	2	2	3	3	3	3	261.50	26.15	5805	4299	2026	74.00	40.75	9.66	3.60	56.97	22.23	1.70	0.97	3.50	1.28	2.57	34.18	47.20	19.74	80.17

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28	31.5	109.5	2	2	3	3	3	3	174.00	20.95	3863	2704	1274	70.00	43.00	10.67	3.17	51.04	26.58	1.62	0.95	3.75	1.30	1.92	32.02	47.13	20.51	78.57
29	30.5	109.0	2	2	3	3	3	3	238.00	18.31	5284	3724	1709	70.50	41.75	10.55	3.47	51.89	25.28	1.66	0.99	3.72	1.32	2.06	31.41	45.89	20.72	78.15
30	31.5	107.5	2	2	3	3	3	3	207.00	30.15	4595	3252	1511	70.75	42.50	10.20	3.09	54.41	23.30	1.69	0.98	3.71	1.30	2.34	32.05	46.47	20.00	78.69
31	30.5	106.5	2	2	3	3	3	3	153.00	14.67	3397	2362	1095	69.50	41.75	10.17	3.62	53.93	23.95	1.66	0.97	3.67	1.25	2.26	32.98	46.30	20.37	78.85
32	32.0	105.5	2	2	3	3	3	3	179.00	17.62	3974	2784	1319	70.00	40.00	9.26	3.27	59.84	19.14	1.85	0.90	3.89	1.38	3.15	32.83	47.18	19.67	79.88
33	31.5	107.0	2	2	3	3	3	3	157.50	16.06	3497	2305	1060	65.50	38.50	10.56	3.05	53.75	23.56	1.69	0.98	3.74	1.34	2.29	32.02	45.77	20.39	78.29
34	32.5	102.0	3	3	4	3	6	3.5	166.00	22.29	3685	2452	1125	66.50	36.00	8.23	3.33	71.56	8.44	1.67	1.11	3.31	1.50	8.57	32.48	45.86	18.04	81.11
35	30.5	111.0	3	3	4	3	6	3.5	175.00	21.01	3885	2547	1220	65.50	33.75	11.55	3.66	43.18	31.80	1.73	0.80	4.00	1.09	1.36	29.41	47.73	22.03	75.77
36	32.0	108.0	3	3	4	3	6	3	132.50	16.21	2942	2072	994	70.50	36.75	10.38	3.25	54.62	23.00	1.73	1.03	3.68	1.40	2.38	31.30	47.93	20.44	78.65
37	31.0	111.5	3	3	4	3.5	6	4	107.00	19.70	2375	1592	728	67.00	35.75	11.76	3.92	41.93	32.70	1.77	0.81	4.03	1.12	1.28	32.08	45.78	22.59	75.45
38	31.0	102.5	3	3	4	3	6.5	3.5	111.00	13.04	2464	1669	798	67.75	37.50	7.53	3.75	73.56	6.26	2.04	1.05	3.41	1.44	11.8	33.92	47.65	18.18	80.87
39	31.5	102.0	2	2	3.5	3	5.5	3	88.50	25.00	1965	1198	549	61.25	35.75	7.83	3.41	71.50	9.24	1.88	0.94	3.56	1.29	7.76	32.72	45.58	17.97	81.69
40	29.5	106.5	2	2	4	3	4.5	3	179.00	22.10	3974	2935	1361	73.75	42.25	10.16	3.73	54.48	23.71	1.66	0.97	3.62	1.28	2.30	34.75	46.44	20.46	79.16
41	31.0	108.5	2	2	3.5	3	4	3	210.00	22.09	4662	3402	1558	73.00	40.50	10.49	3.65	52.33	25.42	1.72	0.97	3.72	1.26	2.06	34.72	45.79	20.84	78.72
42	30.5	109.5	2	2	3	3	3	3	206.50	18.77	4584	3345	1529	73.00	41.50	9.98	3.90	54.21	23.21	1.82	0.96	4.01	1.35	2.34	34.41	45.72	21.06	78.39
43	29.5	110.0	2	2	3	3	3	3	229.00	24.26	5084	3721	1720	73.25	43.00	10.37	3.69	53.27	24.57	1.64	0.99	3.68	1.34	2.17	33.13	46.17	20.72	78.83
44	31.0	111.5	2	2	3	3	3	3	190.00	18.11	4218	2922	1333	69.25	36.50	10.35	3.51	50.96	25.86	1.80	0.99	4.00	1.33	1.97	33.23	45.62	20.98	77.81
45	31.0	111.0	2	2	3	3	3	3	175.50	16.80	3896	2690	1258	69.00	37.75	10.66	3.44	52.05	26.10	1.58	0.97	3.65	1.30	2.00	32.86	46.91	20.63	79.12
46	31.0	110.0	2	2	3	3	3	3	133.50	16.75	2964	2132	971	72.00	38.50	10.62	3.38	49.66	26.59	1.74	1.02	3.90	1.36	1.87	33.24	45.57	21.00	77.27
47	31.0	109.5	2	2	3	3	3	3	173.50	21.69	3852	2726	1292	70.75	36.50	10.65	3.33	49.20	27.16	1.79	0.94	4.02	1.30	1.81	33.28	47.35	21.08	77.30
48	32.5	111.5	2	2	3	3	3	3	206.00	18.78	4573	3532	1597	77.25	39.75	10.56	3.21	52.63	25.08	1.65	0.94	3.70	1.28	2.10	32.11	45.24	20.40	78.64
49	29.5	107.5	2	2	3	3	3	3	198.00	23.87	4396	3343	1573	76.00	43.00	10.45	3.35	52.25	24.82	1.70	0.98	3.81	1.33	2.11	32.65	47.06	20.64	78.05
50	30.5	106.5	2	2	3	3	3	3	225.50	19.94	5006	3679	1690	73.50	37.75	10.97	3.68	52.34	24.85	1.73	0.95	3.59	1.25	2.11	33.02	45.92	21.21	78.15
51	30.0	108.5	2	2	3	3	3	3	223.50	20.51	4962	3660	1735	73.75	38.75	11.00	3.47	49.74	26.35	1.79	0.93	3.94	1.33	1.90	33.15	47.35	21.54	77.02
52	30.5	106.5	2	2	3	3	3	3	201.50	25.19	4473	3089	1437	69.00	39.25	10.07	3.25	55.15	22.84	1.72	0.96	3.76	1.36	2.42	32.31	46.57	20.16	78.95
53	30.0	108.5	2	2	3	3	3	3	170.00	22.55	3774	2639	1232	70.00	39.00	10.47	3.36	52.01	25.84	1.71	0.97	3.83	1.26	2.02	33.35	46.81	20.64	78.81
54	30.0	112.5	2	2	3	3	3	3	162.00	23.44	3596	2569	1185	71.25	39.50	10.52	3.50	50.84	26.20	1.74	0.95	3.86	1.28	1.95	32.75	46.24	20.89	77.99
55	29.5	111.5	2	2	3	3	3	3	147.50	22.71	3275	2315	1071	70.75	38.25	10.65	3.57	49.89	27.80	1.63	0.99	3.97	1.35	1.79	34.19	46.24	21.17	78.67
56	32.0	108.0	2	2	3	3	3	3	173.50	24.79	3852	2413	1164	62.75	39.50	9.68	3.78	56.27	22.28	1.72	0.99	3.84	1.35	2.53	33.68	48.13	20.37	79.54
57	30.0	112.5	2	2	3	3	3	3	198.00	24.90	4396	3139	1442	71.25	35.75	10.64	3.26	49.50	27.19	1.71	0.96	3.91	1.30	1.82	35.53	45.96	20.83	77.64
58	30.5	112.0	2	2	3	3	3	3	171.00	24.43	3796	2683	1244	70.50	35.75	10.62	3.61	51.44	26.32	1.78	0.91	3.82	1.26	1.96	34.32	46.45	21.08	78.67
59	31.5	113.0	2	2	3	3	3	3	190.50	26.31	4229	3153	1465	74.50	35.75	10.70	3.38	51.11	26.54	1.61	0.96	3.66	1.27	1.93	35.72	46.48	20.61	78.61
60	30.0	112.5	2	2	3	3	3	3	223.00	25.18	4951	3514	1623	71.00	38.25	10.74	3.50	50.27	26.81	1.63	0.98	3.74	1.29	1.88	33.77	46.17	20.90	78.06
61	30.5	110.5	2	2	3	3	3	3	128.50	15.40	2853	1998	952	70.00	40.00	10.87	3.22	50.12	27.56	1.58	1.02	3.68	1.35	1.82	32.14	47.57	20.70	78.70
62	29.5	111.0	2	2	3	3	3	3	95.00	17.86	2109	1430	678	67.50	37.75	11.07	3.33	49.07	28.04	1.63	0.97	3.84	1.33	1.75	32.67	47.46	21.19	78.08

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63	30.0	110.5	2	2	3	3	3	3	141.50	19.55	3141	2300	1072	73.25	42.25	10.65	3.53	50.53	27.09	1.76	0.97	3.96	1.35	1.87	33.60	46.68	21.26	78.59
64	30.0	108.0	2	2	3	3	3	3	217.50	21.75	4829	3679	1715	76.25	38.75	8.99	3.88	61.19	18.12	1.84	0.88	3.79	1.36	3.38	34.16	46.65	19.87	80.20
65	29.5	110.5	2	2	3	3	3	3	150.00	18.89	3330	2462	1178	73.75	39.75	10.45	3.51	52.13	25.40	1.75	0.95	3.79	1.30	2.05	32.87	47.79	20.81	78.48
66	30.0	111.0	2	2	3	3	3	3	216.00	28.79	4795	3432	1662	71.50	40.50	10.59	3.60	51.79	26.01	1.77	0.96	3.89	1.40	1.99	33.43	48.47	21.25	78.76
67	30.0	112.5	2	2	3	3	3	3	235.00	21.49	5217	3757	1767	72.00	41.75	11.16	3.17	48.49	28.54	1.63	0.97	3.81	1.34	1.70	33.27	46.98	21.11	78.00
68	30.0	109.5	2	2	3	3	3	3	193.00	20.66	4285	3062	1448	71.50	40.50	10.62	3.61	51.44	26.32	1.78	0.91	3.82	1.26	1.96	32.65	47.29	21.08	78.67
69	29.5	108.5	2	2	3	3	3	3	181.50	17.32	4029	2750	1276	68.25	38.00	10.11	3.67	55.07	23.87	1.77	0.95	3.62	1.28	2.32	32.95	46.41	20.46	79.89
70	30.0	108.0	2	2	3	3	3	3	209.00	20.17	4640	3419	1578	73.75	40.25	10.70	3.00	51.52	26.86	1.70	0.92	3.68	1.31	1.92	32.68	46.12	20.39	79.29
71	30.5	109.5	2	2	3	3	3	3	216.50	16.65	4806	3644	1768	75.75	39.00	10.65	3.30	51.22	27.26	1.72	0.99	3.66	1.31	1.88	33.76	48.36	20.64	79.48
72	31.0	109.5	2	2	3	3	3	3	186.00	23.25	4129	2836	1333	68.75	39.75	10.34	3.58	54.05	24.92	1.64	0.98	3.49	1.30	2.17	32.25	47.02	20.36	79.95
73	31.0	107.5	2	2	3	3	3	3	203.00	24.48	4507	3201	1494	71.00	39.75	9.20	3.88	60.31	19.30	1.69	0.95	3.48	1.29	3.13	32.93	46.63	19.54	80.57
74	31.0	106.5	2	2	3	3	3	3	201.00	23.70	4462	3236	1537	72.50	40.75	10.17	3.09	52.70	25.19	1.73	1.03	3.88	1.41	2.09	32.59	47.56	20.27	78.92
75	31.0	107.0	2	2	3	3	3	3	151.00	14.00	3352	2402	1100	71.75	37.75	9.82	3.75	56.73	22.05	1.77	0.97	3.72	1.41	2.58	31.98	45.61	20.47	79.76
76	32.0	106.0	2	2	3	3	3	3	207.00	23.23	4595	3410	1583	74.25	39.25	9.99	3.51	54.19	24.11	1.78	1.00	3.80	1.40	2.25	35.14	46.43	20.48	79.30
77	30.5	105.5	2	2	3	3	3	3	133.00	19.49	2953	2146	998	73.00	38.75	9.67	3.50	54.69	23.66	1.76	0.97	3.70	1.28	2.31	32.73	46.39	19.92	79.31
78	30.5	105.5	2	2	3	3	3	3	234.00	26.38	5195	3662	1748	70.50	41.25	10.80	2.82	54.32	24.01	1.45	1.02	3.42	1.39	2.27	29.79	47.77	19.88	79.34
79	31.5	105.5	2	2	3	3	3	3	140.50	16.73	3119	2230	1041	71.50	40.00	10.98	3.15	50.86	26.81	1.63	0.98	3.71	1.40	1.90	34.35	46.77	20.88	78.65
80	32.5	111.0	2	2	3	3	3	3	126.50	19.38	2808	2004	944	71.50	37.00	10.65	3.30	51.59	25.24	1.77	0.98	3.78	1.38	2.04	35.13	47.18	20.88	77.80
81	30.5	112.5	2	2	3	3	3	3	239.00	18.38	5306	3847	1739	72.50	38.75	11.05	2.89	47.52	28.75	1.57	1.03	3.85	1.45	1.65	32.03	45.26	20.81	77.30
82	31.0	107.5	2	2	3	3	3	3	116.50	17.77	2586	1919	872	74.00	36.75	10.18	3.60	54.24	23.96	1.60	0.92	3.57	1.27	2.27	32.59	45.49	20.23	79.13
83	30.5	109.5	2	2	3	3	3	3	142.50	16.82	3164	2285	1076	72.00	37.25	10.50	3.38	51.11	27.62	1.60	1.00	3.90	1.37	1.86	34.74	46.81	20.75	79.73
84	31.5	111.0	2	2	3	3	3	3	98.50	15.10	2187	1625	747	74.50	42.00	10.61	3.38	49.95	27.56	1.69	0.95	3.93	1.30	1.82	33.07	45.99	20.91	78.46
85	32.0	113.5	2	2	3	3	3	3	140.00	16.49	3108	2189	1022	70.50	39.50	11.12	3.15	48.63	28.50	1.57	0.92	3.70	1.25	1.71	35.69	46.71	20.78	78.04
86	32.0	110.5	2	2	3	3	3	3	124.00	25.33	2753	2019	942	73.50	38.75	10.79	3.19	49.88	26.73	1.59	0.96	3.82	1.27	1.87	31.91	46.64	20.67	77.57
87	30.5	111.0	2	2	3	3	3	3	208.50	23.23	4629	3223	1554	69.75	40.00	10.62	3.05	51.57	26.35	1.59	1.00	3.73	1.36	1.96	33.96	48.15	20.36	78.92
88	31.0	108.5	2	2	3	3	3	3	193.50	23.12	4296	3032	1416	70.75	42.75	10.22	3.51	53.72	24.60	1.63	0.93	3.79	1.26	2.19	32.80	46.66	20.42	79.24
89	31.0	111.5	2	2	3	3	3	3	139.00	17.78	3086	2185	1020	70.75	40.75	10.76	3.14	52.92	24.85	1.55	0.96	3.68	1.31	2.13	33.89	46.62	20.43	78.72
90	29.5	109.5	2	2	3	3	3	3	153.00	19.50	3397	2260	1062	66.00	41.00	10.28	3.54	52.62	24.91	1.61	0.99	3.75	1.34	2.11	33.85	46.98	20.51	78.52
91	31.0	110.5	2	2	3	3	3	3	171.00	21.67	3796	2809	1307	74.00	42.75	10.17	3.54	54.17	23.73	1.75	0.89	3.80	1.23	2.28	34.33	46.53	20.48	78.79
92	31.0	112.0	2	2	3	3	3	3	108.00	14.27	2398	1727	805	71.00	40.25	11.01	3.04	50.03	27.19	1.52	0.97	3.81	1.35	1.84	31.86	46.68	20.73	78.19
93	30.5	110.5	2	2	3	3	3	3	229.50	21.93	5095	3401	1585	66.75	38.75	10.79	3.20	51.72	25.61	1.53	0.96	3.72	1.30	2.02	34.02	46.61	20.54	78.30
94	31.0	114.0	2	2	3	3	3	3	173.50	19.28	3852	2702	1259	70.50	39.25	11.11	3.36	49.40	26.93	1.62	0.95	3.88	1.32	1.83	35.07	46.38	21.28	77.28
95	31.0	109.5	2	2	3	3	3	3	158.50	17.23	3519	2604	1267	74.25	40.75	10.19	3.45	53.98	24.57	1.58	1.00	3.81	1.36	2.21	34.27	48.62	20.39	79.55

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96	32.0	108.5	2	2	3	3	3	3	155.50	17.90	3452	2410	1109	69.50	39.00	10.45	2.94	55.19	22.84	1.44	0.99	3.54	1.35	2.42	34.61	45.97	19.71	79.01
97	31.0	107.5	2	2	3	3	3	3	165.00	21.20	3663	2733	1300	74.50	40.25	10.22	3.47	55.56	23.63	1.53	1.01	3.38	1.30	2.35	32.44	47.52	19.90	80.19
98	31.0	110.5	2	2	3	3	3	3	217.50	20.65	4829	3254	1518	67.25	39.50	10.46	3.56	50.98	26.54	1.62	0.98	3.83	1.34	1.93	33.05	46.56	20.80	78.51
99	31.0	111.5	2	2	3	3	3	3	192.50	22.69	4274	3033	1435	71.00	41.25	10.85	3.03	50.08	28.14	1.59	1.01	3.79	1.38	1.78	34.38	47.31	20.65	79.23
100	31.0	110.0	2	2	3	3	3	3	182.50	15.35	4052	2915	1406	72.00	38.25	9.98	3.21	52.67	26.31	1.57	1.07	3.92	1.38	2.00	33.66	48.25	20.06	80.06
101	30.0	110.5	2	2	3	3	3	3	211.50	20.11	4695	3396	1592	72.75	40.50	10.30	3.71	52.22	26.48	1.58	0.96	3.66	1.25	1.97	35.32	47.01	20.50	79.66
102	30.5	112.5	2	2	3	3	3	3	174.00	20.57	3863	2687	1227	69.75	38.75	10.82	3.59	48.77	28.69	1.51	0.97	3.85	1.33	1.71	33.81	45.79	21.10	78.43
103	31.0	107.5	2	2	3	3	3	3	127.00	15.80	2819	2052	958	72.75	40.75	9.94	3.51	54.30	24.76	1.45	1.01	3.44	1.22	2.20	33.54	46.57	19.56	80.06
104	31.5	109.5	2	2	3	3	3	3	224.00	26.54	4973	3311	1571	66.75	38.25	10.88	3.19	51.97	25.42	1.50	0.94	3.82	1.31	2.04	32.43	47.50	20.72	78.32
105	31.0	109.0	2	2	3	3	3	3	195.50	19.57	4340	2928	1364	67.50	40.50	10.59	3.40	53.59	24.31	1.50	1.01	3.98	1.45	2.21	32.99	46.66	20.92	78.91
106	31.0	106.5	2	2	3	3	3	3	168.00	18.32	3730	2754	1351	73.75	38.75	9.84	3.62	56.72	22.02	1.58	1.00	3.67	1.36	2.59	34.04	48.91	20.07	79.73
107	31.0	106.5	2	2	3	3	3	3	191.50	20.31	4251	2993	1487	70.25	39.25	10.28	3.46	53.36	24.45	1.57	0.97	3.89	1.34	2.18	33.89	49.60	20.53	78.77
108	30.5	111.5	2	2	3	3	3	3	187.00	23.33	4151	2877	1376	69.50	39.00	10.46	3.53	51.04	26.59	1.52	0.96	4.15	1.35	1.92	34.83	48.11	21.01	78.59
109	31.5	112.5	2	2	3	3	3	3	175.00	21.88	3885	2751	1269	70.75	41.00	10.68	3.50	51.97	25.13	1.49	0.97	3.94	1.36	2.07	34.80	46.20	20.97	78.08
110	31.0	110.5	2	2	3	3	3	3	153.50	27.45	3408	2436	1130	71.50	42.75	10.61	3.33	52.73	24.44	1.51	0.92	3.81	1.26	2.16	33.69	46.39	20.52	78.09
111	30.5	110.0	2	2	3	3	3	3	186.50	19.52	4140	3073	1418	74.25	40.75	10.42	3.57	52.79	24.04	1.41	0.98	3.84	1.31	2.20	33.26	46.23	20.55	77.81
112	33.0	112.5	2	2	3	3	3	3	170.50	19.18	3785	2725	1285	72.00	39.00	9.94	3.86	51.19	25.00	1.56	1.00	3.96	1.30	2.06	32.21	47.16	20.62	77.18
113	32.0	110.5	2	2	3	3	3	3	196.50	27.10	4362	3098	1438	71.00	41.00	10.35	3.69	51.70	25.08	1.45	0.97	3.90	1.27	2.06	32.73	46.39	20.66	77.76
114	30.5	109.5	2	2	3	3	3	3	185.00	20.79	4107	2793	1348	68.00	37.75	10.51	3.28	52.55	25.16	1.44	0.98	3.87	1.31	2.09	33.16	48.24	20.42	78.69
115	30.5	107.5	2	2	3	3	3	3	178.50	17.22	3963	2991	1387	75.50	37.75	10.01	3.61	56.31	22.54	1.48	0.97	3.39	1.22	2.51	32.87	46.39	19.71	79.83
116	30.5	111.0	2	2	3	3	3	3	223.00	22.95	4951	3291	1496	66.50	41.25	10.32	3.39	52.03	25.44	1.51	1.02	3.88	1.36	2.05	32.49	45.49	20.47	78.49
117	30.5	112.5	2	2	3	3	3	3	160.00	21.46	3552	2618	1207	73.75	39.25	10.43	3.35	51.36	25.13	1.55	0.94	4.20	1.30	2.04	31.57	46.10	20.83	77.42
118	32.0	111.5	2	2	3	3	3	3	135.00	14.34	2997	2083	952	69.50	41.75	9.75	3.96	55.14	22.88	1.44	0.98	3.97	1.25	2.41	34.76	45.72	20.37	79.00
119	30.5	109.5	2	2	3	3	3	3	193.50	17.39	4296	3230	1481	75.00	42.75	10.65	3.40	51.11	26.26	1.40	0.98	3.88	1.26	1.95	33.72	45.85	20.59	78.35
120	31.5	110.0	2	2	3	3	3	3	207.50	21.92	4607	3398	1580	73.75	40.75	10.21	4.05	53.47	24.82	1.56	0.93	3.98	1.31	2.16	30.98	46.49	21.11	79.21
121	31.0	112.5	2	2	3	3	3	3	166.50	19.40	3696	2667	1237	72.00	39.75	10.54	3.42	53.62	23.65	1.36	1.01	3.76	1.32	2.27	33.28	46.32	20.39	78.28
122	30.5	106.5	2	2	3	3	3	3	213.50	23.95	4740	3296	1516	69.50	40.75	10.48	3.40	52.77	24.56	1.36	0.99	3.79	1.33	2.15	31.98	46.05	20.35	78.32
123	30.5	107.5	2	2	3	3	3	3	156.50	15.03	3474	2493	1180	72.00	39.75	10.38	3.41	54.84	22.85	1.36	1.01	3.68	1.31	2.40	33.80	47.17	20.13	78.71
124	31.0	108.0	2	2	3	3	3	3	180.00	20.20	3996	2874	1288	72.00	41.50	10.19	3.13	52.78	24.25	1.45	1.03	3.90	1.32	2.18	33.05	44.81	20.00	78.06
125	29.0	109.5	2	2	3	3	3	3	136.50	16.11	3030	2166	1008	71.00	41.50	10.40	3.38	53.90	23.73	1.25	1.03	3.64	1.31	2.27	32.21	46.41	19.98	78.66
126	29.0	108.0	2	2	3	3	3	3	190.00	23.29	4218	3187	1490	75.50	40.75	9.42	4.14	54.68	22.41	1.56	0.91	4.22	1.30	2.44	32.85	46.82	20.64	78.00
127	31.5	111.0	2	2	3	3	3	3	179.50	19.51	3985	2979	1366	74.75	40.50	10.19	4.01	51.25	25.62	1.60	0.88	3.88	1.28	2.00	33.89	45.85	20.96	77.76
128	30.0	110.5	2	2	3	3	3	3	134.00	14.98	2975	2069	952	69.50	38.75	10.26	3.43	51.31	25.49	1.54	0.96	3.98	1.33	2.01	32.07	45.95	20.55	77.77
129	30.5	111.0	2	2	3	3	3	3	213.50	19.41	4740	3503	1593	74.00	36.25	10.17	3.58	51.19	25.77	1.45	0.98	3.92	1.25	1.99	32.71	45.48	20.37	77.94
130	30.5	112.5	2	2	3	3	3	3	121.50	17.46	2697	1803	843	66.75	36.25	9.90	3.63	52.69	24.40	1.53	0.97	4.12	1.33	2.16	31.73	46.73	20.51	78.06

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131	31.5	112.0	2	2	3	3	3	3	172.50	18.42	3830	2750	1275	71.50	38.75	10.71	3.41	50.32	25.85	1.41	0.99	3.98	1.33	1.95	32.45	46.52	20.84	77.17
132	30.5	110.5	2	2	3	3	3	3	222.00	22.20	4928	3475	1647	70.50	38.75	10.64	3.25	52.22	24.63	1.42	0.99	3.92	1.34	2.13	32.16	47.40	20.57	77.83
133	30.0	111.5	2	2	3	3	3	3	85.00	13.94	1887	1337	625	71.00	37.75	10.75	3.69	49.28	27.17	1.36	0.98	3.79	1.27	1.81	32.54	46.67	20.86	77.43
134	30.0	106.5	2	2	3	3	3	3	180.00	18.67	3996	2767	1325	69.25	40.75	9.73	3.66	52.18	24.57	1.48	1.00	3.91	1.32	2.13	33.34	47.85	20.11	77.75
135	29.5	109.0	2	2	3	3	3	3	185.50	19.58	4118	2965	1427	72.00	41.75	10.39	3.44	48.41	26.84	1.47	1.01	4.11	1.32	1.80	30.04	48.09	20.73	76.26
136	31.5	112.5	2	2	3	3	3	3	213.50	23.80	4740	3438	1580	72.50	40.00	10.32	3.68	49.00	26.67	1.52	1.03	4.16	1.35	1.84	31.40	45.95	21.01	76.70
137	30.5	112.0	2	2	3	3	3	3	154.50	16.34	3430	2283	1025	66.50	42.00	10.83	3.34	47.87	27.48	1.48	1.02	4.12	1.37	1.74	32.00	44.88	21.13	76.38
138	31.5	111.0	2	2	3	3	3	3	194.50	16.86	4318	3126	1453	72.25	38.00	9.91	3.86	52.75	23.82	1.46	1.00	3.85	1.30	2.21	33.17	46.60	20.39	77.57
139	31.0	106.0	2	2	3	3	3	3	160.50	16.98	3563	2317	1073	65.00	36.25	10.18	3.89	52.04	24.76	1.52	0.90	3.88	1.27	2.11	32.68	46.30	20.74	77.70
140	32.5	108.0	2	2	3	3	3	3	217.50	19.15	4829	3561	1609	73.75	43.25	10.31	3.86	49.81	25.45	1.51	0.97	3.90	1.25	1.96	33.48	45.17	20.83	76.23
141	31.0	110.5	2	2	3	3	3	3	180.00	19.00	3996	2817	1307	70.50	39.00	10.62	3.55	50.07	26.06	1.62	0.96	4.02	1.32	1.93	34.67	46.40	21.12	77.09
142	31.0	108.0	2	2	3	3	3	3	182.50	23.40	4052	2933	1382	72.25	41.50	9.96	4.05	54.55	23.16	1.56	0.94	3.81	1.20	2.36	33.34	47.12	20.56	78.66
143	30.5	111.0	2	2	3	3	3	3	240.00	21.02	5328	3584	1681	67.25	39.25	10.85	3.69	50.10	26.29	1.48	0.93	3.91	1.26	1.91	33.00	46.72	21.18	77.32
144	31.5	109.5	2	2	3	3	3	3	214.00	18.86	4751	3216	1475	67.75	39.25	10.37	3.85	52.46	24.73	1.48	0.92	3.84	1.20	2.13	33.84	45.85	20.74	78.11
145	31.0	111.5	2	2	3	3	3	3	201.50	20.15	4473	3149	1504	70.50	39.50	10.49	3.48	49.71	27.17	1.54	0.99	4.21	1.35	1.83	32.39	47.71	21.07	77.86
146	31.5	109.0	2	2	3	3	3	3	220.00	24.63	4884	3335	1546	68.25	37.25	9.93	3.48	53.32	23.69	1.49	0.98	3.97	1.25	2.25	32.39	46.38	20.13	77.99
147	31.0	111.0	2	2	3	3	3	3	152.00	18.60	3374	2208	1006	65.50	39.75	10.68	3.59	49.79	26.02	1.58	0.94	4.05	1.26	1.93	34.52	45.56	21.16	76.75
148	31.5	108.5	2	2	3	3	3	3	214.50	17.20	4762	3226	1509	67.75	39.25	10.36	3.63	53.31	23.52	1.44	1.03	3.77	1.36	2.27	33.12	46.83	20.56	77.86
149	31.0	110.5	2	2	3	3	3	3	224.00	17.92	4973	3526	1655	71.00	40.75	10.57	3.80	51.24	25.75	1.42	0.96	3.86	1.32	1.99	31.78	46.93	20.97	77.95
150	31.0	109.5	2	2	3	3	3	3	217.50	19.83	4829	3375	1588	69.75	39.25	10.43	3.81	52.86	24.75	1.47	0.94	3.66	1.22	2.14	29.61	47.28	20.59	78.55
151	31.5	111.5	2	2	3	3	3	3	271.50	22.83	6027	4389	1973	72.75	40.75	10.80	3.39	51.04	25.30	1.58	0.96	3.90	1.32	2.02	34.01	44.89	20.99	77.30
152	32.0	113.5	2	2	3	3	3	3	157.00	22.65	3485	2583	1204	74.25	42.25	9.77	3.50	51.66	24.16	1.64	1.00	4.23	1.36	2.15	31.56	46.62	20.50	76.82
153	30.0	113.0	2	2	3	3	3	3	215.00	25.89	4773	3584	1654	75.00	42.25	10.67	3.45	50.65	26.12	1.52	0.96	3.84	1.28	1.94	32.81	46.18	20.76	77.74
154	31.0	111.5	2	2	3	3	3	3	241.00	22.68	5350	4012	1891	75.00	40.75	10.40	3.59	52.05	25.83	1.47	0.93	3.75	1.18	2.02	33.43	47.12	20.40	78.80
155	31.0	112.5	2	2	3	3	3	3	202.50	24.58	4496	3259	1492	72.50	42.50	10.00	3.46	55.94	22.58	1.48	1.01	3.64	1.33	2.48	32.57	45.80	19.90	79.53
156	30.0	113.5	2	2	3	3	3	3	181.50	21.81	4029	2960	1381	73.50	41.25	10.38	3.24	50.90	24.93	1.54	0.99	3.95	1.28	2.05	32.18	46.63	20.39	76.82
157	31.5	111.5	2	2	3	3	3	3	120.00	27.25	2664	1890	906	70.75	40.75	10.66	3.23	51.27	25.71	1.46	1.00	3.90	1.31	2.00	30.71	48.12	20.56	77.98
158	31.5	110.5	2	2	3	3	3	3	224.00	28.38	4973	3468	1616	69.75	39.25	10.48	3.08	49.21	26.60	1.53	1.03	3.98	1.35	1.85	34.82	46.59	20.42	76.84
159	31.5	110.0	2	2	3	3	3	3	264.00	21.13	5861	4146	1893	70.75	40.25	11.04	3.08	48.88	27.67	1.43	1.00	3.86	1.32	1.77	32.38	45.70	20.73	77.54
160	31.0	110.5	2	2	3	3	3	3	255.00	25.65	5661	3965	1901	70.00	43.00	10.45	3.16	53.89	23.66	1.59	0.97	3.71	1.29	2.28	32.35	47.90	20.20	78.52
161	32.5	108.5	2	2	3	3	3	3	244.00	23.64	5417	3903	1793	72.00	43.25	10.29	3.24	54.46	23.78	1.64	0.98	3.51	1.33	2.29	32.80	45.94	20.00	79.23
162	31.5	110.5	2	2	3	3	3	3	301.00	26.75	6682	4914	2276	73.50	44.75	10.68	3.44	52.12	25.42	1.70	0.97	3.57	1.28	2.05	32.63	46.34	20.67	78.52
163	31.0	110.5	2	2	3	3	3	3	199.50	24.00	4429	3047	1412	68.75	42.00	10.22	3.42	52.97	25.36	1.73	0.95	3.56	1.19	2.09	32.82	46.38	20.12	79.28

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164	30.5	108.5	2	2	3	3	3	3	222.50	19.75	4940	3567	1686	72.25	43.00	10.38	2.92	55.88	23.79	1.62	0.99	3.63	1.42	2.36	29.80	47.27	19.97	80.66
165	31.0	108.0	2	2	3	3	3	3	235.00	25.20	5217	3695	1725	70.75	42.25	10.50	3.21	54.11	22.73	1.76	0.96	3.66	1.36	2.39	32.69	46.76	20.49	77.80
166	31.5	110.5	2	2	3	3	3	3	226.50	31.40	5028	3657	1685	72.75	44.75	10.49	3.14	53.46	24.68	1.62	1.02	3.49	1.32	2.17	34.10	46.08	20.05	79.16
167	31.5	110.0	2	2	3	3	3	3	204.00	28.60	4529	2960	1423	65.25	39.75	10.59	3.08	52.54	25.19	1.79	0.99	3.76	1.41	2.09	33.78	48.14	20.64	78.72
168	31.0	111.0	2	2	3	3	3	3	241.50	23.40	5361	3796	1752	70.75	43.00	10.38	3.90	53.71	25.10	1.63	0.92	3.49	1.22	2.15	31.82	46.16	20.63	79.72
169	31.0	112.0	2	2	3	3	3	3	199.00	28.80	4418	3307	1498	74.75	42.00	10.78	3.09	50.86	26.85	1.72	0.99	3.90	1.38	1.90	32.78	45.42	20.87	78.71
170	32.5	111.5	2	2	3	3	3	3	158.00	19.89	3508	2300	1056	65.50	40.25	10.28	3.32	51.09	26.24	1.81	1.00	3.83	1.36	1.95	32.61	45.91	20.60	78.33
171	31.5	111.0	2	2	3	3	3	3	179.50	24.95	3985	2899	1378	72.75	43.50	10.92	2.99	49.59	27.44	1.60	0.96	3.63	1.27	1.81	31.89	47.61	20.41	77.99
172	32.5	108.5	2	2	3	3	3	3	200.00	22.38	4440	3125	1455	70.50	41.25	10.65	3.17	54.14	23.40	1.44	0.98	3.29	1.25	2.32	32.29	46.57	19.80	78.52
173	31.0	113.5	2	2	3	3	3	3	210.00	26.25	4662	3324	1540	71.50	40.00	10.42	3.31	52.99	24.22	1.73	1.00	3.98	1.39	2.19	33.84	46.31	20.84	78.21
174	30.5	110.5	2	2	3	3	3	3	200.00	23.70	4440	3267	1524	73.50	40.75	10.46	3.06	55.59	24.03	1.60	0.98	3.50	1.40	2.32	31.81	46.69	20.01	80.59
175	31.5	112.5	2	2	3	3	3	3	210.00	23.41	4662	3339	1591	71.50	42.25	11.12	3.04	49.94	26.70	1.72	0.94	3.98	1.34	1.87	30.07	47.44	21.21	77.59
176	31.0	109.5	2	2	3	3	3	3	207.00	21.40	4595	3207	1483	69.75	40.25	10.76	2.93	51.28	25.65	1.70	0.97	3.87	1.34	2.00	32.36	46.27	20.60	77.90
177	32.0	107.5	2	2	3	3	3	3	179.50	25.95	3985	2953	1418	74.00	41.25	10.64	3.32	52.26	26.15	1.61	0.97	3.67	1.28	2.00	33.69	47.91	20.52	79.38
178	31.0	108.5	2	2	3	3	3	3	184.00	15.43	4085	2910	1345	71.25	42.25	10.41	3.16	53.91	23.78	1.67	1.03	3.78	1.37	2.27	32.93	46.23	20.41	78.72
179	32.5	110.5	2	2	3	3	3	3	222.50	26.86	4940	3470	1628	70.25	42.25	10.51	3.45	53.19	25.21	1.70	0.97	3.69	1.30	2.11	32.43	46.91	20.65	79.37
180	31.0	107.5	2	2	3	3	3	3	200.00	27.75	4440	3238	1484	72.75	40.75	9.43	3.27	62.39	16.85	1.85	0.83	3.55	1.25	3.72	32.64	45.83	19.35	80.07
181	31.5	108.0	2	2	3	3	3	3	198.50	26.51	4407	3042	1379	69.00	40.00	10.57	3.03	55.38	22.75	1.72	0.97	3.62	1.31	2.44	33.04	45.31	20.25	79.10
182	30.5	106.5	2	2	3	3	3	3	224.50	29.25	4984	3394	1649	68.00	39.00	9.56	3.39	58.20	20.57	1.81	1.00	3.75	1.45	2.83	32.73	48.55	19.96	79.78
183	31.5	109.5	2	2	3	3	3	3	176.50	22.40	3918	2880	1317	73.50	39.75	10.52	3.09	52.88	24.51	1.83	0.93	3.81	1.34	2.16	32.98	45.75	20.59	78.33
184	32.0	106.5	2	2	3	3	3	3	189.50	27.52	4207	2796	1308	66.50	37.25	9.36	4.12	61.09	17.60	1.89	0.91	3.64	1.38	3.48	31.89	46.78	20.39	79.59
185	31.5	105.5	2	2	3	3	3	3	154.50	20.35	3430	2394	1119	69.75	39.75	10.35	3.22	54.63	23.40	1.65	0.96	3.48	1.25	2.34	32.91	46.82	19.95	78.99
186	31.5	105.0	2	2	3	3	3	3	142.50	14.79	3164	2331	1085	73.75	36.25	9.33	3.42	59.52	19.21	1.80	0.92	3.68	1.38	3.12	31.79	46.53	19.61	79.66
187	32.0	104.5	2	2	3	3	3	3	209.50	24.83	4651	3401	1613	73.25	40.50	9.89	2.83	62.89	15.73	1.86	0.82	3.41	1.20	4.00	33.50	47.35	19.18	79.44
188	31.5	110.0	2	2	3	3	3	3	100.00	22.00	2220	1541	724	69.50	39.50	10.46	3.23	52.02	25.21	1.66	1.00	3.67	1.33	2.07	32.63	46.80	20.36	78.23
189	32.0	109.0	2	2	3	3	3	3	199.00	27.50	4418	3180	1485	72.00	41.25	10.62	3.13	51.15	25.91	1.69	0.99	3.71	1.33	1.99	32.17	46.71	20.48	78.04
190	32.0	111.5	2	2	3	3	3	3	187.50	20.83	4163	2953	1380	70.75	39.75	10.21	3.45	52.79	24.31	1.71	0.95	3.73	1.34	2.17	34.20	46.87	20.44	78.05
191	31.5	113.0	2	2	3	3	3	3	144.00	18.57	3197	2035	935	73.75	36.50	11.28	3.89	46.52	30.24	1.48	0.83	3.50	1.07	1.55	31.42	45.95	21.21	77.60
192	32.5	114.0	2	2	3	3	3	3	293.50	26.83	6516	4561	2018	70.00	44.25	11.68	3.81	57.70	21.12	1.58	0.85	3.71	1.19	1.49	33.89	44.97	21.96	77.86
193	32.0	110.5	2	2	3	3	3	3	197.50	20.65	4385	3036	1411	69.25	38.25	10.40	3.78	53.83	24.12	1.66	1.00	3.59	1.34	2.24	33.75	46.47	20.78	78.95
194	31.0	110.0	2	2	3	3	3	3	121.50	21.78	2697	1919	881	71.25	38.50	10.07	3.51	54.31	24.75	1.56	1.02	3.59	1.35	2.20	32.07	46.04	20.08	80.08
195	31.5	113.5	2	2	3	3	3	3	116.50	20.04	2586	1887	885	73.00	36.00	10.98	3.52	51.12	26.39	1.63	0.97	3.69	1.31	1.94	35.55	46.91	21.12	78.47
196	30.5	108.5	2	2	3	3	3	3	104.50	14.65	2320	1682	786	72.75	40.00	10.27	3.46	55.02	23.87	1.60	0.94	3.42	1.22	2.31	32.52	46.60	19.97	79.83
197	31.0	106.0	2	2	3	3	3	3	172.00	20.37	3818	2777	1326	72.75	35.50	9.61	3.69	57.71	21.12	1.72	1.00	3.58	1.38	2.73	34.21	47.67	19.98	79.82
198	31.5	110.5	2	2	3	3	3	3	205.00	23.00	4551	3400	1596	74.75	37.75	10.26	3.37	52.12	26.14	1.76	1.01	3.95	1.40	2.00	31.67	46.94	20.74	79.27

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199	32.0	106.5	2	2	3	3	3	3	129.00	15.30	2864	2061	971	71.75	38.25	9.92	3.42	57.33	21.32	1.85	0.96	3.64	1.38	2.69	32.82	46.91	20.22	79.60
200	31.5	107.0	2	2	3	3	3	3	193.50	21.50	4296	3211	1563	74.75	36.25	10.00	3.57	55.18	24.01	1.63	0.98	3.71	1.34	2.32	33.14	48.68	20.24	80.17
201	31.0	108.5	2	2	3	3	3	3	165.50	21.40	3674	2396	1173	65.25	34.25	10.61	3.18	50.74	26.70	1.71	0.95	3.82	1.34	1.90	30.49	49.01	20.66	78.38
202	31.5	112.5	2	2	3	3	3	3	97.00	19.40	2153	1616	760	75.00	37.50	11.25	3.46	49.03	27.85	1.63	0.99	4.01	1.40	1.76	32.93	47.00	21.75	77.87
203	31.0	110.5	2	2	3	3	3	3	162.50	18.14	3608	2610	1221	72.25	38.00	10.93	3.26	51.56	26.08	1.57	0.96	3.56	1.28	1.98	33.88	46.67	20.60	78.60
204	30.5	106.5	2	2	3	3	3	3	142.00	18.89	3152	2359	1075	74.75	36.75	10.44	3.25	55.64	24.10	1.58	0.98	3.48	1.33	2.31	32.39	45.60	20.08	80.71
205	32.0	112.5	2	2	3	3	3	3	159.50	22.03	3541	2611	1248	73.75	36.00	10.56	3.24	52.11	25.39	1.75	0.92	3.84	1.28	2.06	34.50	47.83	20.67	78.42
206	30.5	113.0	2	2	3	3	3	3	178.50	22.60	3963	2914	1336	73.50	38.25	11.06	3.20	50.22	27.23	1.51	0.97	3.61	1.28	1.85	32.11	45.89	20.65	78.41
207	30.5	110.0	2	2	3	3	3	3	175.00	23.35	3885	2788	1285	71.75	38.00	10.78	3.36	51.78	26.01	1.51	0.92	3.58	1.22	1.99	30.88	46.07	20.45	78.72
208	31.0	106.5	2	2	3	3	3	3	136.50	23.21	3030	2278	1086	75.25	42.75	10.23	3.59	52.97	25.56	1.69	0.91	3.94	1.26	2.08	33.17	47.74	20.71	79.44
209	32.0	110.5	2	2	3	3	3	3	194.00	21.56	4307	3108	1455	72.00	37.50	11.06	2.97	50.45	27.15	1.50	0.97	3.69	1.32	1.86	33.69	46.98	20.54	78.57
210	31.5	108.5	2	2	3	3	3	3	173.00	25.50	3841	2880	1342	75.00	40.75	10.24	3.38	54.51	23.74	1.60	0.98	3.56	1.27	2.30	33.44	46.55	20.04	79.23
211	31.5	108.5	2	2	3	3	3	3	215.50	30.05	4784	3549	1660	74.25	40.50	10.50	3.35	53.10	24.87	1.57	0.90	3.59	1.15	2.14	32.76	46.79	20.17	78.87
212	30.5	111.5	2	2	3	3	3	3	106.00	23.63	2353	1656	765	70.50	37.50	9.91	3.86	52.96	24.75	1.60	1.00	3.68	1.20	2.15	33.54	46.23	20.27	78.72
213	32.5	106.5	2	2	3	3	3	3	188.50	23.20	4185	3155	1488	75.25	41.75	9.46	3.55	56.99	21.16	1.76	0.96	3.79	1.32	2.72	32.88	47.05	19.88	79.11
214	30.5	106.5	2	2	3	3	3	3	164.00	23.69	3641	2717	1316	74.50	40.75	9.33	3.71	56.72	21.36	1.79	0.95	3.77	1.31	2.66	32.82	48.23	19.90	79.03
215	31.5	110.0	2	2	3	3	3	3	179.00	22.98	3974	2975	1396	74.75	39.25	10.40	3.60	50.61	27.87	1.61	0.95	4.01	1.36	1.82	32.38	46.92	20.97	79.42
216	31.5	111.5	2	2	3	3	3	3	216.00	24.19	4795	3574	1663	74.50	37.50	10.30	3.47	53.85	23.81	1.62	0.93	3.66	1.23	2.26	33.96	46.48	20.27	78.59
217	32.5	105.5	2	2	3	3	3	3	173.00	21.56	3841	2557	1227	66.25	37.25	9.18	3.73	59.43	19.20	1.75	0.95	3.66	1.33	3.10	32.70	47.76	19.65	79.57
218	31.0	106.5	2	2	3	3	3	3	205.50	27.51	4562	3342	1556	73.25	38.50	9.67	3.38	57.40	20.74	1.59	0.97	3.66	1.29	2.77	32.15	46.56	19.60	79.11
219	32.0	108.5	2	2	3	3	3	3	154.50	21.92	3430	2404	1148	70.00	39.25	9.89	3.37	54.13	23.66	1.59	0.97	3.86	1.37	2.30	29.49	47.27	20.08	78.77
220	31.0	107.0	2	2	3	3	3	3	182.00	22.81	4040	2982	1403	73.50	42.25	8.84	4.39	55.60	22.44	1.71	0.97	4.20	1.29	2.49	31.77	47.04	20.43	79.01
221	32.0	106.5	2	2	3	3	3	3	201.00	28.98	4462	3232	1490	72.25	43.75	9.40	3.44	57.28	20.99	1.49	1.02	3.67	1.27	2.73	32.44	46.13	19.27	79.30
222	30.0	109.5	2	2	3	3	3	3	163.00	19.21	3619	2750	1275	76.00	42.25	10.34	3.36	50.38	26.17	1.49	1.03	4.12	1.41	1.93	33.01	46.57	20.72	77.58
223	32.0	112.5	2	2	3	3	3	3	114.50	16.36	2542	1799	831	70.50	43.75	10.12	3.54	54.49	22.80	1.50	0.94	3.64	1.23	2.40	32.50	46.36	20.02	78.23
224	33.0	111.5	2	2	3	3	3	3	170.50	24.80	3785	2663	1237	70.25	44.00	10.24	3.46	51.70	25.68	1.60	0.96	3.94	1.28	2.01	32.19	46.52	20.52	78.34
225	33.0	108.5	2	2	3	3	3	3	96.00	11.94	2131	1509	740	70.75	43.25	9.62	3.66	54.90	22.49	1.66	0.95	3.96	1.32	2.44	33.02	49.02	20.21	78.34
226	31.5	112.0	2	2	3	3	3	3	140.50	18.76	3119	2352	1138	75.50	42.25	10.08	3.44	52.64	24.87	1.55	0.96	3.95	1.23	2.12	31.58	48.41	20.25	78.46
227	30.0	111.0	2	2	3	3	3	3	168.50	19.06	3741	2661	1246	71.25	38.50	10.74	3.40	51.27	25.57	1.45	0.95	3.71	1.28	2.01	32.15	47.00	20.59	77.80
228	28.5	109.0	2	2	3	3	3	3	123.50	17.75	2742	1961	950	71.75	41.25	9.22	4.00	55.37	21.34	1.70	0.95	4.14	1.19	2.60	29.69	48.34	20.25	77.67
229	30.0	111.5	2	2	3	3	3	3	155.00	16.52	3441	2432	1136	71.00	43.25	9.84	3.64	54.74	22.28	1.56	0.94	3.88	1.23	2.46	32.75	47.06	20.15	77.96
230	33.0	112.0	2	2	3	3	3	3	86.50	21.97	1920	1292	607	67.00	41.25	9.37	3.82	55.03	22.50	1.59	0.97	3.84	1.31	2.48	31.80	46.97	19.93	78.49
231	31.5	109.0	2	2	3	3	3	3	126.00	19.95	2797	1846	856	66.00	43.25	9.62	3.51	55.03	21.24	1.63	1.00	4.04	1.25	2.61	31.33	46.54	20.06	77.27

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232	31.5	106.5	2	2	3	3	3	3	130.00	15.23	2886	1957	934	68.00	41.75	8.54	3.69	59.49	19.96	1.49	1.19	4.46	1.64	2.98	31.45	47.61	19.82	80.64
233	32.5	105.0	2	2	3	3	3	3	121.50	16.11	2697	1792	835	66.50	42.75	8.82	4.05	58.94	17.25	2.01	0.86	4.20	1.38	3.45	32.62	46.17	20.46	77.05
234	30.0	105.5	4	4	5	6	6	7	23.00	6.67	511	299	128	58.50	27.50	10.09	2.92	58.32	21.96	1.19	1.00	3.01	1.18	2.66	30.03	42.79	18.40	81.28
235	27.0	106.0	3	4	5	6	6	7	15.00	5.75	333	180	82	54.00	24.75	9.91	3.25	57.46	22.61	1.28	0.97	3.00	1.11	2.54	28.09	45.93	18.55	81.05
236	27.5	108.5	3.5	4	5	6	6.5	7.5	30.50	12.75	677	389	169	57.50	29.25	10.60	3.01	57.29	22.18	1.18	0.96	3.04	1.23	2.60	28.73	43.41	19.07	80.43
237	27.5	108.0	3.5	4	5	6	6.5	7.5	35.00	9.88	777	584	272	75.50	25.50	10.27	2.78	58.74	21.18	1.17	1.01	3.10	1.24	2.78	27.48	45.80	18.57	80.93
238	28.5	107.5	3	4	5	6	6	7.5	52.00	8.53	1154	756	302	65.50	25.25	10.35	2.98	56.75	23.60	1.14	1.02	3.05	1.18	2.41	26.37	40.03	18.71	81.37
239	27.0	110.5	3	4	4.5	5.5	7	8	50.50	9.32	1121	715	312	63.75	26.75	10.15	2.83	55.10	24.65	1.23	1.02	3.11	1.25	2.24	30.45	43.53	18.56	80.76
240	28.5	106.5	4	4	5	6	7	7	38.00	9.58	844	490	205	58.00	26.75	9.85	3.15	60.69	20.55	1.21	1.03	2.98	1.23	2.97	26.70	41.90	18.42	82.28
241	28.0	106.5	3.5	4	5.5	6	7.5	7.5	67.00	9.04	1487	828	339	55.50	29.25	10.55	2.95	59.40	20.75	1.12	1.01	2.77	1.27	2.88	25.20	41.05	18.65	81.16
242	27.5	105.0	4	4	5.5	6	7.5	7.5	55.00	15.83	1221	837	382	68.50	27.25	10.34	2.85	60.62	20.42	1.12	0.96	2.81	1.22	2.97	27.37	45.20	18.33	82.00
243	28.5	105.5	4	4	5	6	6	7	61.00	12.00	1354	975	389	72.00	27.25	10.13	2.72	56.94	22.88	1.21	1.03	2.94	1.29	2.50	25.23	39.91	18.29	80.85
244	27.0	106.0	4	4	5	6	6	7	31.50	7.85	699	472	190	67.50	36.75	10.19	2.91	63.16	16.85	1.45	0.89	2.95	1.21	3.76	26.79	40.06	18.71	80.89
245	28.0	105.0	4	4	4	6	6	8	22.50	6.17	500	334	133	67.50	31.50	10.60	3.03	59.46	21.07	1.08	0.98	2.83	1.26	2.83	25.23	39.91	18.79	81.51
246	29.5	105.5	3	3.5	4.5	5.5	6.5	7.5	35.50	17.75	788	528	238	67.00	33.50	10.72	3.27	57.63	22.25	1.13	0.94	2.85	1.19	2.59	28.28	45.27	19.15	80.82
247	29.0	111.0	3	4	5	6	6	7	50.50	13.37	1121	605	254	54.00	35.50	10.26	2.91	56.38	23.94	1.16	1.01	3.03	1.22	2.37	28.58	41.96	18.58	81.33
248	28.5	106.5	3	3.5	4.5	5.5	6	7	36.50	9.13	810	425	165	52.50	39.75	9.87	3.71	58.91	21.79	1.29	1.00	3.05	1.17	2.70	26.43	38.85	19.09	81.70
249	29.0	105.5	3	4	5	6	6	7	38.50	10.10	855	549	255	64.50	40.00	11.04	3.05	56.90	22.60	1.11	0.94	2.82	1.24	2.53	28.33	46.07	19.26	80.44
250	31.5	108.5	2	2	3	3	3	3	149.50	18.71	3319	2037	937	61.50	39.50	11.24	3.08	55.63	23.69	1.07	0.92	2.92	1.22	2.35	29.17	45.60	19.54	80.25
251	32.5	108.0	2	2	3	3	3	3	234.00	24.15	5195	3774	1802	72.75	42.75	10.26	3.47	55.04	22.32	1.70	0.90	3.79	1.32	2.47	33.38	47.73	20.54	78.26
252	31.0	105.5	2	2	3	3	3	3	137.00	22.20	3041	2121	1018	69.50	40.75	10.38	3.09	53.23	23.87	1.62	1.00	3.92	1.40	2.23	32.78	47.77	20.40	78.10
253	31.0	111.0	2	2	3	3	3	3	168.50	22.38	3741	2633	1224	70.75	39.50	10.81	3.25	51.14	25.69	1.57	0.98	3.71	1.30	1.99	32.83	46.54	20.64	77.81
254	32.5	111.5	2	2	3	3	3	3	179.00	24.13	3974	2816	1299	71.00	41.75	10.62	3.50	51.33	25.47	1.62	0.96	3.99	1.36	2.02	34.22	46.07	21.09	77.77
255	31.5	112.0	2	2	3	3	3	3	198.00	20.79	4396	3043	1445	69.25	41.25	10.10	3.17	53.04	23.28	1.73	1.01	4.04	1.39	2.28	35.01	47.40	20.43	77.33
256	33.0	109.0	2	2	3	3	3	3	148.00	20.42	3286	2283	1055	69.50	40.75	9.88	3.68	53.67	23.43	1.66	1.01	3.81	1.38	2.31	33.71	46.21	20.41	78.11
257	32.0	111.5	2	2	3	3	3	3	208.50	27.75	4629	3275	1526	70.75	41.25	10.93	3.19	50.76	26.19	1.60	0.94	3.95	1.35	1.94	33.34	46.61	21.02	77.89
258	32.5	112.5	2	2	3	3	3	3	146.00	17.08	3241	2406	1134	73.75	41.75	10.66	3.44	51.60	24.84	1.71	0.95	3.76	1.39	2.08	32.53	47.11	20.96	77.39
259	31.5	110.5	2	2	3	3	3	3	224.00	27.01	4973	3597	1675	72.25	42.25	9.84	3.71	53.56	23.46	1.78	0.99	3.84	1.34	2.28	32.35	46.61	20.51	78.01
260	33.0	109.5	2	2	3	3	3	3	112.50	16.77	2498	1773	845	71.00	40.75	9.87	3.70	55.20	22.21	1.88	0.93	3.84	1.34	2.51	35.63	47.55	20.63	78.34
261	31.0	108.5	2	2	3	3	3	3	220.00	26.89	4884	3509	1681	71.75	40.25	9.58	3.52	55.28	22.56	1.68	1.02	3.95	1.40	2.45	33.81	47.99	20.14	78.85
262	33.5	109.0	2	2	3	3	3	3	152.50	15.52	3386	2315	1086	68.25	39.50	10.10	3.48	54.46	22.73	1.72	0.94	3.86	1.33	2.40	33.99	47.09	20.50	78.14
263	31.0	105.5	2	2	3	3	3	3	160.50	19.99	3563	2423	1132	68.00	42.50	9.02	3.88	61.33	17.81	1.76	0.92	3.76	1.40	3.45	31.84	46.84	19.83	80.07
264	30.5	105.5	2	2	3	3	3	3	133.50	15.64	2964	2140	987	72.25	41.00	10.44	3.17	53.57	24.04	1.58	1.03	3.73	1.34	2.23	33.47	46.21	20.26	78.64
265	31.5	109.5	2	2	3	3	3	3	184.00	19.76	4085	3021	1436	74.00	41.75	10.22	3.40	52.72	24.43	1.71	1.00	4.04	1.41	2.16	32.04	47.55	20.77	78.14
266	30.5	106.0	2	2	3	3	3	3	162.50	21.86	3608	2471	1133	68.50	41.25	9.34	3.64	58.49	19.01	1.67	0.99	3.77	1.31	3.14	32.71	45.86	19.74	78.50

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267	31.0	108.5	2	2	3	3	3	3	133.50	16.07	2964	2207	1020	74.50	42.00	10.41	3.31	51.92	25.23	1.62	0.99	4.18	1.39	2.06	34.16	46.26	20.91	78.15
268	31.5	109.5	2	2	3	3	3	3	190.00	22.85	4218	3108	1445	73.75	40.25	10.41	3.13	54.39	23.09	1.58	0.94	3.71	1.29	2.37	32.35	46.47	20.11	78.43
269	31.5	106.5	2	2	3	3	3	3	181.50	22.91	4029	3007	1409	74.75	37.75	9.35	3.81	57.60	20.65	1.58	0.97	3.72	1.31	2.80	32.95	46.86	19.76	79.22
270	31.0	106.0	3	4	4	5	6	7	62.50	12.67	1388	838	402	60.50	34.25	11.80	3.62	42.32	32.76	1.56	0.79	3.99	1.11	1.30	28.58	48.16	22.08	75.87
271	30.5	105.5	3	4	4.5	6	6	7.5	92.00	14.28	2042	1440	694	70.75	36.75	11.91	3.64	41.55	33.29	1.59	0.80	3.90	1.12	1.25	32.70	48.01	22.15	75.64
272	29.0	108.0	3	4.5	5	6	6	7.5	56.00	14.07	1243	819	377	66.25	34.50	11.49	3.83	41.35	31.77	1.78	0.83	4.11	1.14	1.31	31.90	46.12	22.36	73.94
273	30.5	105.0	3	4	5	6	6	7	187.50	19.76	4163	3013	1384	72.50	35.75	10.35	3.48	53.37	24.47	1.56	0.98	3.68	1.32	2.20	31.91	45.93	20.39	78.82
274	30.5	108.0	3	4	4	6	6	8	66.50	12.29	1476	1024	481	69.50	36.50	11.64	3.91	40.25	33.68	1.71	0.78	3.99	1.08	1.20	32.97	46.76	22.34	74.71
275	29.0	110.5	3	4	4	5.5	5	8	49.50	12.95	1099	669	321	61.00	37.75	11.78	3.72	39.69	33.68	1.72	0.78	4.06	1.11	1.18	30.16	47.91	22.39	74.16
276	28.5	108.0	3	4	4.5	6	5.5	7.5	77.00	17.10	1709	1102	527	64.50	34.75	11.42	3.71	46.39	30.26	1.40	0.78	3.60	1.06	1.53	29.56	47.67	21.19	77.42
277	30.0	111.5	3	3.5	4	5.5	6	7	70.50	15.25	1565	955	430	61.00	36.75	11.76	3.89	42.04	32.86	1.52	0.78	3.93	1.04	1.29	30.17	45.16	22.14	75.68
278	31.0	106.0	2	2	3	3	3	3	134.50	22.39	2986	2072	958	69.25	41.25	11.64	3.91	40.25	33.68	1.71	0.78	3.99	1.08	1.20	31.84	46.29	22.34	74.71
279	32.0	107.5	2	2	3	3	3	3	213.50	23.88	4740	3550	1643	75.00	39.75	10.34	3.52	54.39	22.99	1.46	1.00	3.72	1.29	2.37	31.29	46.35	20.32	78.37
280	31.5	108.0	2	2	3	3	3	3	226.50	24.38	5028	3747	1755	74.50	43.25	10.33	3.20	53.20	23.63	1.55	1.00	3.74	1.29	2.26	32.35	46.83	20.11	77.83
281	31.5	105.0	2	2	3	3	3	3	193.00	21.20	4285	3097	1421	72.50	40.75	9.08	3.39	62.46	16.68	1.58	0.90	3.55	1.32	3.75	34.05	45.91	18.91	80.04
282	31.0	107.0	2	2	3	3	3	3	222.00	19.52	4928	3551	1648	72.00	40.50	10.92	3.25	49.92	26.56	1.67	0.96	3.88	1.30	1.89	32.56	46.45	21.02	77.44
283	30.0	108.5	2	2	3	3	3	3	263.00	24.03	5839	3968	1819	68.00	40.25	9.73	3.82	56.14	22.46	1.52	1.02	3.52	1.24	2.50	31.37	45.87	19.83	79.61
284	30.5	109.0	2	2	3	3	3	3	195.50	20.50	4340	3128	1445	71.75	37.25	10.17	3.13	51.56	25.50	1.58	1.01	4.07	1.37	2.05	31.50	46.17	20.33	78.07
285	31.5	106.0	2	2	3	3	3	3	187.50	20.84	4163	2998	1423	71.75	39.75	9.30	3.68	57.78	20.81	1.59	0.97	3.54	1.24	2.78	33.27	47.61	19.34	79.56
286	30.0	107.5	2	2	3	3	3	3	226.00	23.25	5017	3686	1702	73.50	40.75	9.90	3.43	52.61	24.09	1.70	0.94	4.01	1.24	2.19	32.10	46.15	20.28	77.63
287	31.0	105.0	2	2	3	3	3	3	243.00	24.30	5395	4034	1843	74.75	41.00	10.13	3.51	56.05	21.87	1.56	0.94	3.56	1.27	2.57	31.41	45.73	20.03	78.86
288	30.5	110.5	2	2	3	3	3	3	187.00	23.49	4151	2927	1372	70.50	38.00	10.70	3.34	50.84	25.73	1.60	1.06	3.72	1.35	1.98	32.36	46.88	20.71	77.63
289	31.0	105.5	2	2	3	3	3	3	167.00	26.24	3707	2608	1143	70.75	41.50	9.29	3.71	63.69	14.52	1.88	0.82	3.46	1.21	4.43	34.83	43.99	19.55	79.03
290	30.0	106.5	2	2	3	3	3	3	186.50	20.56	4140	2949	1390	71.25	43.25	10.09	3.10	55.79	22.63	1.45	1.00	3.54	1.31	2.47	32.72	47.21	19.49	79.42
291	30.5	108.0	2	2	3	3	3	3	169.00	17.30	3752	2724	1262	72.50	42.75	10.69	3.22	49.60	25.69	1.68	1.00	3.85	1.33	1.93	33.39	46.38	20.77	76.29
292	32.0	109.0	2	2	3	3	3	3	204.00	17.98	4529	3146	1473	69.50	38.25	10.01	3.49	53.34	24.10	1.62	0.98	3.70	1.25	2.22	32.36	46.83	20.08	78.42
293	33.5	105.5	2	2	3	3	3	3	219.50	19.35	4873	3425	1590	70.25	38.25	9.43	3.75	59.59	20.47	1.48	1.01	3.53	1.26	2.93	33.67	46.46	19.46	81.07
294	33.5	106.5	2	2	3	3	3	3	191.50	21.25	4251	2875	1314	67.75	40.25	10.54	3.11	53.36	23.50	1.68	0.95	3.79	1.28	2.27	33.58	45.70	20.41	77.80
295	31.5	107.5	2	2	3	3	3	3	237.50	23.75	5273	3796	1800	72.00	43.00	10.43	3.28	51.94	25.17	1.59	0.96	3.82	1.29	2.06	32.03	47.49	20.41	78.07
296	30.5	105.0	2	2	3	3	3	3	192.00	18.29	4262	3109	1443	73.00	40.25	9.81	3.79	55.63	22.70	1.64	0.98	3.67	1.27	2.46	32.73	46.39	20.19	79.31
297	31.0	108.0	2	2	3	3	3	3	177.50	16.13	3941	2943	1417	74.75	40.75	10.43	3.51	54.83	23.97	1.75	0.92	3.50	1.35	2.29	32.12	48.08	20.54	79.72
298	32.0	108.0	2	2	3	3	3	3	168.50	20.25	3741	2712	1237	72.50	41.50	10.63	3.28	51.04	26.86	1.69	0.98	3.62	1.29	1.90	34.16	45.62	20.51	78.88
299	31.0	105.5	2	2	3	3	3	3	201.00	21.35	4462	3285	1540	73.50	36.75	9.76	3.56	58.33	20.60	1.72	0.87	3.59	1.34	2.83	32.13	46.90	19.96	79.81

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300	31.5	109.5	2	2	3	3	3	3	195.50	23.60	4340	3114	1488	71.75	39.50	10.38	3.02	50.96	26.47	1.78	1.00	3.78	1.36	1.93	34.04	47.72	20.33	78.43
301	33.0	107.0	2	2	3	3	3	3	220.00	26.90	4884	3652	1689	74.75	39.25	10.39	3.25	56.02	23.47	1.52	0.99	3.35	1.31	2.39	31.89	46.24	19.82	80.48
302	33.5	113.5	2	2	3	3	3	3	130.00	17.48	2886	1778	825	61.50	39.75	12.16	3.59	42.69	33.67	1.57	0.77	3.69	1.06	1.27	31.34	46.47	22.08	77.13
303	33.0	109.0	2	2	3	3	3	3	208.50	20.85	4629	3329	1534	72.00	40.25	10.57	3.79	48.81	29.17	1.69	0.94	3.81	1.32	1.67	34.39	46.10	21.18	78.92
304	32.0	109.5	2	2	3	3	3	3	253.50	22.07	5628	4234	2018	75.25	40.25	10.53	3.50	50.79	26.96	1.62	0.97	3.64	1.27	1.88	32.90	47.64	20.57	78.72
305	33.0	110.0	2	2	3	3	3	3	173.00	29.14	3841	2725	1269	71.00	43.25	10.53	3.56	50.23	27.74	1.64	0.96	3.85	1.32	1.81	33.86	46.66	20.91	78.93
306	32.5	110.0	2	2	3	3	3	3	208.50	19.93	4629	3319	1608	71.75	42.25	10.81	3.61	50.51	26.87	1.60	0.91	3.59	1.19	1.88	33.94	48.45	20.80	78.28
307	33.5	111.5	2	2	3	3	3	3	241.50	22.08	5361	3993	1878	74.50	42.25	10.82	3.54	50.68	26.99	1.52	0.96	3.57	1.23	1.88	32.85	47.06	20.68	78.63
308	32.0	110.0	2	2	3	3	3	3	193.50	22.14	4296	3195	1488	74.25	42.00	10.43	3.40	51.49	25.77	1.59	0.98	3.70	1.30	2.01	33.00	46.63	20.42	78.23
309	33.5	110.5	2	2	3	3	3	3	243.50	25.73	5406	3947	1820	73.00	42.25	10.96	3.41	48.74	28.91	1.57	0.99	3.90	1.37	1.69	33.95	46.12	21.21	78.64
310	31.5	108.5	2	2	3	3	3	3	270.50	22.73	6005	4548	2128	75.75	42.00	10.45	3.93	51.89	26.45	1.52	0.96	3.76	1.30	1.97	33.21	46.79	20.96	79.29
311	33.5	113.5	2	2	3	3	3	3	233.50	23.15	5184	3667	1678	70.75	41.50	11.43	3.52	46.59	30.19	1.52	0.96	3.67	1.31	1.54	31.32	45.75	21.45	77.74
312	31.0	110.5	2	2	3	3	3	3	206.50	23.40	4584	3269	1532	71.25	41.25	10.51	3.44	51.00	26.50	1.59	0.96	3.73	1.27	1.93	31.71	46.89	20.54	78.46
313	33.0	111.5	2	2	3	3	3	3	204.00	21.65	4529	3470	1612	76.50	40.75	10.13	3.85	52.71	25.67	1.68	0.98	3.88	1.35	2.05	33.98	46.55	20.89	79.37
314	32.0	112.0	2	2	3	3	3	3	202.00	19.36	4484	3279	1587	73.00	41.50	10.75	3.45	50.23	27.15	1.61	1.01	4.14	1.41	1.88	32.77	48.31	21.35	78.39
315	30.5	112.5	2	2	3	3	3	3	263.50	25.55	5850	3861	1831	66.00	40.50	10.44	3.54	50.29	27.72	1.54	0.99	4.07	1.42	1.84	32.60	47.43	21.01	79.00
316	32.5	111.5	2	2	3	3	3	3	214.50	21.19	4762	3660	1690	76.75	44.75	10.50	3.49	51.56	26.67	1.60	0.96	3.98	1.34	1.94	33.08	46.21	20.90	79.19
317	31.0	105.5	2	2	3	3	3	3	238.50	17.35	5295	3904	1829	73.75	41.75	9.71	3.64	54.19	25.34	1.56	1.01	3.82	1.29	2.14	35.06	46.88	20.03	80.54
318	32.5	107.5	2	2	3	3	3	3	222.50	17.89	4940	3633	1628	73.50	42.50	10.08	3.58	51.40	26.62	1.64	0.93	4.11	1.37	1.93	32.75	44.89	20.78	78.94
319	31.5	105.5	2	2	3	3	3	3	232.00	23.20	5150	3747	1794	72.75	42.75	11.03	3.54	50.41	27.58	1.49	0.93	3.45	1.22	1.83	32.22	47.91	20.72	78.92
320	32.5	110.0	2	2	3	3	3	3	208.50	23.38	4629	3425	1617	74.00	41.50	9.81	3.63	53.79	25.93	1.51	1.13	3.96	1.39	2.08	29.18	47.25	20.30	80.85
321	31.5	111.5	2	2	3	3	3	3	161.00	21.73	3574	2719	1241	76.00	41.25	10.69	3.61	49.61	28.33	1.61	0.97	3.80	1.31	1.76	31.41	45.69	21.02	78.90
322	31.5	111.0	2	2	3	3	3	3	225.00	20.71	4995	3735	1728	74.75	44.00	10.32	3.36	52.16	25.94	1.53	0.98	3.81	1.27	2.02	32.45	46.21	20.28	79.08
323	31.0	109.5	2	2	3	3	3	3	251.50	23.95	5583	4162	1982	74.50	42.25	10.13	3.37	50.87	27.17	1.57	1.09	3.90	1.32	1.90	33.15	47.57	20.29	79.12
324	32.0	110.5	2	2	3	3	3	3	236.50	22.95	5250	3978	1932	75.75	42.25	10.64	3.68	49.31	28.26	1.59	0.96	3.81	1.25	1.74	33.25	48.59	20.97	78.54
325	31.5	111.0	2	2	3	3	3	3	200.00	22.33	4440	3274	1524	73.75	41.50	10.16	3.59	52.47	25.73	1.65	0.96	3.88	1.33	2.04	29.90	46.51	20.62	79.16
326	30.5	110.5	2	2	3	3	3	3	126.00	22.13	2797	2140	1011	76.25	41.00	10.20	3.42	52.37	25.37	1.70	0.89	3.80	1.22	2.06	33.00	47.22	20.33	78.63
327	30.5	109.5	2	2	3	3	3	3	195.50	23.32	4340	3370	1554	77.50	41.50	10.05	3.51	55.18	22.39	1.74	0.89	3.74	1.31	2.47	32.75	46.08	20.34	78.46
328	33.0	108.0	2	2	3	3	3	3	222.50	26.70	4940	3717	1731	75.25	43.00	9.50	3.19	55.75	23.72	1.69	1.05	3.99	1.34	2.39	32.00	46.56	19.72	80.52
329	31.5	106.0	2	2	3	3	3	3	194.50	17.89	4318	3111	1438	72.00	39.75	10.27	3.39	53.13	24.71	1.58	0.89	3.68	1.29	2.19	32.10	46.18	20.22	78.72
330	32.0	111.0	2	2	3	3	3	3	254.50	22.18	5650	4247	1980	75.25	37.75	10.46	2.81	49.23	26.81	1.69	1.00	4.16	1.34	1.84	33.27	46.55	20.47	77.04
331	31.0	109.5	2	2	3	3	3	3	195.00	18.59	4329	3062	1431	70.75	40.75	10.38	3.01	51.09	25.10	1.64	1.00	3.88	1.30	2.04	31.79	46.75	20.20	77.19
332	31.0	111.0	2	2	3	3	3	3	198.50	18.93	4407	3173	1476	72.00	44.50	10.84	3.07	50.12	26.80	1.55	0.95	3.88	1.25	1.87	29.60	46.49	20.59	77.86
333	33.5	109.5	2	2	3	3	3	3	247.00	24.58	5483	4043	1876	73.75	41.00	10.40	3.14	53.50	24.30	1.55	0.99	3.73	1.28	2.21	33.33	46.36	20.10	78.78
334	32.5	107.5	2	2	3	3	3	3	94.00	24.33	2087	1468	689	70.25	36.00	10.22	3.18	54.39	24.62	1.40	1.06	3.51	1.32	2.23	31.09	46.93	19.63	80.07

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335	29.0	110.5	2	2	3	3	3	3	215.50	22.83	4784	3529	1746	73.75	40.00	10.32	3.32	51.36	26.04	1.56	0.97	3.81	1.35	1.98	32.84	49.45	20.35	78.37
336	30.5	113.5	2	2	3	3	3	3	218.00	22.00	4840	3411	1592	70.50	37.75	10.38	3.06	52.33	25.24	1.62	1.01	3.87	1.37	2.08	32.15	46.68	20.30	78.57
337	30.5	112.5	2	2	3	3	3	3	176.50	17.57	3918	2865	1360	73.25	41.50	10.53	3.19	50.98	26.75	1.50	1.02	3.87	1.31	1.91	32.29	47.42	20.39	78.75
338	31.0	110.5	2	2	3	3	3	3	258.00	21.50	5728	4113	1954	71.75	39.50	10.56	3.43	51.64	26.25	1.53	0.97	3.73	1.27	1.97	31.67	47.61	20.52	78.86
339	32.5	110.5	2	2	3	3	3	3	198.50	19.64	4407	3173	1521	72.00	41.25	10.62	2.96	51.02	27.19	1.57	0.98	3.82	1.30	1.88	29.55	48.07	20.26	79.19
340	30.5	111.0	2	2	3	3	3	3	146.00	15.34	3241	2426	1133	74.75	41.00	10.77	2.91	52.81	24.91	1.51	1.01	3.68	1.37	2.12	33.42	46.60	20.25	78.73
341	32.0	112.0	2	2	3	3	3	3	182.00	21.34	4040	2669	1254	66.25	37.75	10.61	3.33	50.72	26.73	1.55	1.01	3.92	1.35	1.90	32.41	47.16	20.75	78.46
342	32.5	109.0	2	2	3	3	3	3	175.00	23.80	3885	2883	1360	74.25	38.50	10.85	2.95	52.49	25.00	1.50	0.94	3.68	1.26	2.11	32.31	47.18	20.24	78.43
343	33.0	110.0	2	2	3	3	3	3	227.00	27.35	5039	3491	1644	69.25	39.50	10.47	3.03	53.03	24.81	1.47	1.03	3.67	1.34	2.15	30.89	47.04	19.98	78.86
344	31.5	111.5	2	2	3	3	3	3	154.50	23.10	3430	2467	1087	72.00	36.00	10.82	2.66	50.04	27.08	1.60	1.00	3.95	1.42	1.85	26.82	44.40	20.44	78.11
345	33.0	114.0	2	2	3	3	3	3	268.50	25.64	5961	4471	2056	75.00	37.25	10.56	3.13	49.11	28.24	1.55	1.00	3.82	1.27	1.74	31.16	45.98	20.34	78.35
346	31.5	111.5	2	2	3	3	3	3	162.00	17.85	3596	2711	1272	75.25	41.00	10.47	3.24	49.38	27.04	1.67	0.98	3.99	1.36	1.83	28.93	46.90	20.73	77.40
347	30.5	110.5	2	2	3	3	3	3	67.50	15.00	1499	931	420	61.50	37.75	10.43	3.65	49.54	27.02	1.65	1.00	4.10	1.42	1.85	32.36	45.67	21.26	77.56
348	31.0	105.5	2	2	3	3	3	3	132.00	15.02	2930	2040	985	69.50	34.25	8.67	3.72	61.07	18.11	1.77	0.94	3.86	1.44	3.38	30.47	48.09	19.46	80.12
349	30.5	112.5	2	2	3	3	3	3	146.50	19.57	3252	2245	1045	69.00	37.75	10.61	3.46	51.22	26.64	1.64	0.94	3.80	1.24	1.94	33.57	46.51	20.76	78.80
350	31.5	110.5	2	2	3	3	3	3	191.00	22.36	4240	3232	1553	76.00	41.75	10.19	3.23	52.15	25.98	1.58	0.97	3.76	1.37	2.02	33.67	48.19	20.13	79.10
351	31.5	111.5	2	2	3	3	3	3	122.50	24.75	2720	1970	924	72.50	42.25	10.60	3.39	51.89	26.25	1.54	0.99	3.73	1.32	1.98	31.54	46.91	20.57	79.13
352	33.0	106.5	2	2	3	3	3	3	197.50	23.71	4385	3046	1396	69.50	39.25	10.15	3.16	54.67	22.54	1.54	0.99	3.75	1.34	2.43	31.43	45.84	19.94	78.20
353	31.5	111.5	2	2	3	3	3	3	173.00	23.09	3841	2726	1307	71.00	36.00	10.16	3.76	51.90	25.36	1.65	1.00	4.04	1.38	2.05	29.87	47.88	20.99	78.26
354	31.0	108.5	2	2	3	3	3	3	162.00	19.30	3596	2585	1204	72.00	39.25	10.01	3.65	56.30	23.00	1.58	0.96	3.78	1.29	2.45	33.46	46.67	20.31	80.26
355	31.5	110.5	2	2	3	3	3	3	251.50	29.35	5583	4204	1930	75.25	36.75	10.68	3.17	52.09	25.07	1.52	0.98	3.80	1.30	2.08	34.11	45.88	20.47	78.14
356	33.5	106.5	2	2	3	3	3	3	232.00	30.82	5150	3620	1676	70.25	35.75	9.70	3.58	58.39	20.12	1.61	0.94	3.51	1.29	2.92	34.66	46.39	19.69	79.45
357	33.5	110.5	2	2	3	3	3	3	153.50	16.24	3408	2453	1142	72.00	38.75	10.58	3.28	51.35	25.52	1.60	0.95	3.94	1.33	2.04	32.27	46.55	20.72	77.83
358	30.0	106.5	2	2	3	3	3	3	172.50	21.52	3830	2577	1227	67.25	38.25	10.13	3.41	55.47	22.64	1.61	0.99	3.69	1.31	2.46	32.88	47.37	20.16	79.11
359	29.5	106.0	2	2	3	3	3	3	182.00	20.49	4040	3040	1412	75.25	39.50	10.15	3.16	54.67	22.54	1.54	0.99	3.75	1.34	2.43	29.15	46.43	19.94	78.20
360	30.5	109.0	2	2	3	3	3	3	211.50	21.15	4695	3465	1611	73.75	38.50	10.33	3.66	51.51	24.95	1.67	0.95	3.68	1.25	2.09	32.06	46.53	20.60	77.41
361	32.5	112.5	2	2	3	3	3	3	189.00	19.84	4196	3137	1469	74.50	37.50	10.99	3.69	47.32	28.83	1.64	0.94	4.00	1.30	1.64	33.42	46.66	21.60	77.09
362	33.5	109.5	2	2	3	3	3	3	138.50	12.88	3075	2268	1043	74.00	38.00	10.33	3.47	51.32	26.15	1.61	0.95	3.93	1.33	1.96	28.32	46.09	20.66	78.41
363	30.0	112.5	2	2	3	3	3	3	256.50	21.48	5694	4240	1999	74.50	35.75	11.07	3.46	47.78	27.71	1.61	0.94	3.85	1.26	1.73	32.34	47.14	21.26	76.42
364	28.0	103.0	4	4	5	6	6	7	33.50	13.90	744	475	218	64.50	32.75	12.16	3.59	42.69	33.67	1.57	0.77	3.69	1.06	1.27	30.21	45.91	22.08	77.13
365	27.5	102.5	3.5	4	5	6	6	7	19.50	13.75	433	253	116	58.50	30.25	11.81	3.36	44.73	31.24	1.55	0.86	3.74	1.16	1.45	28.40	46.38	21.62	76.83
366	26.5	106.0	3	3.5	5	6	6.5	7.5	26.50	10.50	588	365	165	62.00	29.75	10.97	3.74	42.28	33.20	1.70	0.87	3.91	1.11	1.28	31.20	45.15	21.44	76.35
367	27.5	101.5	3	4	5	6	6	7	25.50	14.00	566	297	134	52.00	29.00	11.56	3.51	43.66	32.90	1.56	0.82	3.66	1.07	1.33	27.32	45.31	21.36	77.38

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368	28.5	101.0	3	4	5	5	5.5	7	25.50	14.17	566	328	150	57.50	30.25	11.10	3.62	45.50	30.23	1.62	0.89	3.88	1.16	1.51	30.65	45.67	21.37	76.63
369	28.5	104.0	3	4	6	5	6.5	6.5	14.00	8.67	311	142	66	45.50	30.50	10.80	3.53	47.87	28.39	1.69	0.93	3.88	1.24	1.69	26.74	45.71	21.13	77.20
370	27.5	102.0	3	4	5	7	6	7	17.50	10.75	389	241	109	62.00	33.75	11.87	3.98	41.39	33.65	1.64	0.78	4.01	1.04	1.23	27.28	45.08	22.55	75.81
371	28.5	104.0	3	4	5	6	6	7	18.00	5.40	400	222	102	55.50	27.75	11.76	3.89	42.04	32.86	1.52	0.78	3.93	1.04	1.29	29.25	45.88	22.14	75.68
372	28.5	101.0	3	4	5	6	6	7	103.00	26.47	2287	1401	667	61.25	34.50	11.13	3.79	44.71	30.74	1.72	0.86	4.02	1.18	1.45	28.57	47.65	21.84	76.31
373	28.0	102.5	3	4.5	4	6	5.5	7	117.50	13.21	2609	1663	780	63.75	33.00	10.97	3.74	42.28	33.20	1.70	0.87	3.91	1.11	1.28	27.35	46.93	21.44	76.35
374	27.0	105.5	3	4.5	4	6	5.5	7.5	96.00	15.75	2131	1236	579	58.00	28.50	11.10	3.62	45.50	30.23	1.62	0.89	3.88	1.16	1.51	28.53	46.82	21.37	76.63
375	28.5	108.0	3	4.5	4	6	5	7	82.50	15.48	1832	1133	524	61.75	31.75	12.01	3.89	40.42	34.64	1.59	0.77	4.02	1.04	1.17	30.92	46.30	22.55	75.84
376	29.5	103.0	3	4.5	4	6	5	7.5	64.50	10.10	1432	831	397	58.00	29.00	10.55	3.66	50.96	25.34	1.62	0.90	3.72	1.21	2.02	29.86	47.83	20.77	77.19
377	30.5	109.5	3	4.5	4	6	5.5	7.5	56.50	10.88	1254	724	344	57.00	26.00	10.81	4.24	44.77	30.75	1.87	0.88	4.31	1.23	1.46	27.72	47.95	22.45	76.40
378	28.0	108.0	3	4.5	6	5.5	6.5	7	73.00	14.82	1621	1019	468	63.00	30.00	11.12	4.17	44.40	30.58	1.79	0.82	4.22	1.11	1.46	31.50	46.06	22.41	75.80
379	27.0	111.5	3	4.5	6	5.5	6.5	7.5	52.50	9.53	1166	696	327	61.00	26.50	10.58	4.55	44.66	30.48	1.88	0.83	4.41	1.13	1.47	27.79	47.33	22.54	75.97
380	28.0	111.0	3.5	4	6	6.5	7	7.5	117.00	19.49	2597	1610	758	62.00	30.50	10.56	4.49	43.17	31.40	1.96	0.87	4.63	1.18	1.38	28.89	47.07	22.82	75.43
381	28.5	111.5	3.5	4.5	6	6	7	7	72.50	13.45	1610	1010	486	63.00	30.75	10.73	3.77	46.07	29.08	1.67	0.90	4.13	1.25	1.60	28.65	47.62	21.55	76.05
382	27.5	106.0	3	4	4	6	5	8	96.50	15.73	2142	1163	542	54.00	27.75	11.10	3.94	42.85	31.39	1.80	0.83	4.22	1.20	1.37	30.13	46.49	22.27	75.07
383	28.5	103.5	3	4	4	6	5	7	89.00	13.30	1976	1159	541	59.00	30.00	11.57	3.97	42.31	32.40	1.64	0.82	4.23	1.22	1.31	30.53	47.00	22.63	75.53
384	27.5	108.0	3	4	4	6	7	7.5	108.00	17.95	2398	1340	651	56.00	30.50	11.35	3.93	41.57	32.26	1.75	0.83	4.29	1.18	1.29	29.55	48.49	22.50	74.66
385	31.5	106.5	2	2	3	3	3	3	137.50	16.19	3053	2151	1001	70.50	39.00	10.60	3.52	47.11	29.85	1.62	1.01	4.06	1.34	1.60	35.05	46.59	21.14	77.97
386	31.5	110.5	2	2	3	3	3	3	183.00	20.56	4063	2966	1370	73.00	40.00	10.55	3.69	50.05	26.29	1.73	0.90	3.97	1.22	1.91	33.31	46.19	21.15	77.24
387	31.5	110.5	2	2	3	3	3	3	225.50	30.24	5006	3541	1644	70.75	39.00	10.37	3.53	50.33	26.56	1.68	0.97	3.92	1.32	1.90	32.34	46.44	20.82	77.86
388	31.0	109.5	2	2	3	3	3	3	207.50	18.02	4607	3173	1452	69.00	38.00	10.44	3.76	49.54	27.48	1.72	0.94	4.03	1.27	1.80	33.58	45.73	21.23	77.96
389	31.5	112.5	2	2	3	3	3	3	216.50	21.65	4806	3435	1635	71.50	40.75	10.55	3.66	50.96	25.34	1.62	0.90	3.72	1.21	2.02	31.55	47.64	20.77	77.19
390	31.5	110.5	2	2	3	3	3	3	171.00	16.21	3796	2674	1255	70.25	40.75	10.37	3.53	50.33	26.56	1.68	0.97	3.92	1.32	1.90	33.19	46.79	20.82	77.86
391	33.5	113.5	2	2	3	3	3	3	117.50	18.21	2609	1754	843	67.25	36.00	10.03	3.20	50.94	26.40	1.92	0.99	4.00	1.44	1.94	32.70	48.01	20.59	78.33
392	30.5	110.5	2	2	3	3	3	3	181.00	14.44	4018	2844	1317	71.00	39.25	10.57	3.18	51.01	26.68	1.91	0.93	3.72	1.33	1.91	33.28	46.26	20.72	78.62
393	30.5	108.5	2	2	3	3	3	3	197.50	20.83	4385	3136	1520	71.50	41.25	10.31	2.98	50.88	26.77	1.81	1.02	3.65	1.34	1.91	33.61	48.45	20.09	78.67
394	32.5	111.5	2	2	3	3	3	3	206.50	17.43	4584	3281	1531	71.50	39.50	10.57	3.30	54.11	24.23	1.75	0.94	3.31	1.33	2.23	32.43	46.62	20.25	79.29
395	31.0	107.5	2	2	3	3	3	3	189.50	20.25	4207	3004	1392	71.50	38.75	10.38	2.85	54.45	23.73	1.71	0.97	3.28	1.32	2.29	34.29	46.43	19.53	79.15
396	32.0	108.5	2	2	3	3	3	3	209.50	25.20	4651	3233	1486	69.50	39.25	10.75	3.08	52.01	26.75	1.76	0.89	3.66	1.29	1.95	33.49	45.98	20.55	79.65
397	31.0	109.5	2	2	3	3	3	3	233.00	33.85	5173	3930	1868	76.00	42.00	10.69	2.69	52.36	25.13	1.79	0.95	3.55	1.31	2.09	32.33	47.52	20.02	78.43
398	32.0	111.5	2	2	3	3	3	3	154.00	16.91	3419	2646	1240	77.00	41.25	10.66	2.96	51.92	26.06	1.82	0.91	3.63	1.31	2.00	31.01	46.65	20.38	78.89
399	33.0	111.5	2	2	3	3	3	3	125.50	13.05	2786	2003	919	71.75	40.50	10.14	3.24	52.40	25.24	1.97	0.99	3.95	1.41	2.08	32.62	45.87	20.71	78.64
400	33.5	111.5	2	2	3	3	3	3	302.00	30.20	6704	4814	2329	71.75	43.00	10.66	3.35	52.07	26.27	1.89	0.94	3.73	1.36	1.98	32.17	48.41	20.99	79.29
401	32.5	105.0	2	2	3	3	3	3	177.00	17.67	3929	2814	1332	71.50	42.25	10.50	3.27	55.57	23.09	1.78	0.94	3.35	1.32	2.41	32.37	47.37	20.23	79.60
402	31.5	106.0	2	2	3	3	3	3	239.50	21.72	5317	3793	1734	71.25	40.50	10.14	3.21	51.91	25.54	1.83	1.01	3.72	1.43	2.05	34.03	45.76	20.32	78.46

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403	31.5	108.0	2	2	3	3	3	3	170.00	22.48	3774	2665	1233	71.00	37.75	10.53	2.87	52.80	24.55	1.82	0.99	3.68	1.39	2.16	31.80	46.33	20.30	78.35
404	31.0	107.5	2	2	3	3	3	3	156.50	28.78	3474	2407	1110	69.25	39.50	10.44	3.31	55.57	22.72	1.86	0.94	3.37	1.30	2.45	33.27	46.15	20.27	79.23
405	31.5	108.5	2	2	3	3	3	3	192.50	20.20	4274	2938	1363	68.75	42.50	10.92	2.76	51.62	25.58	1.78	0.99	3.69	1.40	2.02	31.33	46.40	20.56	78.20
406	31.5	110.5	2	2	3	3	3	3	205.00	24.90	4551	3095	1403	68.00	40.25	10.38	2.96	52.53	24.44	1.84	0.97	3.65	1.38	2.15	32.26	45.34	20.21	77.94
407	31.5	106.0	2	2	3	3	3	3	193.00	24.52	4285	2913	1415	68.00	39.75	10.83	2.95	51.18	25.37	1.84	0.93	3.95	1.33	2.02	33.60	48.56	20.90	77.48
408	31.5	109.5	2	2	3	3	3	3	190.50	20.15	4229	2863	1328	67.50	41.50	10.60	2.83	53.38	24.42	1.79	0.96	3.68	1.34	2.19	32.63	46.49	20.24	78.76
409	32.5	107.0	2	2	3	3	3	3	242.00	28.65	5372	3905	1860	72.75	36.75	10.44	3.12	53.06	24.60	1.76	0.98	3.64	1.32	2.16	34.14	47.65	20.27	78.64
410	31.5	107.5	2	2	3	3	3	3	198.50	23.33	4407	3181	1451	72.25	38.75	10.27	3.04	53.94	23.85	1.76	0.98	3.68	1.37	2.27	33.20	45.61	20.12	78.77
411	31.5	105.5	2	2	3	3	3	3	166.00	23.71	3685	2751	1271	74.75	40.50	9.21	3.70	58.94	19.52	1.87	0.96	3.79	1.32	3.03	33.47	46.25	19.89	79.41
412	33.0	109.0	2	2	3	3	3	3	187.50	20.83	4163	2665	1285	64.00	41.00	10.60	3.21	51.35	25.65	1.89	0.95	4.03	1.34	2.00	30.02	48.29	21.06	77.95
413	33.0	111.0	2	2	3	3	3	3	269.50	33.69	5983	4248	1981	71.00	40.75	10.52	3.68	50.94	25.45	1.79	0.95	4.03	1.36	2.00	31.31	46.61	21.37	77.34
414	31.5	105.5	2	2	3	3	3	3	181.50	29.20	4029	2850	1304	70.75	38.25	10.18	3.63	55.71	23.67	1.65	0.96	3.69	1.37	2.37	32.57	45.76	20.52	80.34
415	31.0	105.5	2	2	3	3	3	3	217.00	22.86	4817	3590	1659	74.50	40.50	10.59	4.16	49.77	27.07	1.88	0.92	3.77	1.32	1.85	31.84	46.25	21.72	77.76
416	32.5	112.0	2	2	3	3	3	3	183.00	26.45	4063	2864	1311	70.50	42.00	10.50	3.73	53.58	23.65	1.75	0.92	3.70	1.37	2.28	33.64	45.84	21.06	78.15
417	33.5	112.5	2	2	3	3	3	3	180.00	20.62	3996	2692	1250	67.50	38.50	10.12	3.70	54.02	22.98	1.89	0.93	3.96	1.33	2.37	33.79	46.40	21.00	77.94
418	31.5	112.5	2	2	3	3	3	3	176.00	19.56	3907	2873	1386	73.50	42.00	10.34	3.55	54.08	23.27	1.68	0.97	3.84	1.33	2.32	32.31	48.28	20.75	78.31
419	32.5	111.5	2	2	3	3	3	3	180.00	26.31	3996	2598	1227	65.00	41.25	10.02	3.59	52.47	25.36	1.87	0.98	4.28	1.36	2.07	31.17	47.22	21.12	78.81
420	31.5	110.5	2	2	3	3	3	3	117.50	13.15	2609	1805	827	69.25	37.50	10.26	3.72	51.48	25.97	1.89	0.96	4.11	1.34	1.99	31.57	45.79	21.32	78.41
421	31.0	112.5	2	2	3	3	3	3	159.00	17.67	3530	2636	1234	75.00	39.50	10.71	2.83	51.11	26.32	1.73	1.02	4.07	1.41	1.95	33.31	47.04	20.76	78.45
422	30.5	110.5	2	2	3	3	3	3	237.50	26.79	5273	4008	1849	76.00	41.25	10.21	2.93	53.22	24.64	1.74	1.04	3.54	1.38	2.17	33.92	46.11	19.81	78.90
423	32.5	109.5	2	2	3	3	3	3	157.50	16.80	3497	2512	1210	72.00	40.25	10.82	2.92	52.39	24.79	1.70	1.01	3.81	1.45	2.11	30.01	48.03	20.68	78.19
424	32.5	110.0	2	2	3	3	3	3	230.50	23.05	5117	3825	1817	74.75	41.25	9.44	3.31	63.37	15.20	1.90	0.88	3.27	1.24	4.18	33.42	47.44	19.17	79.46
425	33.5	109.5	2	2	3	3	3	3	213.00	26.63	4729	2652	1261	56.25	39.50	10.43	3.63	52.95	24.80	1.86	0.94	3.66	1.30	2.16	32.33	47.46	20.89	78.70
426	30.5	108.5	2	2	3	3	3	3	168.50	21.10	3741	2706	1260	72.25	41.00	10.24	3.67	55.19	23.32	1.66	1.02	3.46	1.32	2.37	32.32	46.49	20.34	79.53
427	32.5	106.0	2	2	3	3	3	3	198.50	28.56	4407	3083	1425	70.00	39.75	9.58	3.67	56.77	21.39	1.97	0.96	3.78	1.36	2.65	31.71	46.21	20.35	79.11
428	32.0	105.5	2	2	3	3	3	3	107.00	19.23	2375	1732	788	72.75	41.00	10.32	3.33	54.66	23.45	1.74	1.01	3.62	1.32	2.33	32.64	45.41	20.33	79.12
429	32.5	107.5	2	2	3	3	3	3	183.00	23.13	4063	2722	1280	67.00	37.00	10.83	3.13	50.37	27.07	1.70	0.96	3.65	1.27	1.86	31.30	47.02	20.57	78.40
430	32.0	110.5	2	2	3	3	3	3	164.00	22.85	3641	2665	1263	73.25	37.50	10.94	3.28	49.41	27.33	1.74	0.95	3.72	1.31	1.81	31.20	47.39	20.97	77.69
431	30.0	112.5	2	2	3	3	3	3	180.50	24.12	4007	2896	1351	72.25	41.50	10.27	3.31	51.24	26.01	1.83	0.99	3.96	1.33	1.97	33.00	46.62	20.71	78.24
432	31.0	111.5	2	2	3	3	3	3	183.50	19.27	4074	2915	1363	71.50	40.00	10.77	3.29	51.44	25.67	1.73	0.99	3.52	1.35	2.01	31.96	46.74	20.65	78.10
433	31.0	110.5	2	2	3	3	3	3	172.00	15.72	3818	2761	1285	72.25	37.25	10.96	3.48	47.87	28.78	1.69	0.99	3.78	1.32	1.67	32.16	46.52	21.22	77.65
434	30.5	106.5	2	2	3	3	3	3	149.00	15.73	3308	2307	1076	69.75	36.25	10.38	2.99	53.88	23.77	1.76	0.97	3.72	1.42	2.29	33.77	46.64	20.29	78.63
435	32.0	106.5	2	2	3	3	3	3	186.00	28.56	4129	2853	1330	69.00	40.50	10.20	3.07	54.10	23.97	1.71	1.05	3.70	1.43	2.26	32.00	46.71	20.10	79.12

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436	31.0	105.0	2	2	3	3	3	3	138.50	17.35	3075	2213	1039	72.00	40.50	9.92	3.64	57.32	21.29	1.81	0.95	3.49	1.34	2.72	32.62	46.94	20.20	79.56
437	32.0	112.5	2	2	3	3	3	3	238.50	21.74	5295	3544	1665	67.00	38.50	10.76	3.04	49.04	27.27	1.70	1.02	3.67	1.37	1.80	33.29	46.92	20.54	77.33
438	31.0	104.5	2	2	3	3	3	3	178.50	17.07	3963	2683	1287	67.75	38.25	8.49	3.86	66.08	13.47	1.89	0.88	3.41	1.26	4.90	32.56	48.00	18.92	80.43
439	31.0	108.5	2	2	3	3	3	3	186.50	17.84	4140	2879	1304	69.50	38.75	10.64	3.75	51.26	26.39	1.76	0.94	3.78	1.33	1.95	32.95	45.19	21.26	78.58
440	31.5	104.5	2	2	3	3	3	3	254.00	25.65	5639	3968	1852	70.25	38.00	8.80	3.99	64.91	13.61	1.93	0.88	3.56	1.25	4.92	32.31	46.63	19.54	79.40
441	31.0	105.5	2	2	3	3	3	3	145.00	18.63	3219	2265	1063	70.50	39.75	9.38	3.98	57.49	20.08	2.02	0.89	3.99	1.33	2.89	32.88	46.79	20.70	78.45
442	31.5	110.0	2	2	3	3	3	3	113.00	29.00	2509	1742	819	69.25	37.75	10.94	3.57	50.88	25.42	1.82	0.94	3.85	1.31	2.00	32.59	47.03	21.48	77.24
443	31.0	110.5	2	2	3	3	3	3	252.00	26.15	5594	4128	1947	73.75	38.50	10.14	3.61	52.44	25.11	1.75	0.97	3.95	1.30	2.09	32.56	47.09	20.76	78.52
444	32.5	110.5	2	2	3	3	3	3	123.50	17.23	2742	1784	835	65.75	34.25	10.42	3.77	51.49	24.62	1.85	0.94	4.01	1.36	2.09	32.27	46.87	21.41	77.05
445	33.5	108.5	2	2	3	3	3	3	152.50	25.42	3386	2437	1146	72.00	41.00	9.93	3.58	54.47	23.57	1.83	0.90	3.94	1.30	2.32	31.75	47.03	20.58	78.94
446	32.0	111.5	2	2	3	3	3	3	158.50	19.45	3519	2420	1168	69.25	41.50	10.66	3.51	50.76	26.11	1.79	0.94	4.06	1.35	1.95	33.65	48.40	21.37	77.80
447	30.5	111.5	2	2	3	3	3	3	193.50	21.33	4296	3150	1425	73.25	43.25	10.54	3.41	50.71	26.30	1.77	0.97	4.11	1.40	1.93	32.13	45.41	21.22	77.97
448	32.5	111.5	2	2	3	3	3	3	148.50	17.42	3297	2321	1088	70.50	39.00	10.39	3.71	49.74	26.51	1.76	0.97	3.94	1.34	1.88	30.03	47.29	21.14	77.22
449	30.0	111.5	2	2	3	3	3	3	172.50	17.60	3830	2808	1343	73.25	41.00	10.35	3.57	51.19	24.91	1.79	1.00	3.94	1.39	2.06	32.12	47.73	21.05	77.10
450	31.5	105.5	2	2	3	3	3	3	162.00	21.53	3596	2491	1165	69.25	43.25	9.07	4.02	59.44	18.81	1.85	1.00	3.84	1.37	3.17	33.65	46.75	20.15	79.25
451	31.0	106.5	2	2	3	3	3	3	212.00	25.61	4706	3446	1606	73.25	41.50	9.88	3.76	53.95	23.53	1.88	0.99	3.89	1.40	2.30	31.29	46.60	20.80	78.47
452	33.0	106.5	2	2	3	3	3	3	115.50	13.26	2564	1892	874	73.50	40.75	10.28	3.60	51.28	25.12	1.84	0.95	4.04	1.36	2.04	32.35	46.35	21.12	77.35
453	32.5	108.5	2	2	3	3	3	3	202.50	24.17	4496	3402	1606	75.75	40.00	9.93	3.78	51.77	24.24	1.88	0.99	4.08	1.37	2.14	32.29	47.20	21.03	77.00
454	32.5	110.5	2	2	3	3	3	3	165.00	16.50	3663	2798	1344	76.25	40.25	10.50	3.44	50.77	25.98	1.73	0.96	3.98	1.43	1.96	32.76	47.69	21.08	77.70
455	33.5	109.5	2	2	3	3	3	3	215.50	27.30	4784	3135	1528	65.50	35.75	10.66	3.37	50.61	26.20	1.61	0.98	3.82	1.31	1.93	34.35	48.76	20.77	77.79
456	31.5	111.5	2	2	3	3	3	3	182.00	29.90	4040	2697	1264	66.75	36.25	10.61	3.23	51.57	25.21	1.66	1.00	3.88	1.38	2.06	32.82	46.86	20.76	77.78
457	31.0	112.5	2	2	3	3	3	3	126.00	14.53	2797	2071	976	73.75	42.25	10.66	3.10	51.25	25.10	1.61	1.01	3.85	1.36	2.04	31.97	47.12	20.58	77.36
458	30.0	106.0	2	2	3	3	3	3	245.50	29.02	5450	3936	1876	72.25	41.75	10.05	3.57	54.47	22.47	1.81	1.01	4.22	1.48	2.43	29.65	47.67	21.12	77.94
459	31.5	106.5	2	2	3	3	3	3	170.50	18.71	3785	2618	1188	69.50	38.75	9.72	3.64	56.54	21.49	1.70	0.94	3.70	1.30	2.63	31.19	45.65	20.06	78.98
460	31.5	108.0	2	2	3	3	3	3	168.00	16.24	3730	2603	1199	69.75	40.00	10.53	3.37	52.57	24.76	1.66	0.97	3.79	1.32	2.12	32.81	46.07	20.66	78.29
461	30.0	109.5	2	2	3	3	3	3	244.00	25.75	5417	3750	1776	69.25	43.50	9.97	3.60	52.26	24.03	1.76	1.02	4.02	1.38	2.18	33.61	47.46	20.73	77.30
462	31.0	110.5	2	2	3	3	3	3	180.00	17.32	3996	2834	1316	71.00	43.25	10.83	3.31	52.42	24.61	1.56	0.94	3.53	1.26	2.13	31.39	46.46	20.50	77.97
463	29.5	110.0	2	2	3	3	3	3	247.50	20.63	5495	3930	1907	71.50	44.25	10.50	3.51	51.40	24.86	1.70	0.97	3.93	1.32	2.07	32.38	48.56	20.97	77.23
464	30.5	111.5	2	2	3	3	3	3	192.00	19.20	4262	3071	1468	72.00	40.75	10.71	3.49	49.23	27.32	1.69	0.98	4.18	1.37	1.80	33.50	47.64	21.43	77.53
465	31.5	108.5	2	2	3	3	3	3	154.50	15.32	3430	2451	1188	71.00	39.25	9.90	3.62	53.43	23.79	1.71	0.96	4.13	1.39	2.25	32.61	48.21	20.74	78.18
466	31.5	110.5	2	2	3	3	3	3	186.50	21.70	4140	3084	1476	74.50	42.00	10.42	3.77	46.69	28.50	1.76	1.01	4.34	1.41	1.64	32.13	47.87	21.70	76.19
467	31.0	112.5	2	2	3	3	3	3	283.00	22.89	6283	4024	1909	64.00	38.75	10.86	3.68	49.62	26.77	1.59	0.97	3.85	1.31	1.85	33.27	47.36	21.29	77.37
468	31.0	111.5	2	2	3	3	3	3	191.50	22.75	4251	2853	1369	67.25	37.25	10.29	3.70	50.59	26.21	1.71	0.94	4.08	1.31	1.95	29.89	47.81	21.09	77.75
469	31.5	111.0	2	2	3	3	3	3	202.00	27.08	4484	3061	1442	68.25	37.75	10.59	3.66	51.67	25.73	1.57	1.00	3.83	1.31	2.01	33.36	47.13	20.95	78.40
470	31.5	110.5	2	2	3	3	3	3	233.00	25.43	5173	3712	1740	71.50	38.75	10.46	3.84	51.43	25.19	1.67	0.93	4.17	1.36	2.04	33.30	46.88	21.50	77.55

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471	31.0	108.5	2	2	3	3	3	3	196.00	19.60	4351	3031	1445	69.50	36.75	10.35	3.61	53.43	23.32	1.59	0.97	3.80	1.26	2.29	31.91	47.71	20.62	77.73
472	31.5	110.5	2	2	3	3	3	3	242.00	23.36	5372	3697	1749	68.75	41.00	10.49	3.59	51.53	25.29	1.63	0.96	3.97	1.30	2.05	33.80	47.17	20.99	77.78
473	33.5	111.0	2	2	3	3	3	3	183.50	20.39	4074	2980	1405	73.00	38.25	10.30	3.52	52.83	23.67	1.62	0.95	4.06	1.30	2.23	33.84	46.99	20.80	77.46
474	33.0	113.5	2	2	3	3	3	3	197.00	22.05	4373	3239	1560	74.00	38.00	10.98	3.39	49.07	27.90	1.67	1.01	4.33	1.47	1.76	32.91	48.14	21.84	77.98
475	32.0	110.5	2	2	3	3	3	3	199.00	18.00	4418	3266	1536	73.50	39.75	10.59	3.91	49.32	27.32	1.67	0.95	4.19	1.33	1.81	31.95	47.01	21.69	77.59
476	31.5	112.5	2	2	3	3	3	3	236.00	18.15	5239	3741	1783	71.50	40.00	10.75	3.52	50.71	26.16	1.61	0.96	4.05	1.35	1.96	34.25	47.73	21.28	77.83
477	30.5	111.5	2	2	3	3	3	3	191.00	19.10	4240	3027	1388	71.50	36.50	10.96	3.38	48.89	27.55	1.94	0.94	3.93	1.35	1.78	32.12	45.85	21.56	77.37
478	32.5	111.5	2	2	3	3	3	3	216.50	19.78	4806	3376	1559	70.00	39.50	10.56	3.57	50.94	26.14	1.86	0.96	3.91	1.32	1.95	33.28	46.11	21.22	78.04
479	33.5	111.5	2	2	3	3	3	3	201.50	18.23	4473	3262	1523	72.75	40.25	10.94	3.35	50.66	26.17	1.80	0.92	3.73	1.29	1.94	30.95	46.59	21.11	77.75
480	30.5	105.5	2	2	3	3	3	3	219.50	23.23	4873	3506	1665	72.00	40.00	8.99	3.67	58.22	20.10	2.06	0.98	3.97	1.40	2.91	32.87	47.44	20.09	79.30
481	33.5	108.5	2	2	3	3	3	3	222.50	18.52	4940	3629	1664	73.25	40.00	10.78	3.74	50.49	26.63	1.74	0.96	3.70	1.33	1.90	32.54	45.86	21.29	78.08
482	28.5	109.5	2	2	3	3	3	3	155.00	21.17	3441	2468	1131	71.75	41.50	10.34	3.53	52.33	24.90	1.83	0.99	3.95	1.39	2.10	33.04	45.87	21.04	78.22
483	29.5	111.5	2	2	3	3	3	3	163.00	18.44	3619	2573	1203	71.00	38.00	10.33	3.80	52.44	24.44	1.91	0.92	3.91	1.33	2.20	32.26	46.78	21.28	77.80
484	28.5	112.5	2	2	3	3	3	3	214.50	20.71	4762	3516	1645	73.75	43.75	10.46	4.06	52.17	24.68	1.92	0.93	3.91	1.31	2.11	33.06	46.71	21.65	77.77
485	29.5	110.5	2	2	3	3	3	3	97.50	10.84	2165	1442	687	66.50	37.75	10.41	3.29	53.44	23.83	1.92	0.94	3.82	1.30	2.25	31.67	47.80	20.74	78.21
486	28.0	112.5	2	2	3	3	3	3	188.50	18.60	4185	3021	1396	72.25	40.50	11.26	3.13	48.62	27.45	1.74	0.96	4.04	1.35	1.77	31.35	46.24	21.53	77.03
487	29.0	112.5	2	2	3	3	3	3	154.00	17.89	3419	2202	1008	64.50	38.75	10.00	3.60	53.34	24.03	1.85	0.92	3.83	1.27	2.31	32.99	45.82	20.54	78.28
488	30.0	113.0	2	2	3	3	3	3	200.50	18.23	4451	3218	1497	72.25	42.00	11.11	3.44	48.24	28.43	1.70	0.94	3.76	1.30	1.70	33.00	46.63	21.30	77.62
489	31.5	105.5	2	2	3	3	3	3	145.00	22.11	3219	1378	641	42.75	40.50	9.78	3.95	54.44	23.41	1.95	0.94	3.78	1.31	2.34	33.24	46.76	20.78	78.79
490	31.0	108.5	2	2	3	3	3	3	211.00	21.10	4684	3537	1637	75.25	40.75	10.42	3.37	52.20	24.50	1.91	0.97	3.84	1.34	2.13	32.66	46.19	20.88	77.67
491	31.0	101.5	2	2	3	3	3	3	159.50	18.97	3541	2616	1251	74.00	40.75	10.32	3.19	50.34	26.05	1.78	1.03	3.90	1.43	1.94	32.40	47.62	20.62	77.43
492	29.0	110.5	2	2	3	3	3	3	193.50	27.64	4296	3137	1477	73.00	41.25	10.32	3.35	52.81	24.29	1.87	1.01	3.82	1.41	2.17	32.18	47.07	20.76	78.10
493	33.0	112.0	2	2	3	3	3	3	247.00	24.65	5483	4050	1873	73.75	41.25	10.73	3.45	50.79	26.52	1.63	1.00	3.90	1.40	1.92	33.26	46.22	21.11	78.31
494	29.5	105.0	2	2	3	3	3	3	186.00	22.29	4129	3084	1413	74.50	41.25	9.87	3.35	52.54	24.09	1.69	1.08	3.80	1.43	2.23	34.40	45.77	20.14	77.71
495	31.5	109.5	2	2	3	3	3	3	202.00	20.55	4484	3388	1603	75.50	38.75	10.63	3.42	50.99	25.50	1.71	1.00	4.02	1.39	2.00	29.88	47.14	21.17	77.49
496	31.5	110.5	2	2	3	3	3	3	198.50	22.60	4407	3343	1572	75.50	42.75	10.84	3.25	52.01	25.75	1.58	0.98	3.59	1.35	2.02	33.52	46.80	20.62	78.74
497	31.5	109.5	2	2	3	3	3	3	191.00	27.30	4240	3069	1430	72.50	42.75	10.41	3.29	51.24	24.53	1.84	0.98	3.97	1.32	2.09	32.32	46.64	20.83	76.75
498	32.0	110.5	2	2	3	3	3	3	110.00	21.75	2442	1774	859	72.50	42.25	10.21	4.08	53.71	23.29	1.89	0.98	3.92	1.37	2.31	33.61	48.48	21.48	77.97
499	31.0	111.5	2	2	3	3	3	3	137.50	23.21	3053	2038	943	66.75	39.75	10.99	3.49	48.36	28.40	1.66	0.98	4.00	1.38	1.71	33.46	46.25	21.52	77.74
500	31.5	110.5	2	2	3	3	3	3	166.50	22.19	3696	2562	1173	69.25	43.00	10.66	2.92	52.99	24.23	1.64	0.95	3.67	1.33	2.19	32.09	45.80	20.23	78.17
501	31.0	108.0	2	2	3	3	3	3	163.50	16.09	3630	2762	1290	76.00	40.25	10.20	3.63	51.50	24.88	1.84	0.96	4.04	1.29	2.07	31.67	46.75	20.99	77.35
502	32.5	108.0	2	2	3	3	3	3	267.00	24.39	5927	4243	1937	71.50	40.50	10.49	3.42	51.33	25.34	1.82	1.02	4.06	1.42	2.03	30.78	45.67	21.20	77.70
503	31.0	104.5	2	2	3	3	3	3	159.50	26.41	3541	2574	1221	72.75	40.75	8.97	3.85	61.34	16.79	1.91	0.92	3.59	1.31	3.66	29.48	47.79	19.62	79.06

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504	30.0	107.0	2	2	3	3	3	3	165.00	18.01	3663	2777	1343	76.00	37.75	10.13	3.31	53.36	23.95	1.72	0.98	3.80	1.29	2.24	32.91	48.45	20.26	78.29
505	30.0	108.5	2	2	3	3	3	3	146.00	18.23	3241	2445	1145	75.25	39.50	10.67	3.15	51.69	25.14	1.63	0.99	3.77	1.36	2.07	31.54	46.85	20.58	77.82
506	31.0	110.5	2	2	3	3	3	3	203.00	21.60	4507	3348	1566	74.00	36.75	10.49	3.42	51.33	25.34	1.82	1.02	4.06	1.42	2.03	32.60	46.99	21.20	77.70
507	30.0	110.5	2	2	3	3	3	3	173.00	19.22	3841	2777	1301	72.50	41.25	10.81	3.43	50.55	26.21	1.67	0.97	3.66	1.31	1.93	32.98	46.69	20.87	77.73
508	32.5	108.5	2	2	3	3	3	3	154.50	20.82	3430	2371	1101	69.25	38.50	10.41	3.49	52.09	24.69	1.78	0.96	4.03	1.36	2.11	33.08	46.48	21.06	77.74
509	31.0	111.5	2	2	3	3	3	3	216.50	26.06	4806	3150	1507	65.50	36.75	9.74	3.43	53.11	23.67	1.73	1.02	3.76	1.34	2.25	32.88	47.90	20.01	77.80
510	31.5	111.5	2	2	3	3	3	3	246.50	23.10	5472	3897	1806	71.25	39.75	10.73	3.26	51.62	24.95	1.81	0.95	3.92	1.36	2.07	31.82	46.34	21.08	77.51
511	31.5	110.5	2	2	3	3	3	3	145.00	17.50	3219	2041	973	63.50	36.25	10.93	3.32	49.78	27.47	1.69	0.90	3.61	1.23	1.81	32.81	47.65	20.77	78.16
512	31.0	110.0	2	2	3	3	3	3	207.50	18.25	4607	3219	1488	70.00	41.00	10.99	3.36	49.44	27.43	1.69	0.93	3.82	1.29	1.80	33.38	46.21	21.15	77.79
513	30.0	110.0	2	2	3	3	3	3	188.00	26.35	4174	2684	1265	64.50	35.75	10.39	3.61	50.62	27.17	1.70	0.96	3.84	1.31	1.87	33.28	47.02	20.85	78.76
514	30.5	110.5	2	2	3	3	3	3	238.00	20.76	5284	3728	1723	70.50	36.50	10.77	3.45	50.83	26.26	1.76	0.91	3.86	1.28	1.94	33.13	46.17	21.13	78.00
515	32.5	111.5	2	2	3	3	3	3	158.50	17.75	3519	2419	1115	68.75	34.75	11.12	3.23	49.28	27.02	1.74	0.92	3.85	1.29	1.82	33.28	46.09	21.23	77.22
516	31.5	111.5	2	2	3	3	3	3	213.00	26.90	4729	3563	1635	75.50	36.75	11.02	3.58	48.27	28.09	1.79	0.93	4.08	1.37	1.72	31.23	45.89	21.84	77.28
517	31.5	110.5	2	2	3	3	3	3	206.00	20.20	4573	3048	1408	66.50	39.00	10.04	3.47	52.30	24.01	1.88	0.95	3.89	1.32	2.18	28.06	46.48	20.58	77.26
518	31.5	112.5	2	2	3	3	3	3	185.50	22.09	4118	3006	1444	73.00	40.75	10.82	3.42	49.82	27.12	1.66	0.96	3.70	1.34	1.84	33.22	47.92	20.93	77.91
519	31.5	112.0	2	2	3	3	3	3	169.00	19.92	3752	2645	1221	70.50	37.00	10.85	3.47	49.80	27.03	1.70	0.95	3.93	1.37	1.84	33.43	46.16	21.32	77.77
520	31.0	111.5	2	2	3	3	3	3	238.50	25.15	5295	3854	1789	72.75	34.50	10.88	3.47	50.38	26.86	1.67	0.96	3.82	1.35	1.88	33.72	46.51	21.18	78.19
521	31.0	111.5	2	2	3	3	3	3	103.50	17.25	2298	1553	722	67.50	36.25	10.50	3.12	50.80	25.62	1.71	1.01	4.01	1.38	1.98	32.54	46.65	20.72	77.43
522	31.0	111.5	2	2	3	3	3	3	164.50	20.74	3652	2527	1176	69.25	38.50	9.83	3.53	51.61	25.06	1.72	1.05	3.78	1.32	2.07	34.16	46.49	20.18	77.72
523	31.5	110.0	2	2	3	3	3	3	156.50	19.48	3474	2460	1160	70.50	40.50	10.22	3.40	53.95	24.24	1.77	0.90	3.86	1.26	2.23	32.08	47.17	20.52	79.09
524	31.0	110.5	2	2	3	3	3	3	157.50	16.69	3497	2520	1175	72.00	37.75	10.66	3.02	49.99	26.14	1.71	0.97	3.81	1.34	1.91	33.72	46.51	20.54	77.10
525	30.0	108.5	2	2	3	3	3	3	129.50	18.19	2875	2015	948	69.75	38.25	10.36	3.61	54.99	22.60	1.65	0.93	3.84	1.32	2.44	34.31	46.67	20.76	78.51
526	31.5	111.0	2	2	3	3	3	3	150.50	16.00	3341	2086	991	62.50	35.50	10.69	3.38	50.27	26.96	1.77	0.95	4.10	1.39	1.86	32.36	47.56	21.34	78.18
527	30.0	108.5	2	2	3	3	3	3	111.00	15.77	2464	1724	792	69.75	40.75	10.70	3.05	49.57	26.12	1.68	1.02	3.74	1.32	1.90	33.12	45.98	20.50	76.70
528	31.0	110.5	2	2	3	3	3	3	176.00	22.44	3907	2753	1322	70.50	38.75	10.39	3.67	52.97	24.15	1.86	0.95	3.93	1.35	2.19	33.41	48.00	21.21	78.08
529	31.5	110.5	2	2	3	3	3	3	126.00	18.00	2797	2023	929	72.50	39.75	11.17	3.34	50.16	26.36	1.63	0.92	3.73	1.25	1.91	32.81	45.97	21.12	77.44
530	32.0	111.0	2	2	3	3	3	3	198.00	21.94	4396	3120	1476	70.75	41.75	10.09	3.71	51.73	25.23	1.83	0.92	4.10	1.29	2.07	32.33	47.25	21.02	77.87
531	31.5	108.5	2	2	3	3	3	3	182.50	17.51	4052	3016	1435	74.25	38.75	9.74	4.06	55.89	21.60	1.77	0.92	3.72	1.25	2.59	32.49	47.66	20.55	78.41
532	31.5	110.5	2	2	3	3	3	3	206.50	19.60	4584	3255	1556	70.75	40.00	10.77	3.42	51.16	27.33	1.57	0.96	3.91	1.38	1.88	32.78	47.59	21.05	79.45
533	31.0	105.5	2	2	3	3	3	3	207.50	20.75	4607	3378	1541	73.25	40.75	8.65	3.61	58.82	19.38	2.03	0.98	4.04	1.37	3.04	32.14	45.63	19.72	79.18
534	31.0	109.0	2	2	3	3	3	3	133.50	15.46	2964	2163	995	72.50	40.00	10.37	3.26	49.86	26.58	1.75	0.99	4.10	1.39	1.88	31.89	45.99	20.88	77.44
535	30.5	107.5	2	2	3	3	3	3	172.50	22.50	3830	2665	1270	69.00	39.25	10.19	3.13	52.86	23.93	1.81	0.98	4.02	1.42	2.23	31.79	47.48	20.58	77.77
536	31.5	109.5	2	2	3	3	3	3	189.00	23.63	4196	3184	1475	75.75	42.25	9.84	3.24	52.62	24.41	1.74	0.98	3.84	1.31	2.16	34.37	46.22	19.97	78.01
537	31.5	105.5	2	2	3	3	3	3	146.50	24.93	3252	2226	1023	68.50	37.75	9.18	3.93	58.47	19.77	1.97	0.97	3.90	1.32	2.96	32.45	45.94	20.30	79.20
538	31.0	107.5	2	2	3	3	3	3	193.50	20.32	4296	3199	1530	74.25	43.25	10.30	3.73	50.78	25.66	1.76	0.97	3.94	1.32	1.98	32.72	47.65	21.04	77.41

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539	33.0	110.5	2	2	3	3	3	3	177.00	19.55	3929	2973	1364	75.50	39.50	10.32	3.90	50.46	26.27	1.74	0.95	3.99	1.31	1.92	32.80	45.89	21.26	77.68
540	30.5	111.5	2	2	3	3	3	3	160.50	19.14	3563	2643	1248	74.25	41.00	9.84	3.94	51.90	23.62	1.86	0.96	4.10	1.39	2.20	32.13	47.26	21.13	76.48
541	31.0	106.5	2	2	3	3	3	3	167.00	27.83	3707	2690	1234	72.50	40.50	9.02	3.81	58.16	19.99	1.98	0.94	4.00	1.37	2.91	33.84	45.84	20.17	79.10
542	31.0	108.5	2	2	3	3	3	3	145.00	14.45	3219	2226	1056	69.25	38.75	10.67	3.34	49.83	25.93	1.69	0.98	4.12	1.41	1.95	33.10	47.37	21.24	76.74
543	33.0	111.0	2	2	3	3	3	3	160.50	13.94	3563	2564	1171	72.00	39.25	10.18	3.42	49.69	26.10	1.84	0.95	4.22	1.33	1.90	32.71	45.65	20.97	76.74
544	31.0	107.5	2	2	3	3	3	3	146.00	22.65	3241	2468	1150	76.00	41.00	10.31	3.94	53.56	24.06	1.62	0.91	3.63	1.22	2.24	31.66	46.46	20.71	78.53
545	32.0	109.5	2	2	3	3	3	3	134.50	14.88	2986	2067	982	69.00	38.25	10.38	3.90	49.32	27.17	1.72	1.00	4.05	1.39	1.82	30.06	47.92	21.44	77.49
546	30.5	110.0	2	2	3	3	3	3	165.00	17.39	3663	2601	1219	70.75	38.25	10.30	3.49	50.51	25.49	1.76	0.98	3.98	1.33	1.98	32.56	46.71	20.85	76.98
547	31.5	109.0	2	2	3	3	3	3	183.50	20.15	4074	2933	1419	72.00	41.25	9.94	3.77	52.55	24.31	1.77	0.95	4.01	1.28	2.16	32.99	48.38	20.77	77.80
548	31.0	111.0	2	2	3	3	3	3	146.50	14.00	3252	2351	1112	72.25	40.25	9.71	3.93	52.29	24.79	1.78	0.97	4.07	1.32	2.11	32.91	47.29	20.81	78.05
549	30.5	109.0	2	2	3	3	3	3	139.00	13.77	3086	2143	994	69.50	41.00	10.08	3.53	49.49	26.31	1.86	0.99	4.21	1.34	1.88	33.50	46.43	21.01	76.80
550	31.0	109.0	2	2	3	3	3	3	268.00	21.39	5950	4557	2106	76.50	43.25	10.97	3.20	51.10	25.33	1.60	0.97	3.83	1.34	2.03	32.09	46.29	20.95	77.40
551	31.5	110.5	2	2	3	3	3	3	311.50	27.30	6915	5016	2343	72.50	42.75	10.08	3.62	52.54	23.92	1.73	0.99	3.92	1.31	2.20	32.52	46.65	20.65	77.45
552	31.5	111.5	2	2	3	3	3	3	140.50	16.15	3119	2377	1089	76.25	42.75	10.62	3.23	48.02	27.57	1.68	0.98	4.13	1.38	1.74	34.93	45.94	21.04	76.58
553	31.5	109.5	2	2	3	3	3	3	212.00	20.32	4706	3504	1585	74.50	41.25	10.33	3.26	48.89	26.64	1.68	1.04	3.98	1.37	1.83	31.99	45.17	20.62	76.57
554	31.5	112.5	2	2	3	3	3	3	194.50	21.53	4318	2887	1344	66.75	38.50	10.90	3.52	49.75	25.80	1.77	0.95	4.06	1.33	1.93	34.01	46.68	21.58	76.49
555	31.0	110.5	2	2	3	3	3	3	209.50	23.38	4651	3479	1677	74.50	39.00	10.26	3.80	54.16	23.55	1.68	0.94	3.97	1.37	2.33	33.12	48.34	21.07	78.65
556	31.0	110.0	2	2	3	3	3	3	180.00	18.00	3996	2848	1323	71.00	39.50	10.19	3.41	51.91	24.62	1.78	0.99	4.03	1.35	2.11	33.27	46.36	20.76	77.52
557	30.5	110.0	2	2	3	3	3	3	218.50	24.23	4851	3543	1684	72.75	37.50	10.39	3.24	52.26	24.35	1.77	1.00	4.09	1.42	2.15	33.61	47.23	20.91	77.62
558	31.5	110.5	2	2	3	3	3	3	208.00	20.80	4618	3467	1638	75.00	40.00	10.82	4.00	49.18	28.11	1.75	0.91	3.92	1.26	1.75	31.83	47.22	21.76	78.19
559	30.5	111.5	2	2	3	3	3	3	168.00	26.45	3730	2870	1317	76.50	41.00	10.48	3.15	50.64	25.59	1.75	1.00	4.00	1.43	1.98	33.61	45.86	20.82	77.24
560	31.5	105.5	2	2	3	3	3	3	191.50	35.00	4251	3164	1466	74.50	41.25	10.70	3.66	52.93	24.91	1.62	0.96	3.55	1.28	2.13	31.64	46.32	20.81	78.79
561	30.0	105.0	2	2	3	3	3	3	228.50	22.85	5073	3534	1636	69.75	41.75	10.39	3.44	54.08	23.18	1.69	0.97	3.74	1.29	2.33	32.64	46.25	20.55	78.23
562	31.5	106.5	2	2	3	3	3	3	168.50	21.06	3741	2853	1351	76.00	39.75	10.61	3.56	50.03	26.95	1.86	0.91	4.24	1.33	1.87	32.35	47.08	21.59	77.89
563	31.5	111.5	2	2	3	3	3	3	171.50	22.00	3807	2793	1303	73.50	42.75	10.88	3.76	48.90	27.72	1.76	0.98	4.06	1.37	1.77	33.04	46.62	21.83	77.60
564	31.5	110.5	2	2	3	3	3	3	273.00	23.75	6061	4578	2183	75.50	41.75	10.53	3.58	50.48	26.53	1.81	0.92	3.97	1.35	1.91	32.34	47.61	21.24	77.93
565	32.5	110.0	2	2	3	3	3	3	171.00	18.09	3796	2751	1263	72.50	40.75	10.52	3.73	51.81	25.82	1.74	0.95	4.08	1.39	2.01	33.74	45.90	21.47	78.59
566	31.0	110.0	2	2	3	3	3	3	240.00	25.36	5328	4020	1863	75.50	39.50	9.98	3.56	52.34	24.96	1.83	1.00	4.03	1.39	2.12	34.45	46.34	20.79	78.30
567	30.5	108.5	2	2	3	3	3	3	241.50	25.13	5361	4057	1902	75.50	42.25	10.34	3.96	52.07	25.42	1.74	0.93	4.01	1.32	2.05	32.35	46.90	21.37	78.42
568	31.5	111.5	2	2	3	3	3	3	202.00	23.88	4484	3418	1593	76.25	42.50	10.51	3.98	51.38	26.26	1.76	0.94	4.10	1.36	1.96	32.94	46.61	21.71	78.59
569	32.5	112.5	2	2	3	3	3	3	185.00	18.50	4107	3032	1459	73.75	40.75	10.51	3.19	52.52	24.74	1.76	0.96	4.01	1.40	2.13	32.67	48.20	20.87	78.22
570	32.5	105.5	2	2	3	3	3	3	314.00	31.65	6971	5403	2543	77.50	43.50	9.99	3.85	54.25	23.93	1.69	0.93	3.62	1.32	2.30	32.10	47.07	20.47	79.10
571	30.5	108.0	2	2	3	3	3	3	214.50	17.98	4762	3238	1561	68.00	40.75	9.91	3.53	54.18	23.20	1.76	1.02	4.07	1.42	2.34	31.64	48.22	20.69	78.40

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572	31.5	109.0	2	2	3	3	3	3	233.00	20.51	5173	3890	1800	75.25	35.75	10.79	3.27	51.81	26.03	1.51	0.99	3.72	1.34	2.00	31.56	46.26	20.63	78.83
573	30.5	105.5	2	2	3	3	3	3	226.00	23.82	5017	3817	1793	76.00	41.75	9.60	3.78	57.37	20.57	1.76	0.97	3.64	1.31	2.79	33.35	46.86	20.10	78.92
574	32.5	110.5	2	2	3	3	3	3	154.50	26.43	3430	2498	1160	72.75	41.25	10.47	3.62	49.83	26.47	1.77	0.94	4.16	1.41	1.88	32.86	46.39	21.44	77.25
575	30.5	105.5	2	2	3	3	3	3	151.00	18.83	3352	2332	1092	69.75	37.75	9.65	3.89	56.44	20.89	1.79	0.93	3.84	1.33	2.70	31.72	46.78	20.50	78.26
576	31.5	106.5	2	2	3	3	3	3	144.50	28.90	3208	2223	1027	68.25	39.75	11.00	3.21	50.13	26.75	1.73	0.98	3.89	1.38	1.88	33.21	46.34	21.20	77.86
577	30.5	108.0	2	2	3	3	3	3	171.00	23.43	3796	2626	1242	69.25	39.00	10.29	3.44	53.93	23.96	1.67	0.99	3.70	1.31	2.28	31.96	47.19	20.40	78.88
578	31.0	109.0	2	2	3	3	3	3	103.00	13.44	2287	1497	707	65.25	35.75	10.38	3.57	51.99	25.34	1.74	0.97	3.80	1.38	2.06	31.98	47.30	20.88	78.30
579	30.5	109.5	2	2	3	3	3	3	141.00	16.09	3130	2273	1094	72.50	37.25	10.74	2.96	50.62	25.54	1.74	0.99	3.88	1.40	2.00	32.82	47.97	20.73	77.15
580	31.0	109.5	2	2	3	3	3	3	170.00	17.63	3774	2482	1140	65.75	38.75	10.28	3.70	52.81	24.36	1.70	0.95	3.72	1.33	2.17	32.14	45.93	20.73	78.13
581	30.0	105.5	2	2	3	3	3	3	159.50	16.62	3541	2560	1233	72.25	40.75	10.10	3.71	54.30	23.44	1.77	0.91	3.75	1.37	2.33	32.18	48.13	20.70	78.64
582	31.0	107.5	2	2	3	3	3	3	157.50	18.03	3497	2397	1093	68.50	40.50	10.81	3.19	50.83	26.18	1.67	0.95	3.72	1.30	1.95	31.86	45.64	20.68	77.96
583	31.5	108.0	2	2	3	3	3	3	191.00	17.47	4240	3149	1456	74.25	40.50	10.46	3.66	51.36	26.76	1.64	0.96	3.73	1.26	1.92	31.98	46.25	20.74	79.09
584	30.0	107.0	2	2	3	3	3	3	131.50	17.59	2919	2058	945	70.50	41.25	10.33	3.15	52.30	25.07	1.62	1.06	3.68	1.37	2.09	32.57	45.90	20.15	78.42
585	31.5	105.5	2	2	3	3	3	3	161.00	14.69	3574	2287	1065	64.00	37.25	9.58	3.97	57.94	20.73	1.73	0.93	3.53	1.30	2.80	31.78	46.50	20.10	79.60
586	30.5	108.0	2	2	3	3	3	3	188.50	20.85	4185	3022	1388	72.00	41.25	10.64	3.45	49.33	27.09	1.82	0.97	3.99	1.35	1.84	31.74	45.92	21.24	77.38
587	30.5	105.5	2	2	3	3	3	3	208.50	24.63	4629	3494	1644	75.50	43.75	10.23	3.48	53.99	23.95	1.62	1.00	3.70	1.34	2.25	31.94	47.06	20.37	78.94
588	31.0	105.0	2	2	3	3	3	3	215.00	19.40	4773	3414	1563	71.50	41.50	9.76	3.59	57.22	21.41	1.74	0.91	3.64	1.34	2.68	33.88	45.76	20.06	79.54
589	30.5	107.5	2	2	3	3	3	3	161.50	15.92	3585	2578	1255	72.00	40.50	10.67	3.39	51.99	26.40	1.52	1.02	3.67	1.36	1.97	34.48	48.65	20.62	79.42
590	30.0	106.5	2	2	3	3	3	3	200.50	18.09	4451	3118	1425	70.00	40.00	10.50	3.48	52.92	24.93	1.70	0.96	3.80	1.34	2.13	32.87	45.70	20.83	78.82
591	30.5	104.5	2	2	3	3	3	3	281.00	25.90	6238	4618	2163	74.00	42.25	10.36	3.24	52.50	25.42	1.66	1.01	3.61	1.38	2.07	31.57	46.85	20.24	78.93
592	32.5	107.5	2	2	3	3	3	3	184.00	20.90	4085	2965	1364	72.50	40.00	10.60	3.56	51.24	26.19	1.65	0.96	3.90	1.32	1.96	35.10	46.06	21.02	78.38
593	30.5	109.5	2	2	3	3	3	3	173.00	15.71	3841	2883	1377	75.25	43.75	10.22	3.63	53.68	24.60	1.59	0.97	3.53	1.28	2.18	33.03	47.61	20.25	79.26
594	31.0	110.5	2	2	3	3	3	3	129.00	19.81	2864	2015	939	70.25	42.50	10.32	2.92	53.48	23.82	1.65	1.01	3.79	1.37	2.25	33.20	46.56	20.05	78.31
595	30.5	111.5	2	2	3	3	3	3	195.00	23.10	4329	3111	1457	71.75	39.75	10.53	3.72	51.72	25.92	1.69	0.96	3.91	1.34	2.00	31.55	46.77	21.18	78.60
596	31.0	104.5	2	2	3	3	3	3	189.00	24.90	4196	3062	1477	73.00	44.50	9.65	3.64	57.21	21.48	1.74	0.93	3.72	1.36	2.67	29.92	48.30	20.12	79.62
597	32.5	105.5	2	2	3	3	3	3	224.50	21.70	4984	3586	1669	72.00	45.50	10.58	3.33	52.49	25.35	1.66	1.01	3.70	1.40	2.08	33.05	46.56	20.66	78.85
598	31.0	106.5	2	2	3	3	3	3	169.00	18.40	3752	2760	1295	73.25	41.75	10.61	3.63	52.18	25.65	1.61	0.94	3.66	1.27	2.03	32.04	47.21	20.79	78.77
599	29.0	107.5	2	2	3	3	3	3	201.00	21.17	4462	3362	1584	75.25	45.75	10.55	3.25	52.18	25.14	1.73	1.00	3.89	1.39	2.08	32.54	47.17	20.82	78.32
600	32.5	108.5	2	2	3	3	3	3	275.50	26.95	6116	4498	2162	73.50	43.75	10.63	3.17	52.65	24.86	1.66	0.98	3.64	1.33	2.12	31.85	46.55	20.44	78.49
601	31.0	109.5	2	2	3	3	3	3	229.50	19.00	5095	3704	1724	72.75	41.50	10.64	3.57	50.13	27.05	1.78	0.98	4.07	1.38	1.86	32.85	48.00	21.45	78.17
602	29.0	105.5	2	2	3	3	3	3	186.00	17.55	4129	3067	1439	74.25	42.50	9.91	3.85	54.63	23.57	1.82	0.93	3.90	1.32	2.33	33.85	46.98	20.79	79.13
603	32.5	106.5	2	2	3	3	3	3	188.50	17.65	4185	2971	1434	71.00	42.00	10.39	3.28	50.29	26.81	1.80	0.99	3.98	1.37	1.88	32.07	48.23	20.82	78.09
604	29.0	107.5	2	2	3	3	3	3	171.50	20.60	3807	2421	1132	64.00	38.00	10.66	3.45	50.88	26.26	1.67	0.96	3.82	1.30	1.94	33.59	46.56	20.90	78.10
605	31.0	104.5	2	2	3	3	3	3	148.00	17.76	3286	2163	1003	66.00	39.00	10.10	4.17	55.25	22.60	1.82	0.90	3.65	1.25	2.46	31.98	46.38	20.99	78.75
606	32.5	106.5	2	2	3	3	3	3	152.50	18.70	3386	2333	1127	69.25	38.25	10.31	3.67	52.79	24.88	1.85	0.93	4.09	1.35	2.12	32.21	48.43	21.27	78.60

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607	31.0	105.5	2	2	3	3	3	3	233.50	21.38	5184	3513	1678	67.75	35.50	10.54	3.60	53.21	24.35	1.54	0.95	3.59	1.28	2.19	31.88	47.80	20.55	78.51
608	32.0	104.5	2	2	3	3	3	3	97.50	16.69	2165	1441	670	66.75	34.25	9.63	3.48	54.85	22.32	1.71	1.03	4.02	1.43	2.46	31.22	46.62	20.27	78.20
609	32.5	104.5	2	2	3	3	3	3	127.50	14.30	2831	1943	898	68.75	36.25	10.38	3.50	51.50	25.06	1.80	0.98	4.17	1.39	2.06	33.13	46.16	21.25	77.54
610	32.0	107.0	2	2	3	3	3	3	172.50	23.14	3830	2677	1246	70.00	40.00	9.70	3.62	52.43	24.64	1.78	1.00	4.18	1.39	2.15	31.88	46.67	20.67	78.07
611	30.0	109.5	2	2	3	3	3	3	136.00	15.10	3019	2091	1015	69.00	37.25	10.94	3.69	46.93	29.83	1.75	1.00	4.13	1.44	1.57	29.60	48.70	21.95	77.76
612	31.0	110.5	2	2	3	3	3	3	111.50	27.30	2475	1795	828	72.25	36.25	10.98	3.30	48.68	27.99	1.71	0.98	4.01	1.37	1.74	33.13	46.05	21.37	77.65
613	30.5	107.5	2	2	3	3	3	3	129.50	20.16	2875	2156	998	74.75	34.75	10.73	3.55	46.70	29.83	1.79	0.99	4.31	1.41	1.57	33.73	46.15	21.79	77.52
614	32.5	106.5	2	2	3	3	3	3	114.00	15.25	2531	1653	799	65.25	35.25	10.67	3.51	50.05	26.92	1.73	0.92	4.20	1.32	1.88	32.58	48.12	21.42	77.89
615	31.0	107.0	2	2	3	3	3	3	185.00	20.48	4107	3006	1397	73.00	38.25	10.68	3.61	49.36	27.58	1.63	0.97	4.09	1.33	1.80	33.16	46.41	21.34	77.91
616	32.5	107.5	2	2	3	3	3	3	117.00	16.55	2597	1922	913	74.00	39.50	10.54	3.62	50.02	26.97	1.78	0.95	4.21	1.33	1.87	33.83	47.72	21.49	77.95
617	32.5	110.5	2	2	3	3	3	3	156.00	11.55	3463	2297	1060	66.25	35.25	10.57	3.63	49.87	27.11	1.76	0.97	4.07	1.35	1.85	33.66	46.09	21.39	77.96
618	30.5	108.0	2	2	3	3	3	3	126.00	12.17	2797	2070	956	73.25	37.75	10.50	3.83	51.07	25.53	1.67	0.99	3.94	1.33	2.00	33.11	46.38	21.27	77.59
619	30.5	108.0	2	2	3	3	3	3	173.50	15.34	3852	2503	1143	65.00	35.25	10.45	3.75	50.59	26.29	1.74	0.98	4.04	1.36	1.92	31.87	45.67	21.35	77.87
620	31.5	108.5	2	2	3	3	3	3	113.00	15.72	2509	1762	812	70.25	37.75	10.77	3.63	51.05	25.69	1.72	0.94	4.18	1.33	1.99	34.52	46.06	21.63	77.68
621	32.5	105.0	2	2	3	3	3	3	190.00	16.79	4218	3037	1435	72.00	38.00	10.07	3.80	54.37	23.11	1.76	0.96	3.89	1.31	2.37	31.51	47.23	20.83	78.44
622	31.0	104.5	2	2	3	3	3	3	182.50	20.63	4052	2890	1351	71.25	35.75	10.79	4.03	48.69	27.44	1.74	0.95	4.15	1.34	1.79	33.88	46.68	22.05	77.08
623	29.5	103.5	2	2	3	3	3	3	236.50	25.60	5250	3740	1700	71.25	36.75	9.61	3.95	52.66	23.48	1.88	1.09	4.28	1.49	2.25	32.74	45.44	21.21	77.22
624	30.0	103.5	2	2	3	3	3	3	182.50	21.53	4052	2881	1329	70.75	38.00	10.54	3.43	51.09	25.75	1.74	0.96	4.04	1.36	1.98	32.40	46.27	21.11	77.79
625	32.0	104.5	2	2	3	3	3	3	182.50	23.75	4052	2840	1302	70.00	36.75	10.80	3.34	50.08	27.19	1.63	0.96	4.01	1.34	1.84	33.73	45.83	21.13	78.23
626	30.0	102.5	2	2	3	3	3	3	205.00	18.63	4551	3279	1575	72.00	37.25	10.97	3.62	47.88	29.23	1.71	1.02	4.32	1.44	1.64	33.56	47.91	22.06	78.13
627	32.5	104.5	2	2	3	3	3	3	185.00	19.41	4107	2916	1359	71.00	38.00	10.66	3.71	50.42	25.86	1.70	0.98	3.94	1.33	1.96	31.34	46.54	21.34	77.25
628	31.5	111.5	2	2	3	3	3	3	224.50	20.45	4984	3693	1715	74.00	38.25	11.07	3.49	46.29	29.89	1.65	1.00	4.32	1.49	1.56	33.28	46.39	22.03	77.19
629	31.5	106.5	2	2	3	3	3	3	226.50	22.72	5028	3646	1704	72.50	41.00	10.85	3.80	49.60	27.43	1.70	0.93	3.86	1.26	1.81	33.33	46.64	21.47	77.96
630	30.5	108.0	2	2	3	3	3	3	196.50	15.78	4362	3195	1477	73.25	38.00	10.94	3.50	48.10	28.42	1.67	0.98	3.98	1.35	1.69	32.97	46.26	21.45	77.50
631	32.5	104.5	2	2	3	3	3	3	195.50	14.30	4340	3162	1492	72.75	40.75	10.56	3.52	52.70	24.54	1.63	0.97	3.77	1.35	2.17	32.21	47.21	20.83	78.21
632	30.5	103.5	2	2	3	3	3	3	147.00	13.35	3263	2272	1107	69.50	36.25	9.84	3.56	55.23	22.15	1.72	0.99	3.75	1.31	2.49	33.85	48.71	20.19	78.37
633	32.5	104.5	2	2	3	3	3	3	205.00	21.75	4551	3004	1395	66.00	38.25	9.78	3.76	50.85	25.63	1.96	0.97	4.21	1.37	1.99	33.16	46.33	21.07	77.45
634	31.0	104.0	2	2	3	3	3	3	197.50	17.13	4385	3038	1432	69.25	36.00	10.32	4.10	53.15	24.48	1.67	0.95	3.95	1.36	2.19	32.55	47.14	21.40	78.58
635	31.5	105.5	2	2	3	3	3	3	188.50	17.89	4185	3053	1396	72.75	39.25	10.30	3.68	51.14	25.63	1.74	0.95	4.04	1.36	2.00	34.78	45.72	21.13	77.72
636	31.5	105.5	2	2	3	3	3	3	220.00	20.65	4884	3335	1532	68.25	40.25	9.51	3.77	52.66	24.23	1.72	1.10	4.19	1.44	2.19	33.80	46.02	20.63	77.98
637	30.5	107.0	2	2	3	3	3	3	207.50	21.70	4607	3120	1456	67.75	39.00	10.82	3.25	49.69	26.44	1.62	1.00	3.86	1.37	1.90	32.99	46.64	20.92	77.12
638	31.0	107.5	2	2	3	3	3	3	165.50	26.05	3674	2747	1302	74.75	42.75	10.78	3.34	49.89	26.16	1.78	0.91	4.03	1.26	1.91	33.57	47.55	21.20	76.97
639	30.5	105.5	2	2	3	3	3	3	149.00	15.72	3308	2513	1187	76.00	37.75	10.35	3.62	49.93	27.10	1.82	1.00	4.28	1.39	1.84	31.71	47.21	21.45	78.02

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640	33.0	105.5	2	2	3	3	3	3	169.50	16.75	3763	2548	1187	67.75	36.25	10.24	4.08	52.60	24.18	1.86	0.93	4.23	1.38	2.19	33.82	46.69	21.79	77.71
641	33.5	107.5	2	2	3	3	3	3	185.00	20.69	4107	2993	1395	72.75	35.00	10.36	3.72	51.12	25.65	1.83	0.95	3.88	1.33	2.00	32.89	46.68	21.11	77.72
642	30.5	107.5	2	2	3	3	3	3	213.00	31.40	4729	3488	1594	73.75	42.00	10.57	4.03	50.96	25.89	1.56	0.96	3.99	1.32	1.97	34.41	45.67	21.46	77.80
643	31.5	104.5	2	2	3	3	3	3	115.00	12.38	2553	1731	813	67.75	35.25	10.17	3.89	50.71	25.70	1.86	0.95	4.23	1.37	1.98	32.75	46.78	21.51	77.36
644	31.0	107.5	2	2	3	3	3	3	202.00	23.77	4484	3331	1566	74.25	41.75	10.70	3.56	46.36	28.90	1.67	1.05	4.38	1.43	1.61	32.97	47.00	21.74	76.31
645	32.5	104.5	2	2	3	3	3	3	135.00	20.85	2997	2153	1025	71.50	38.50	10.25	3.83	52.81	22.92	1.89	0.93	4.08	1.36	2.32	32.41	47.67	21.40	76.67
646	31.0	103.5	2	2	3	3	3	3	172.50	19.45	3830	2633	1219	68.75	36.00	10.38	3.63	51.97	24.98	1.76	0.96	4.05	1.37	2.10	31.65	46.30	21.20	77.92
647	31.5	104.0	2	2	3	3	3	3	76.50	16.65	1698	1181	570	69.50	35.50	10.66	3.24	51.26	24.82	1.75	0.97	3.98	1.37	2.07	32.31	48.16	20.98	77.04
648	32.0	105.0	2	2	3	3	3	3	102.50	16.15	2276	1392	654	60.75	39.25	9.05	3.76	62.79	15.80	1.78	0.93	3.68	1.43	4.01	32.70	47.00	19.68	79.52
649	31.0	102.5	2	2	3	3	3	3	114.00	19.00	2531	1536	723	60.75	35.00	10.42	3.43	52.45	24.63	1.75	0.97	3.93	1.38	2.13	31.88	47.08	20.92	78.05
650	32.0	101.5	2	2	3	3	3	3	172.00	25.40	3818	2821	1304	73.75	38.50	10.59	3.40	50.48	25.63	1.67	0.97	3.83	1.32	1.97	33.70	46.07	20.82	77.07
651	31.0	104.5	2	2	3	3	3	3	201.00	20.25	4462	3202	1466	71.75	36.25	10.47	3.54	53.34	23.58	1.69	0.98	3.82	1.35	2.28	33.76	45.79	20.87	77.90
652	32.5	103.5	2	2	3	3	3	3	151.00	18.14	3352	2355	1107	70.25	33.00	10.51	3.40	52.26	23.61	1.84	0.98	4.05	1.40	2.22	33.28	46.98	21.19	76.84
653	30.5	109.5	2	2	3	3	3	3	119.50	24.25	2653	1882	865	71.00	39.00	10.78	3.74	49.83	26.98	1.72	0.95	3.88	1.31	1.85	33.88	46.02	21.42	77.76
654	32.5	111.5	2	2	3	3	3	3	201.00	22.45	4462	3255	1532	73.00	40.25	10.88	3.70	49.28	26.83	1.78	0.96	4.07	1.37	1.84	32.34	47.03	21.80	77.06
655	31.0	111.5	2	2	3	3	3	3	159.00	13.03	3530	2651	1254	75.25	40.00	10.71	3.77	49.69	26.45	1.78	0.95	3.90	1.32	1.88	33.31	47.31	21.49	77.08
656	31.5	112.0	2	2	3	3	3	3	216.00	22.76	4795	3516	1620	73.25	39.00	10.74	3.65	51.16	25.40	1.59	0.98	3.66	1.35	2.02	32.83	46.14	20.98	77.54
657	30.5	105.5	2	2	3	3	3	3	212.50	16.99	4718	3380	1579	71.75	40.50	10.29	3.32	52.49	24.05	1.88	0.98	3.99	1.36	2.21	33.47	46.78	20.84	77.52
658	32.5	111.5	2	2	3	3	3	3	256.00	26.15	5683	4159	1938	73.00	37.75	10.80	3.51	50.29	26.33	1.63	0.93	3.65	1.28	1.91	33.18	46.63	20.87	77.55
659	32.5	102.0	2	2	3	3	3	3	230.50	23.95	5117	3825	1839	74.75	38.50	10.54	3.59	53.31	22.84	1.85	0.94	3.87	1.34	2.36	32.59	48.09	21.19	77.09
660	32.0	104.5	2	2	3	3	3	3	222.50	23.60	4940	3476	1594	70.25	37.25	10.25	3.87	52.43	24.67	1.80	0.93	3.84	1.31	2.13	34.10	45.90	21.07	78.03
661	32.0	104.5	2	2	3	3	3	3	217.00	22.83	4817	3535	1675	73.50	37.75	9.82	3.76	51.45	25.95	1.87	1.01	4.21	1.43	2.00	32.93	47.39	21.09	78.40
662	32.5	105.0	2	2	3	3	3	3	219.00	17.51	4862	3611	1637	74.25	39.75	10.57	3.60	50.46	26.11	1.82	0.96	4.01	1.35	1.94	33.43	45.32	21.35	77.52
663	30.5	110.0	2	2	3	3	3	3	235.00	18.15	5217	3898	1817	74.75	39.25	11.15	3.39	47.79	28.47	1.71	0.97	4.04	1.39	1.68	31.90	46.61	21.67	77.23
664	32.5	107.5	2	2	3	3	3	3	203.00	18.49	4507	3340	1511	74.00	36.00	10.38	3.48	50.48	25.69	1.81	1.06	4.01	1.43	1.97	33.15	45.18	21.11	77.24
665	33.0	106.5	2	2	3	3	3	3	204.50	17.77	4540	3310	1571	72.75	39.00	10.36	3.66	50.82	25.32	1.87	0.95	3.99	1.35	2.01	31.95	47.54	21.22	77.09
666	30.0	106.0	2	2	3	3	3	3	212.00	17.67	4706	3414	1661	72.50	36.00	10.27	3.38	54.34	22.24	1.80	0.98	3.98	1.43	2.44	33.14	48.60	20.87	77.55
667	31.0	108.0	2	2	3	3	3	3	217.00	18.78	4817	3647	1672	75.50	38.25	10.13	3.76	51.85	24.89	1.81	0.98	3.92	1.34	2.09	33.92	45.93	20.95	77.71
668	30.5	112.5	2	2	3	3	3	3	171.50	20.28	3807	2704	1265	71.00	37.75	10.73	3.47	49.61	26.39	1.76	0.92	3.95	1.28	1.88	33.36	46.79	21.19	76.92
669	31.5	105.5	2	2	3	3	3	3	163.50	13.19	3630	2511	1182	69.00	35.50	10.28	3.58	54.58	23.25	1.64	0.95	3.53	1.26	2.35	32.15	47.35	20.29	78.78
670	32.5	105.5	2	2	3	3	3	3	114.00	16.75	2531	1643	757	65.25	35.75	10.78	3.31	49.98	27.09	1.73	1.00	3.85	1.38	1.85	33.41	45.98	21.05	78.06
671	33.0	107.5	2	2	3	3	3	3	161.00	20.00	3574	2586	1200	72.25	39.00	10.11	3.71	55.77	22.81	1.75	0.97	3.50	1.32	2.45	32.04	46.37	20.39	79.55
672	30.5	106.5	2	2	3	3	3	3	119.50	17.00	2653	1845	858	69.75	36.75	10.46	3.49	52.06	25.34	1.74	0.96	4.14	1.40	2.06	33.20	46.64	21.23	78.36
673	30.0	109.5	2	2	3	3	3	3	151.00	15.20	3352	2446	1135	73.00	36.50	10.78	3.50	49.11	27.31	1.76	0.94	3.85	1.30	1.80	34.20	46.37	21.19	77.36
674	30.5	110.0	2	2	3	3	3	3	130.00	18.75	2886	1928	808	66.75	40.00	10.87	3.48	50.64	26.02	1.82	0.95	3.87	1.31	1.95	30.19	42.30	21.36	77.61

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675	32.0	110.0	2	2	3	3	3	3	171.00	19.60	3796	2651	1246	69.75	37.75	10.24	3.90	50.27	26.22	1.79	1.01	4.33	1.36	1.92	33.52	46.92	21.62	77.50
676	30.0	109.5	2	2	3	3	3	3	137.50	17.19	3053	2038	941	66.75	35.75	10.42	3.68	50.26	26.76	1.73	0.94	3.97	1.32	1.89	33.04	46.21	21.12	77.97
677	30.5	110.0	2	2	3	3	3	3	128.50	15.70	2853	1955	912	68.75	35.75	10.17	3.99	52.54	25.17	1.73	0.93	3.81	1.29	2.09	32.32	46.70	21.00	78.64
678	30.5	111.5	2	2	3	3	3	3	186.00	16.35	4129	2960	1376	71.75	35.75	10.67	3.46	48.96	26.90	1.74	1.01	4.25	1.38	1.83	33.34	46.47	21.50	76.87
679	30.0	110.5	2	2	3	3	3	3	163.00	21.95	3619	2413	1111	66.50	35.00	11.11	3.29	48.58	28.17	1.71	0.96	3.81	1.38	1.73	33.02	46.09	21.30	77.72
680	30.5	105.5	2	2	3	3	3	3	152.50	25.42	3386	2372	1091	70.00	33.50	10.41	3.42	54.13	23.65	1.64	0.95	3.49	1.27	2.29	33.29	46.04	20.22	78.73
681	28.5	110.0	2	3	4	5	5.5	7	41.00	9.20	910	405	170	44.50	29.50	10.95	3.12	53.19	26.15	1.30	0.99	3.13	1.32	2.03	26.61	41.61	19.81	80.32
682	27.5	105.5	2.5	3.5	5	5.5	6	6.5	45.00	10.30	999	539	256	53.00	28.25	11.09	3.26	52.15	27.23	1.28	0.94	3.13	1.22	1.92	26.91	45.37	19.98	80.32
683	28.5	105.0	3	4	5	6	6	7	47.50	11.35	1055	453	184	43.00	25.00	10.94	3.01	51.71	27.52	1.35	0.96	3.20	1.26	1.88	26.35	40.06	19.75	80.19
684	28.5	105.0	3	4	4.5	6	6	7	50.00	6.25	1110	536	245	48.00	24.50	10.79	3.16	53.91	25.55	1.37	0.98	3.12	1.30	2.13	26.43	45.17	19.74	80.44
685	28.0	104.5	3	4	5	6.5	6	7.5	54.00	6.67	1199	588	265	49.50	23.25	10.89	2.94	54.24	25.59	1.25	1.01	2.99	1.31	2.13	27.13	46.06	19.38	80.83
686	28.0	104.0	3	3.5	4	5.5	6	7.5	35.00	4.59	777	313	125	40.50	24.00	10.01	3.11	55.62	25.26	1.51	0.88	3.28	1.21	2.21	27.53	39.50	19.12	81.76
687	27.5	106.5	3	4	4	6.5	6	7.5	40.50	8.00	899	465	198	52.00	24.50	11.62	2.77	49.47	29.33	1.21	0.97	3.23	1.31	1.70	24.94	42.47	20.14	79.76
688	29.0	107.5	3	4	4	6	5.5	7	37.50	6.25	833	400	178	48.00	21.50	10.70	3.03	51.82	26.98	1.37	0.94	3.26	1.25	1.93	26.44	45.82	19.61	79.74
689	28.0	106.5	3	4	4	6.5	6	8	45.50	11.60	1010	526	208	52.00	24.00	10.59	3.17	53.73	25.79	1.42	0.96	3.18	1.30	2.08	26.23	39.70	19.64	80.48
690	29.0	104.5	3	4	4	6	5	7	48.00	6.38	1066	548	239	51.50	28.75	10.21	2.97	58.15	21.80	1.26	0.98	2.82	1.24	2.69	26.35	44.01	18.49	80.93
691	27.5	105.5	3	4	5	6.5	5	7.5	44.00	6.80	977	488	211	49.50	22.65	10.82	2.62	54.14	26.10	1.24	1.03	2.95	1.35	2.09	27.31	44.69	18.97	81.27
692	28.0	106.0	3	4	4	5.5	5	7	54.00	7.75	1199	731	315	61.00	26.75	10.99	3.19	50.78	28.54	1.38	0.98	3.28	1.30	1.79	28.14	43.79	20.14	80.30
693	28.0	111.5	3	4	4	5.5	5	7	40.00	7.13	888	414	181	46.50	23.00	11.15	2.81	50.85	28.28	1.27	1.00	3.21	1.33	1.80	26.55	44.17	19.77	80.13
694	28.5	101.5	3	4.5	5	6	5	7.5	48.50	8.08	1077	549	241	51.00	25.00	10.71	2.92	55.22	24.46	1.24	0.99	2.88	1.27	2.26	26.67	44.03	19.02	80.67
695	28.5	100.5	3	4	5	6	7	7.5	45.00	7.35	999	510	217	50.50	27.50	10.66	3.11	52.67	26.81	1.39	0.99	3.27	1.29	1.97	30.74	43.19	19.73	80.48
696	29.0	100.0	3	4	4	6	6	7	67.00	9.06	1487	686	296	46.00	24.75	10.63	2.80	55.45	23.88	1.38	1.01	3.17	1.35	2.33	30.30	42.79	19.34	80.34
697	30.0	99.5	3	4	5	6	6.5	7.5	34.00	5.67	755	321	142	42.50	22.75	10.81	2.79	48.40	29.31	1.46	1.00	3.44	1.29	1.65	29.47	44.09	19.79	78.70
698	27.0	100.0	3	4	4	6	6.5	7.5	46.50	7.46	1032	429	176	41.50	22.75	10.68	3.11	54.70	24.82	1.27	0.99	2.97	1.25	2.22	28.63	40.79	19.28	80.52
699	27.5	101.5	3	4	4	5.5	5	7	36.50	5.79	810	380	173	45.50	25.50	10.46	2.72	57.72	22.30	1.33	1.01	3.00	1.37	2.59	28.08	46.79	18.87	81.04
700	27.5	98.5	3	4	4	5.5	5	7	51.00	10.92	1132	512	227	45.25	27.00	10.63	3.05	53.34	26.18	1.35	1.01	3.16	1.31	2.04	27.97	44.11	19.50	80.53
701	27.0	101.5	3	4	4	6	5	7	114.50	15.20	2542	1739	765	68.25	28.50	10.66	2.47	56.12	25.11	1.42	0.98	2.90	1.33	2.24	27.59	44.71	18.78	82.21
702	27.5	106.0	3	4	5	6	5.5	7.5	72.50	12.08	1610	844	342	52.50	26.75	10.89	2.64	53.00	27.29	1.42	1.03	3.12	1.41	1.95	27.50	40.20	19.48	81.33
703	29.0	105.0	2	2	3	3	3	3	167.00	20.88	3707	2575	1232	69.50	40.00	9.54	3.60	54.20	24.24	1.87	0.99	3.76	1.38	2.27	34.35	47.84	20.15	79.43
704	29.5	105.0	2	2	3	3	3	3	232.50	23.25	5162	3826	1762	74.25	40.50	10.12	3.33	50.76	26.23	1.81	1.02	3.99	1.40	1.94	31.60	46.10	20.65	78.01
705	31.5	105.0	2	2	3	3	3	3	153.50	13.43	3408	2415	1129	70.75	38.50	10.66	3.66	50.14	27.75	1.81	0.97	3.71	1.33	1.81	32.68	46.70	21.17	78.85
706	31.5	107.5	2	2	3	3	3	3	181.50	18.15	4029	2972	1367	73.50	41.75	11.03	3.22	47.86	29.48	1.74	0.95	3.85	1.31	1.62	32.98	46.02	21.15	78.30
707	30.5	108.0	2	2	3	3	3	3	316.50	27.75	7026	5101	2352	72.75	40.00	11.17	3.47	49.67	28.39	1.82	0.89	3.86	1.28	1.75	34.09	46.13	21.60	78.96

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708	32.5	108.5	2	2	3	3	3	3	200.00	21.06	4440	3221	1494	72.50	42.00	10.84	3.11	49.29	28.81	1.75	0.93	3.85	1.27	1.71	32.52	46.48	20.82	79.03
709	30.0	105.5	2	2	3	3	3	3	332.00	33.20	7370	5675	2648	77.00	46.75	10.23	3.14	55.54	24.48	1.75	1.00	3.47	1.40	2.28	33.00	46.67	19.98	81.02
710	31.5	108.0	2	2	3	3	3	3	217.00	23.31	4817	3484	1610	72.25	38.75	11.10	3.44	49.19	28.82	1.70	0.95	3.66	1.30	1.71	33.11	46.25	21.20	78.96
711	30.0	105.5	2	2	3	3	3	3	207.00	22.10	4595	3566	1632	77.75	42.25	10.00	3.36	52.26	25.16	1.78	1.03	3.77	1.41	2.08	33.82	45.82	20.31	78.45
712	30.0	107.5	2	2	3	3	3	3	263.00	27.78	5839	4364	2095	74.75	42.75	10.92	3.51	49.83	27.59	1.70	0.90	3.73	1.30	1.81	32.98	48.02	21.16	78.32
713	29.5	108.0	2	2	3	3	3	3	225.50	23.20	5006	3872	1761	77.25	41.75	10.66	3.26	51.57	25.53	1.76	0.94	3.72	1.34	2.02	32.31	45.57	20.74	78.04
714	31.5	105.0	2	2	3	3	3	3	233.00	21.15	5173	3943	1875	76.25	42.25	9.92	3.27	54.27	23.98	1.78	0.99	3.74	1.42	2.27	32.82	47.63	20.13	79.25
715	32.5	108.5	2	2	3	3	3	3	235.50	21.74	5228	4005	1851	76.50	42.75	10.29	3.53	50.07	27.66	1.77	0.99	4.13	1.44	1.81	34.12	46.18	21.15	78.72
716	30.0	106.5	2	2	3	3	3	3	217.50	23.25	4829	3609	1687	74.75	41.25	10.43	3.53	52.61	25.05	1.74	0.96	3.84	1.34	2.10	33.81	46.82	20.88	78.62
717	30.0	109.5	2	2	3	3	3	3	220.00	18.33	4884	3615	1666	74.00	41.25	10.57	3.31	50.53	27.07	1.85	0.99	3.93	1.42	1.87	32.03	46.10	21.08	78.60
718	29.5	105.5	2	2	3	3	3	3	270.00	23.78	5994	4375	2099	73.00	40.25	10.38	3.19	55.77	22.64	1.53	0.99	3.33	1.32	2.47	33.22	46.85	19.76	79.40
719	30.5	108.0	2	2	3	3	3	3	217.50	21.70	4829	3718	1743	77.00	43.50	10.63	3.72	51.81	25.96	1.64	0.94	3.66	1.29	2.00	32.82	48.01	20.94	78.71
720	28.5	105.5	2	2	3	3	3	3	187.50	21.38	4163	3041	1421	73.00	40.00	9.98	3.52	56.86	21.98	1.72	0.91	3.45	1.30	2.59	33.45	46.58	19.98	79.75
721	31.5	106.5	2	2	3	3	3	3	202.00	27.10	4484	3253	1493	72.50	41.00	10.63	3.50	49.90	27.34	1.78	1.04	3.95	1.46	1.82	31.45	45.95	21.32	78.29
722	28.5	105.0	2	2	3	3	3	3	222.50	24.72	4940	3570	1675	72.25	41.25	10.30	3.93	53.89	24.41	1.66	0.94	3.76	1.35	2.21	32.51	46.89	20.99	79.24
723	29.0	105.0	2	2	3	3	3	3	307.00	25.60	6815	5277	2441	77.50	45.25	10.74	3.57	51.47	25.57	1.61	0.94	3.83	1.31	2.01	34.09	46.23	21.06	77.98
724	29.0	104.5	2	2	3	3	3	3	244.50	30.79	5428	3832	1726	70.75	37.75	9.98	3.52	56.86	21.98	1.72	0.91	3.45	1.30	2.59	32.82	45.02	19.98	79.75
725	30.0	110.5	2	2	3	3	3	3	155.50	18.32	3452	2451	1134	71.00	42.00	10.24	3.47	49.85	27.94	1.78	1.03	3.99	1.39	1.79	34.32	46.30	20.86	78.81
726	28.5	106.0	2	2	3	3	3	3	183.00	20.16	4063	2772	1315	68.50	39.75	10.18	3.71	53.22	25.33	1.68	1.00	3.56	1.31	2.10	32.87	47.51	20.43	79.55
727	29.0	104.5	2	2	3	3	3	3	165.00	21.60	3663	2739	1265	74.75	39.00	9.68	3.38	56.78	21.58	1.68	0.96	3.84	1.35	2.63	33.83	46.14	19.92	79.32
728	30.0	105.5	2	2	3	3	3	3	167.50	21.65	3719	2876	1335	77.25	39.50	10.06	3.73	52.29	25.81	1.70	0.98	3.81	1.32	2.03	33.36	46.51	20.61	79.08
729	30.0	106.0	2	2	3	3	3	3	220.00	20.97	4884	3196	1478	65.50	37.25	9.92	3.57	53.15	24.69	1.71	1.02	3.72	1.34	2.15	32.09	46.25	20.25	78.86
730	33.0	105.0	2	2	3	3	3	3	239.50	24.35	5317	4007	1706	75.50	39.75	10.25	3.50	53.75	24.47	1.73	0.96	3.92	1.36	2.20	30.16	42.26	20.75	79.18
731	33.5	103.5	2	2	3	3	3	3	214.50	22.20	4762	3656	1720	76.75	41.25	10.54	3.56	51.06	26.57	1.65	0.97	3.77	1.32	1.92	32.38	47.10	20.84	78.60
732	32.5	104.0	2	2	3	3	3	3	218.00	19.86	4840	3496	1621	72.25	40.50	10.16	3.85	50.14	27.32	1.80	0.97	4.29	1.36	1.84	33.06	46.42	21.47	78.43
733	30.0	105.5	2	2	3	3	3	3	206.50	21.45	4584	3426	1602	74.75	40.75	10.58	3.19	52.46	25.47	1.66	0.96	3.68	1.36	2.06	32.66	46.78	20.47	78.89
734	31.5	106.0	2	2	3	3	3	3	238.50	29.81	5295	4068	1890	76.75	42.50	10.06	3.51	55.18	23.13	1.71	0.95	3.83	1.32	2.39	33.57	46.40	20.43	79.26
735	32.0	106.5	2	2	3	3	3	3	185.00	23.10	4107	3065	1428	74.50	38.75	10.13	3.57	55.21	22.72	1.74	0.95	3.75	1.34	2.43	32.72	46.51	20.52	78.87
736	30.0	106.5	2	2	3	3	3	3	181.50	16.58	4029	3074	1457	76.25	41.75	10.38	3.35	54.36	23.31	1.74	0.94	3.83	1.35	2.33	32.03	47.39	20.66	78.61
737	31.5	105.5	2	2	3	3	3	3	166.00	18.39	3685	2782	1339	75.25	41.00	9.69	3.70	56.28	21.80	1.71	0.97	3.61	1.32	2.59	32.52	48.34	20.04	79.05
738	33.5	108.5	2	2	3	3	3	3	168.00	21.00	3730	2795	1286	74.65	37.50	10.66	3.21	48.67	27.67	1.75	0.97	4.21	1.34	1.76	33.50	45.98	21.16	77.31
739	32.0	110.0	2	2	3	3	3	3	183.50	18.35	4074	2966	1341	72.75	38.00	10.73	3.32	49.98	27.11	1.60	1.02	3.87	1.36	1.85	32.27	45.26	20.87	78.10
740	33.5	106.5	2	2	3	3	3	3	179.00	22.38	3974	2985	1386	75.00	37.00	10.59	3.19	52.01	25.81	1.59	1.00	3.66	1.32	2.02	31.90	46.48	20.34	78.83
741	32.5	107.5	2	2	3	3	3	3	209.00	26.50	4640	3456	1670	74.50	41.50	10.68	3.09	50.25	27.60	1.62	1.01	3.82	1.37	1.82	32.87	48.32	20.58	78.87
742	33.5	108.5	2	2	3	3	3	3	177.00	19.96	3929	2897	1358	73.75	41.75	10.75	3.54	49.10	28.14	1.60	0.99	3.99	1.39	1.76	31.78	46.86	21.27	78.23

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743	33.5	105.0	2	2	3	3	3	3	215.50	24.31	4784	3407	1559	71.25	40.00	9.61	3.60	57.29	20.12	1.74	0.91	3.63	1.30	2.85	33.90	45.76	19.88	78.32
744	33.0	105.5	2	2	3	3	3	3	170.00	22.50	3774	2753	1266	73.25	41.00	10.17	3.29	52.34	23.89	1.77	1.02	4.00	1.44	2.19	33.39	46.03	20.67	77.24
745	30.5	104.5	2	2	3	3	3	3	162.50	21.25	3608	2746	1266	75.75	38.25	9.99	3.30	55.56	23.14	1.77	1.02	3.92	1.41	2.42	34.11	46.02	20.38	79.72
746	33.0	106.0	2	2	3	3	3	3	205.00	20.50	4551	3323	1572	73.25	40.00	10.38	3.35	51.55	25.20	1.76	1.00	3.76	1.35	2.06	33.25	47.34	20.60	77.76
747	32.5	107.5	2	2	3	3	3	3	212.50	25.03	4718	3607	1663	76.50	42.25	10.56	3.27	52.77	24.73	1.54	0.94	3.81	1.31	2.14	32.44	46.11	20.50	78.45
748	32.0	108.5	2	2	3	3	3	3	121.00	12.82	2686	1933	911	72.00	38.50	10.24	3.42	52.42	24.31	1.86	0.94	3.99	1.30	2.16	34.30	47.35	20.82	77.66
749	31.0	104.5	2	2	3	3	3	3	226.50	23.31	5028	3734	1727	74.25	42.25	9.83	3.67	53.89	24.38	1.82	0.97	4.15	1.35	2.25	33.86	46.28	20.82	79.24
750	32.0	105.0	2	2	3	3	3	3	288.50	26.28	6405	4673	2162	73.00	42.25	10.02	3.60	54.66	23.87	1.73	0.98	3.95	1.35	2.32	32.19	46.30	20.64	79.51
751	29.5	105.0	2	2	3	3	3	3	211.00	18.25	4684	3487	1664	74.25	38.75	8.44	6.28	63.15	17.82	2.88	0.75	4.18	0.78	3.54	33.71	47.33	22.57	81.72
752	31.5	108.5	2	2	3	3	3	3	224.50	29.95	4984	3358	1577	67.50	40.00	9.66	3.33	53.43	23.95	1.61	1.13	4.04	1.49	2.24	32.52	46.97	20.13	78.51
753	31.0	109.5	2	2	3	3	3	3	196.50	20.50	4362	3172	1470	72.50	41.00	10.71	3.32	49.27	27.63	1.75	0.95	3.89	1.32	1.78	33.13	46.23	21.00	77.85
754	29.5	111.0	2	2	3	3	3	3	171.50	18.11	3807	2597	1191	68.00	35.75	10.83	3.73	47.69	29.43	1.73	0.88	4.16	1.27	1.62	34.39	45.81	21.72	78.00
755	30.0	110.5	2	2	3	3	3	3	148.00	16.28	3286	2330	1071	70.50	36.50	9.70	3.50	51.36	25.17	1.78	1.01	4.06	1.34	2.05	32.78	45.95	20.37	77.55
756	31.0	111.0	2	2	3	3	3	3	131.50	14.30	2919	1801	844	61.50	37.75	11.26	3.92	44.82	30.85	1.73	0.81	3.97	1.15	1.46	31.40	47.17	22.03	76.48
757	29.0	111.5	2	2	3	3	3	3	146.00	14.60	3241	2183	1029	67.75	36.00	10.16	3.71	52.58	25.55	1.61	0.92	3.62	1.25	2.08	32.19	47.13	20.35	79.05
758	31.5	110.0	2	2	3	3	3	3	211.50	21.44	4695	3193	1496	68.25	36.25	10.57	3.49	50.90	25.98	1.81	0.98	4.06	1.36	1.96	33.39	46.73	21.28	77.86
759	31.5	109.5	2	2	3	3	3	3	159.00	14.39	3530	2415	1106	68.25	36.50	10.39	3.37	54.51	23.68	1.56	0.98	3.51	1.35	2.30	32.50	45.78	20.18	79.17
760	32.5	106.5	2	2	3	3	3	3	184.50	19.45	4096	2879	1337	70.25	33.50	10.27	3.65	54.00	24.27	1.64	0.90	3.53	1.22	2.24	32.20	46.47	20.30	79.17
761	31.5	107.0	2	2	3	3	3	3	143.50	17.94	3186	2192	1013	68.50	33.00	10.88	3.15	52.20	25.41	1.59	1.00	3.54	1.32	2.05	32.89	46.12	20.49	78.61
762	31.5	111.5	2	2	3	3	3	3	191.00	21.49	4240	3212	1507	75.75	37.00	10.79	3.26	48.10	29.54	1.70	0.98	4.06	1.41	1.64	33.46	46.91	21.22	78.62
763	31.5	105.5	2	2	3	3	3	3	145.50	12.63	3230	2170	1007	67.00	35.00	10.20	3.74	53.74	24.74	1.69	0.98	3.59	1.32	2.17	32.20	46.47	20.54	79.46
764	32.0	104.5	2	2	3	3	3	3	196.00	21.90	4351	3225	1523	74.00	37.00	10.40	3.36	54.07	24.20	1.56	0.96	3.50	1.28	2.23	29.59	47.42	20.11	79.23
765	30.5	104.5	2	2	3	3	3	3	116.50	10.65	2586	1849	874	71.50	40.50	9.81	3.40	56.54	22.72	1.62	0.95	3.56	1.34	2.50	33.17	47.24	19.74	80.20
766	31.0	104.5	2	2	3	3	3	3	206.00	21.72	4573	3261	1490	71.25	37.00	10.07	3.90	52.93	25.20	1.78	0.95	3.98	1.32	2.10	33.40	45.69	21.05	79.08
767	27.5	102.0	3	4	4	6	5	7	86.50	13.18	1920	1248	582	65.00	33.50	11.37	4.01	44.89	30.00	1.80	0.86	4.07	1.28	1.50	30.68	46.48	22.53	75.75
768	27.5	101.5	3	4	4	6.5	5	7.5	41.50	6.30	921	589	277	63.50	29.00	11.29	3.89	46.48	28.93	1.72	0.86	3.78	1.14	1.61	31.47	47.02	21.82	76.27
769	28.5	106.0	3	4	4	6.5	5	7.5	56.00	7.10	1243	831	389	67.25	28.50	10.81	3.86	49.24	27.32	1.71	0.86	3.83	1.12	1.80	29.34	46.79	21.33	77.42
770	27.5	104.0	3	4	4	6	5	7	33.50	7.00	744	439	202	59.00	26.75	11.47	3.65	43.77	31.04	1.78	0.85	4.03	1.17	1.42	32.25	46.01	22.08	75.66
771	28.0	101.5	3	4	5	6	5	8	39.00	7.80	866	564	259	65.25	27.25	11.12	3.85	48.24	27.84	1.69	0.86	3.75	1.13	1.73	28.65	46.06	21.53	76.93
772	27.5	101.5	3	4	5	5.5	5	6.5	73.50	10.40	1632	937	436	57.25	28.50	10.95	3.87	49.38	26.63	1.68	0.84	3.78	1.11	1.85	31.47	46.37	21.38	76.85
773	27.5	101.0	3	4	5	5.5	5	7	57.50	8.73	1277	746	352	58.25	23.75	11.60	3.83	43.20	31.56	1.76	0.82	4.10	1.12	1.37	29.55	47.74	22.42	75.57
774	27.5	104.5	3	4	4	6	6.5	7	68.50	9.24	1521	879	420	57.50	30.50	11.57	3.66	44.31	31.39	1.64	0.87	3.89	1.16	1.41	28.72	47.52	21.93	76.57
775	28.0	101.0	3	4	4	6	7	7.5	62.00	8.65	1376	699	338	51.00	26.75	11.41	4.04	42.15	32.95	1.79	0.84	4.03	1.13	1.28	28.51	48.05	22.40	75.94

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776	29.0	103.0	3	4	5	6	7	7	39.00	5.63	866	498	234	57.50	24.25	11.21	3.81	47.52	28.94	1.68	0.85	3.85	1.17	1.64	28.94	47.09	21.71	77.31
777	29.5	101.5	3	4	5	6	7	7.5	53.50	9.78	1188	718	330	60.50	31.00	11.10	3.84	48.08	28.48	1.69	0.86	3.76	1.17	1.70	28.80	45.93	21.55	77.42
778	26.5	101.5	3	4	5	6	7	7.5	54.00	8.05	1199	737	344	62.00	30.25	11.38	3.97	43.10	32.36	1.75	0.87	4.01	1.14	1.33	30.66	46.19	22.26	76.32
779	27.5	104.5	3	4	5	5.5	7	6.5	49.00	5.78	1088	674	318	62.00	30.00	11.48	3.93	45.39	31.24	1.67	0.85	4.02	1.21	1.46	30.74	47.13	22.30	77.48
780	27.5	104.5	3	4	5	5.5	6.5	7	73.00	9.13	1621	1031	504	63.50	30.75	11.24	3.88	46.55	29.42	1.76	0.86	4.04	1.19	1.58	29.34	48.62	22.11	76.83
781	27.5	105.5	3	4	5	5.5	6.5	7	97.50	12.37	2165	1374	638	63.50	33.25	11.60	3.83	43.20	31.56	1.76	0.82	4.10	1.12	1.37	29.45	46.42	22.42	75.57
782	28.0	101.5	3	4	5	5.5	6.5	6.5	64.50	8.92	1432	926	437	64.75	36.25	11.38	3.89	44.05	31.09	2.00	0.82	4.10	1.17	1.42	29.49	47.36	22.55	75.95
783	27.5	106.5	3	4	4	5.5	5	6	81.00	10.44	1798	1240	584	69.25	35.00	11.50	3.95	44.53	31.65	1.84	0.80	3.89	1.12	1.41	29.81	47.15	22.30	76.98
784	28.5	105.5	3	4	4	5.5	5	6.5	98.50	11.55	2187	1362	652	62.25	36.00	12.17	3.74	41.33	33.69	1.79	0.82	3.89	1.13	1.23	28.91	47.67	22.72	75.83
785	26.5	102.5	3	4	4	5	5	6	65.50	8.75	1454	815	388	56.00	29.00	11.31	4.00	47.58	29.12	1.77	0.79	3.61	1.10	1.64	30.94	47.56	21.79	77.49
786	27.0	102.5	3	4	4	5	5	6	69.50	9.81	1543	941	442	61.00	32.00	11.33	3.86	46.31	29.59	1.80	0.81	3.75	1.15	1.57	29.32	47.00	21.89	76.71
787	28.5	101.5	3	4	4	5.5	5	7	112.00	17.83	2486	1534	721	61.75	33.50	11.63	3.78	43.11	32.96	1.78	0.85	4.05	1.19	1.31	29.47	47.04	22.43	76.92
788	28.5	101.0	3	4	4	5.5	5	6.5	50.50	8.72	1121	730	342	64.75	33.50	11.44	4.04	46.17	30.19	1.75	0.79	3.73	1.12	1.55	29.64	46.76	22.07	77.15
789	27.5	105.5	3	4	5	5.5	6	6	80.50	13.04	1787	1115	529	62.00	34.50	11.20	3.97	46.76	28.69	1.72	0.83	3.68	1.15	1.63	28.52	46.95	21.72	76.28
790	26.5	102.5	3	4	5	5	6	6.5	125.50	19.27	2786	1788	871	64.25	29.50	11.52	4.09	43.58	31.12	1.79	0.84	3.86	1.14	1.41	29.80	48.64	22.39	75.54
791	27.5	103.0	3	4	5	5.5	6	7	80.00	13.03	1776	1178	558	66.25	31.00	11.63	3.88	42.24	32.69	1.79	0.82	4.02	1.14	1.29	29.32	47.85	22.46	75.75
792	26.0	103.5	3	4	5	5	6	6.5	69.00	11.06	1532	1010	497	66.00	35.50	11.33	3.97	43.23	31.59	1.91	0.79	4.23	1.16	1.38	28.84	49.14	22.60	75.61
793	26.5	102.5	3	4	5	5.5	6	7	68.50	12.44	1521	915	427	60.00	30.50	11.54	3.82	44.10	31.59	1.81	0.79	3.96	1.14	1.40	31.96	46.61	22.29	76.48
794	26.5	102.5	3	4	5	5.5	6	7	60.50	9.85	1343	797	370	60.00	35.00	11.34	3.87	42.02	32.99	1.89	0.81	4.17	1.17	1.27	28.51	46.61	22.44	75.82
795	29.0	100.5	3	4	5	5.5	6	7	77.00	16.75	1709	1050	510	61.00	36.00	11.39	3.56	44.30	31.81	1.76	0.85	3.97	1.18	1.39	29.13	48.51	21.87	76.95
796	27.5	103.0	3	4	5	6	5.5	7	86.50	14.24	1920	1291	615	67.00	35.25	12.08	3.38	41.07	34.14	1.66	0.86	3.91	1.15	1.20	29.16	47.87	22.18	76.07
797	28.0	102.5	3	4	4	6	5.5	7	84.50	12.75	1876	1270	604	67.75	34.75	11.88	3.63	42.98	32.29	1.68	0.76	3.75	1.05	1.33	28.41	47.90	21.99	76.03
798	28.0	106.5	3	4	4	6	5.5	7	53.00	9.02	1177	759	370	65.00	32.50	11.91	3.62	42.00	32.82	1.75	0.80	3.98	1.12	1.28	28.44	47.93	22.39	75.62
799	28.5	106.5	3	4	4	6	5.5	7.5	55.50	12.23	1232	833	404	67.50	35.50	11.59	3.72	45.12	30.57	1.70	0.80	3.72	1.11	1.48	28.82	48.31	21.84	76.49
800	27.0	101.5	3	4	4	6	5.5	7	120.00	20.00	2664	1667	772	62.50	36.75	11.95	3.88	41.65	33.40	1.72	0.75	3.83	1.03	1.25	28.41	46.34	22.41	75.80
801	28.5	105.5	3	4	4	5.5	5.5	6.5	70.50	9.92	1565	976	476	62.00	37.50	11.80	3.43	43.60	31.68	1.70	0.88	3.81	1.27	1.38	29.19	48.43	22.01	76.15
802	28.5	106.5	3	4	4.5	5.5	6	6.5	106.50	17.75	2364	1650	789	69.75	39.75	11.42	3.89	45.03	30.56	1.74	0.82	3.82	1.15	1.47	28.50	48.03	22.02	76.41
803	27.0	110.0	3	4	4.5	5.5	6	6.5	123.00	16.61	2731	1901	874	69.50	37.50	11.71	3.73	43.05	32.88	1.67	0.79	3.70	1.10	1.31	30.86	45.99	21.90	76.72
804	28.0	102.5	3	4	4	5	6	6	166.00	17.60	3685	2676	1282	72.50	39.50	11.02	4.00	49.54	26.77	1.76	0.82	3.58	1.13	1.85	29.93	47.70	21.48	77.13
805	27.5	104.5	3	4	4.5	5.5	5.5	6.5	152.00	16.76	3374	2409	1123	71.25	38.00	9.10	3.51	66.00	14.08	1.67	0.95	3.23	1.29	4.70	32.85	46.81	18.81	81.03
806	27.5	103.5	3	4	4.5	5.5	5.5	7	155.00	22.14	3441	2270	1106	66.00	36.25	9.94	3.39	55.66	21.77	1.95	0.93	4.10	1.37	2.59	29.72	48.76	20.75	78.37
807	28.0	108.0	3	4	5	4	5	9	165.50	20.30	3674	2502	1148	68.25	39.50	10.23	3.92	50.70	26.15	1.70	1.01	4.01	1.33	1.94	33.07	46.00	21.20	77.87
808	29.5	106.5	3	3	4	5	6	7	175.00	19.43	3885	2685	1274	69.25	37.50	10.51	3.67	52.68	25.13	1.65	0.91	3.66	1.23	2.10	30.04	47.67	20.71	78.72
809	28.5	108.0	3	4	5	6	6	7	140.00	17.15	3108	2198	1018	70.25	40.25	10.54	3.47	48.88	28.16	1.80	0.95	4.17	1.40	1.74	33.51	46.48	21.38	77.99
810	28.5	111.5	2.5	2.5	4	5.5	6	7	177.50	22.20	3941	2937	1401	74.25	41.00	10.60	3.62	51.29	25.91	1.62	0.93	3.76	1.23	1.98	29.43	47.35	20.82	78.14

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811	29.5	111.0	2.5	3	4	6	6	7.5	199.00	26.75	4418	3194	1482	72.25	39.75	9.46	3.85	51.01	25.60	1.97	1.08	4.32	1.44	1.99	33.46	46.45	21.04	77.69
812	27.5	101.5	2.5	3.5	4	5	6	8	128.50	18.00	2853	2005	930	70.50	38.25	7.35	3.96	76.13	5.55	1.83	1.02	3.26	1.42	14.6	29.00	46.85	17.82	82.70
813	27.0	102.0	2.5	3	4	5.5	5.5	8	184.00	22.92	4085	2927	1391	71.50	39.00	8.44	3.67	67.15	11.97	1.95	0.95	3.61	1.31	5.95	33.83	47.63	18.99	80.07
814	28.5	104.5	3	3	4	5.5	5.5	7.5	213.50	22.48	4740	3403	1560	71.75	36.75	10.72	3.38	50.78	26.21	1.71	0.93	3.81	1.28	1.94	33.29	45.80	20.89	77.92
815	27.5	103.0	2	2	4	4	5	6	102.50	11.41	2276	1548	704	68.00	36.50	8.41	3.50	67.11	11.34	1.91	1.00	3.58	1.34	5.98	34.37	45.41	18.74	79.46
816	27.5	102.0	2	2	5	6	6	7.5	186.50	17.90	4140	2689	1212	64.75	36.00	8.02	4.41	70.17	8.46	2.15	0.88	3.71	1.23	8.55	31.20	45.07	19.52	79.50
GPBD-4	29.5	107.5	2	2	3	3	3	3	148.00	21.35	3286	2351	1094	71.50	40.25	10.97	3.09	50.20	26.32	1.79	1.03	3.82	1.41	1.91	29.11	46.49	21.07	77.55
GM4-3	31.0	110.5	2	2	3	3	3	3	132.50	18.35	2942	2147	1064	73.00	42.00	8.28	3.73	70.43	10.46	1.93	0.94	3.42	1.18	6.75	30.06	49.17	18.55	81.83
TMV-2	27.5	102.5	5	5	6	6.5	8	8.5	112.00	18.50	2486	1750	766	70.50	42.25	11.70	3.69	44.22	33.68	1.85	0.81	3.98	1.24	1.31	20.39	43.75	22.47	78.71
GM6-1	30.5	109.5	2	2	3	3	3	3	123.00	11.41	2731	1869	844	68.50	38.75	8.11	3.43	69.00	12.08	1.77	0.96	3.65	1.18	5.77	31.50	45.22	18.15	82.04
JL-24	28.5	107.0	5	5	6	6.5	8	8.5	157.00	14.81	3485	2524	1185	72.50	42.50	10.74	3.65	48.37	29.28	2.14	0.71	4.03	1.13	1.67	25.22	47.33	21.68	78.36
DH86	31.0	104.0	5	5.5	6	7	8	9	116.50	13.75	2586	1953	974	75.50	44.25	11.57	3.40	47.32	30.38	1.75	0.82	3.52	1.14	1.57	27.69	49.86	21.38	78.52
G2-52	29.5	110.5	2	2	3	3	3	3	170.50	22.75	3785	2706	1273	71.50	41.75	9.81	3.39	54.41	24.85	1.92	1.00	4.04	1.38	2.19	28.97	46.95	20.54	80.26
Mean	30.8	108.2	2.16	2.29	3.24	3.41	3.45	3.61	168.45	19.73	3740	2661	1243	69.91	38.53	10.43	3.48	52.08	25.31	1.67	0.96	3.80	1.31	2.16	32.17	46.60	20.70	78.34
C.V.	2.8	0.9	3.78	5.99	4.43	6.05	4.28	5.95	14.55	14.34	15	15	16	2.77	3.08	3.79	8.62	3.31	5.75	6.21	4.90	5.45	5.24	13.9	3.63	3.59	2.09	0.98
S.E.	0.6	0.7	0.06	0.10	0.10	0.15	0.10	0.15	17.34	2.00	385	287	138	1.37	0.84	0.28	0.21	1.22	1.03	0.07	0.03	0.15	0.05	0.21	0.83	1.18	0.31	0.54
C.D. 5%	1.7	1.8	0.16	0.27	0.28	0.40	0.29	0.42	48.12	5.55	1068	797	382	3.81	2.33	0.78	0.59	3.39	2.86	0.20	0.09	0.41	0.13	0.59	2.30	3.28	0.85	1.51
C.D. 1%	2.2	2.4	0.21	0.35	0.37	0.53	0.38	0.56	63.29	7.31	1405	1048	502	5.01	3.06	1.02	0.77	4.45	3.76	0.27	0.12	0.53	0.18	0.78	3.02	4.31	1.12	1.98

Appendix IV: Mean performance of selected recombinant inbred lines evaluated in *kharif* 2012

	50 % FL	DM	70 DAS R	70 DAS LLS	80 DAS R	80 DAS LLS	90 DAS R	90 DAS LLS	PW	PYH	KYP	OYH	SP	100 SM	YPP	OLE	LIN	O/ L	Protein	Oil
1	30.5	107.5	2	2	3	3	3	3	597.50	3319.4	2539.3	1211.3	76.50	39.25	24.95	56.72	22.49	2.54	33.24	47.70
5	31	109.5	2	2	3	3	3	3	475.00	2638.9	2058.1	986.9	78.00	41.50	21.65	56.81	22.02	2.58	34.98	47.95
10	31.5	110.5	2	2	3	3	3	3	502.00	2788.9	2105.4	1017.0	75.50	39.75	25.75	58.70	19.77	2.97	34.26	48.29
11	30	109	2	2	3	3	3	3	732.50	4069.4	3174.4	1523.5	78.00	41.00	26.75	57.31	21.15	2.71	35.05	47.96
20	30.5	110.5	2	2	3	3	3	3	688.50	3825.0	2878.4	1372.1	75.25	38.25	26.45	56.16	21.74	2.58	33.05	47.67
27	32	105.5	2	2	3	3	3	3	637.50	3541.7	2753.7	1287.6	77.75	37.75	22.30	55.36	24.24	2.29	32.81	46.76
37	32	111.5	5	4	7.5	7.5	8	8	414.00	2300.0	1598.7	765.0	69.50	42.75	17.20	40.63	34.03	1.19	33.27	47.83
39	30.5	102	3	2.5	5.5	3	6.5	4.5	638.50	3547.2	2386.1	1155.9	67.25	39.25	20.80	71.50	9.24	7.76	33.57	48.39
40	30	106.5	2	2	3	3	3	3	667.00	3705.6	2797.4	1304.7	75.50	39.25	30.25	53.86	23.29	2.31	32.90	46.64
41	30.5	108.5	2	2	3	3	3	3	610.50	3391.7	2569.2	1268.8	75.75	42.50	21.20	55.88	21.69	2.58	33.92	49.39
42	31	109.5	2	2	3	3	3	3	773.50	4297.2	3234.0	1539.2	75.25	41.75	28.20	55.73	23.48	2.38	31.70	47.59
44	31	110	2	2	3	3	3	3	692.00	3844.4	2931.1	1376.4	76.25	42.50	24.05	54.96	23.57	2.33	32.90	46.96
45	31.5	111.5	2	2	3	3	3	3	678.50	3769.4	2704.5	1275.5	71.75	38.50	24.90	57.09	21.92	2.61	33.46	47.16
48	30	111	2	2	3	3	3	3	694.00	3855.6	2921.2	1427.8	75.75	41.75	25.95	57.51	20.03	2.87	31.46	48.91
55	31	106.5	2	2	3	3	3	3	641.00	3561.1	2751.1	1312.0	77.25	40.50	22.85	54.76	24.22	2.26	33.09	47.67
57	30.5	108.5	2	2	3	3	3	3	651.00	3616.7	2829.8	1362.6	78.25	39.50	22.45	55.98	21.99	2.56	33.87	48.15
58	30	109.5	2	2	3	3	3	3	665.00	3694.4	2566.8	1231.8	69.50	35.75	27.75	54.71	23.87	2.29	34.18	47.98
60	30.5	110	2	2	3	3	3	3	859.50	4775.0	3677.0	1698.4	77.00	41.00	24.65	57.66	22.14	2.60	33.22	46.18
64	31.5	111.5	2	2	3	3	3	3	481.50	2675.0	2100.1	1032.3	78.50	41.50	13.80	54.04	24.86	2.17	32.92	49.18
79	30.5	111	2	2	3	3	3	3	824.00	4577.8	3467.9	1683.7	76.50	40.25	31.60	56.97	21.09	2.70	33.16	48.52
80	31.5	106.5	2	2	3	3	3	3	731.50	4063.9	3109.5	1473.2	76.50	41.25	24.75	56.03	23.20	2.42	33.34	47.36
82	30.5	108.5	2	2	3	3	3	3	819.50	4552.8	3584.3	1695.9	77.75	40.50	22.05	54.70	23.31	2.35	32.94	47.31
91	31	109.5	2	2	3	3	3	3	850.50	4725.0	3674.7	1783.0	77.75	41.25	24.25	56.47	22.12	2.55	32.11	48.46
92	30	110	2	2	3	3	3	3	920.00	5111.1	3935.7	1897.4	77.00	43.00	32.90	57.88	21.23	2.82	32.85	48.19

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101	31.5	111.5	2	2	3	3	3	3	486.00	2700.0	1816.7	881.2	67.25	36.75	16.40	55.23	24.03	2.30	34.31	48.48
102	30.5	111	2	2	3	3	3	3	690.50	3836.1	3040.7	1478.8	78.75	40.00	23.85	59.88	18.86	3.18	31.92	48.65
106	32	110	2	2	3	3	3	3	874.50	4858.3	3643.5	1751.8	75.50	38.75	28.80	54.44	23.67	2.30	32.00	48.10
108	31.5	111.5	2	2	3	3	3	3	908.00	5044.4	3706.7	1780.3	74.50	41.50	23.30	52.37	25.08	2.10	33.95	48.03
114	31	111	2	2	3	3	3	3	469.50	2608.3	1970.5	921.8	75.50	38.25	14.05	54.57	23.01	2.38	33.65	46.79
121	31.5	110	2	2	3	3	3	3	667.00	3705.6	2686.9	1273.3	72.50	37.75	18.30	54.45	23.83	2.28	34.18	47.37
130	30.5	111.5	2	2	3	3	3	3	823.00	4572.2	3520.9	1661.2	75.75	43.25	26.75	55.43	22.08	2.51	35.46	47.20
136	31	111	2	2	3	3	3	3	734.50	4080.6	3233.9	1554.1	79.25	45.00	29.35	55.75	22.54	2.48	32.01	48.08
150	32	110	2	2	3	3	3	3	728.00	4044.4	3062.7	1429.7	76.50	41.50	18.10	54.52	24.02	2.27	35.07	46.67
161	31	111.5	2	2	3	3	3	3	803.00	4461.1	3390.7	1585.4	76.00	40.75	20.45	57.51	19.67	2.95	33.73	46.76
162	31	111	2	2	3	3	3	3	1005.50	5586.1	4328.8	2104.8	77.50	39.25	33.45	55.10	23.04	2.39	33.01	48.63
168	30.5	110	2	2	3	3	3	3	661.50	3675.0	2618.3	1278.3	71.25	42.75	25.45	55.69	22.70	2.46	32.67	48.83
173	31.5	111.5	2	2	3	3	3	3	626.50	3480.6	2723.2	1271.8	78.50	40.50	28.00	54.89	22.72	2.42	33.88	46.68
175	31	111	2	2	3	3	3	3	547.00	3038.9	2195.6	1065.4	72.25	40.00	25.35	57.62	20.25	2.86	31.67	48.55
180	31.5	110	2	2	3	3	3	3	615.00	3416.7	2707.4	1258.2	79.25	42.75	21.10	58.24	21.16	2.75	33.31	46.48
183	32	111.5	2	2	3	3	3	3	519.50	2886.1	1825.7	864.8	63.25	38.75	23.20	56.05	22.19	2.55	33.14	47.34
185	31.5	111	2	2	3	3	3	3	658.00	3655.6	2825.4	1318.4	77.25	40.25	26.25	56.84	21.54	2.64	35.02	46.69
188	32	110	2	2	3	3	3	3	782.00	4344.4	3247.5	1513.9	74.75	38.00	25.35	57.12	20.52	2.79	33.27	46.62
191	31.5	111.5	2	2	3	3	3	3	636.00	3533.3	2730.5	1286.2	78.50	40.50	24.05	57.75	20.95	2.77	34.43	47.07
192	31.5	111	2	2	3	3	3	3	592.00	3288.9	2574.1	1197.4	78.25	41.75	20.25	57.06	21.80	2.62	34.65	46.52
195	31	110	2	2	3	3	3	3	838.00	4655.6	3642.4	1741.9	78.25	41.75	26.55	55.37	22.10	2.51	31.98	47.81
197	31	111.5	2	2	3	3	3	3	831.00	4616.7	3505.3	1628.7	76.00	39.50	28.65	60.34	18.25	3.33	35.02	46.47
198	32	111	2	2	3	3	3	3	732.00	4066.7	3121.0	1505.8	76.75	43.00	23.55	55.56	22.46	2.49	33.52	48.25
209	30.5	110	2	2	3	3	3	3	609.50	3386.1	2625.3	1212.0	77.50	42.00	25.90	55.69	23.13	2.41	32.20	46.14
212	31.5	111.5	2	2	3	3	3	3	777.00	4316.7	3432.1	1645.9	79.50	44.00	25.85	57.25	21.10	2.71	32.99	47.96
216	30.5	111	2	2	3	3	3	3	769.00	4272.2	3310.1	1549.9	77.50	41.75	29.55	53.88	24.12	2.24	33.25	46.82
223	31.5	110	2	2	3	3	3	3	584.50	3247.2	2541.3	1227.1	78.25	42.25	27.80	56.58	22.39	2.53	31.21	48.25
224	30.5	111.5	2	2	3	3	3	3	817.50	4541.7	3554.5	1687.9	78.25	42.50	21.85	56.93	21.44	2.66	32.68	47.47
228	31	111	2	2	3	3	3	3	637.00	3538.9	2529.0	1206.6	71.50	45.75	20.50	56.61	21.25	2.66	34.38	47.71

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230	30	110	2	2	3	3	3	3	718.00	3988.9	3082.3	1453.7	77.25	39.50	23.10	56.20	21.49	2.62	31.93	47.14
233	30.5	111.5	2	2	3	3	3	3	717.50	3986.1	3099.8	1460.9	77.75	43.75	24.70	57.54	21.03	2.74	33.50	47.14
236	31	105.5	5	3	7.5	5	8	6	117.00	650.0	384.8	187.9	59.00	41.50	16.60	55.19	25.17	2.19	31.46	49.03
237	31	106	5	3.5	7.5	6	8	7	231.00	1283.3	899.0	421.7	70.25	36.50	13.60	55.72	23.66	2.35	32.20	46.86
245	31	108.5	5	3	8	5	8	6	232.50	1291.7	755.4	357.7	58.50	35.25	14.00	54.36	24.46	2.24	29.59	47.35
252	30	108	2	2	3	3	3	3	640.50	3558.3	2766.8	1310.8	77.75	42.25	20.55	55.07	21.90	2.52	31.51	47.38
255	31	107.5	2	2	3	3	3	3	729.00	4050.0	3138.9	1477.2	77.50	43.50	25.65	53.69	23.83	2.26	32.30	47.07
266	30.5	109	2	2	3	3	3	3	832.50	4625.0	3595.8	1742.6	77.75	44.00	23.10	54.23	23.22	2.35	32.87	48.47
300	30.5	109.5	2	2	3	3	3	3	673.00	3738.9	2822.5	1364.8	75.50	40.25	24.15	52.65	25.55	2.06	33.18	48.36
321	32	111	2	2	3	3	3	3	665.00	3694.4	2705.2	1286.5	73.25	42.00	19.55	56.95	21.75	2.62	31.85	47.58
333	31	112	2	2	3	3	3	3	702.00	3900.0	2778.4	1321.0	71.25	38.00	23.30	54.56	24.18	2.27	33.10	47.55
355	31.5	109.5	2	2	3	3	3	3	820.00	4555.6	3131.3	1524.7	68.75	37.75	29.25	54.52	23.18	2.36	32.96	48.69
358	31	110	2	2	3	3	3	3	679.00	3772.2	2876.3	1420.6	76.25	41.50	20.85	56.02	21.97	2.56	34.97	49.37
416	30	111	2	2	3	3	3	3	562.50	3125.0	2326.7	1114.2	74.50	40.50	19.65	53.44	25.05	2.16	32.39	47.88
437	31.5	112	2	2	3	3	3	3	893.00	4961.1	3633.0	1750.6	73.25	43.00	27.95	56.64	21.61	2.63	33.64	48.19
439	32	109.5	2	2	3	3	3	3	808.50	4491.7	3381.7	1598.8	75.25	42.25	24.00	54.15	24.09	2.25	34.60	47.31
443	31.5	110	2	2	3	3	3	3	824.00	4577.8	3410.9	1603.1	74.50	40.00	25.45	61.69	16.80	3.78	35.36	47.02
449	31	111	2	2	3	3	3	3	746.50	4147.2	3276.2	1614.0	79.00	41.75	23.10	59.76	18.17	3.29	33.25	49.26
456	32	112	2	2	3	3	3	3	894.50	4969.4	3677.4	1762.2	74.00	41.50	26.75	57.62	21.70	2.66	32.39	47.92
486	32	109.5	2	2	3	3	3	3	794.00	4411.1	3263.8	1550.9	74.00	41.25	25.85	58.59	20.47	2.90	34.32	47.53
495	32	110	2	2	3	3	3	3	688.50	3825.0	2923.8	1418.9	76.50	42.75	23.35	55.16	21.85	2.56	17.17	48.46
515	31	111	2	2	3	3	3	3	608.50	3380.6	2493.8	1158.7	73.75	42.00	20.60	57.34	21.95	2.61	32.49	46.51
520	30.5	112	2	2	3	3	3	3	886.00	4922.2	3728.2	1764.6	75.75	40.50	26.85	55.83	22.29	2.51	33.46	47.33
526	32	109.5	2	2	3	3	3	3	755.50	4197.2	3296.6	1559.9	78.50	44.50	26.50	51.95	25.55	2.03	31.05	47.29
537	30.5	110	2	2	3	3	3	3	572.50	3180.6	2402.9	1167.1	75.50	37.50	19.30	56.15	22.69	2.48	34.52	48.67
566	31	111	2	2	3	3	3	3	820.00	4555.6	3405.8	1624.5	74.75	39.00	28.20	56.81	21.77	2.61	33.08	47.67
600	31.5	112	2	2	3	3	3	3	839.50	4663.9	3532.9	1699.1	75.75	41.75	26.25	58.86	19.59	3.02	31.06	48.08
718	30.5	109.5	2	2	3	3	3	3	913.50	5075.0	4009.0	1849.8	79.00	41.50	30.95	53.96	23.75	2.27	32.67	46.16
737	32	107.5	2	2	3	3	3	3	695.50	3863.9	2985.6	1384.8	78.25	44.25	22.70	57.70	20.16	2.87	33.20	46.39

Contd...

806	30.5	101.5	5	4	7.5	7.5	8	8	381.00	2116.7	1444.8	690.0	68.25	37.75	27.20	42.68	33.07	1.29	32.16	47.71
812	30.5	102	2	2	3	3	3	3	624.00	3466.7	2747.0	1288.2	79.25	45.00	24.55	75.14	5.54	13.59	32.32	46.89
813	30.5	104.5	2	2	3	3	3	3	512.50	2847.2	2015.1	959.8	70.75	38.75	26.70	50.58	26.11	1.94	33.04	47.61
108	30	103	2	2	5	6	6.5	7.5	605.50	3363.9	2422.0	1151.6	72.00	39.75	20.05	73.50	5.40	13.62	32.60	47.54
GPBD-4	31	107.5	2	2	3	3	3	3	617.50	3430.6	2504.3	1228.6	73.00	38.70	22.95	50.56	28.15	1.80	31.99	49.05
GM4-3	31	110.5	2	2	3	3	3	3	674.00	3744.4	2789.8	1327.1	74.50	39.95	23.60	72.21	8.72	8.38	34.68	47.56
tmv-2	28.5	102.5	5	5	6	6.5	8	8.5	536.00	2977.8	2099.7	997.2	70.50	42.25	18.50	44.22	33.68	1.31	28.42	47.52
gm6-1	31.5	109.5	2	2	3	3	3	3	616.00	3422.2	2345.8	1123.1	68.50	38.75	20.50	69.00	12.08	5.77	30.69	47.88
jl-24	29.5	107	5	5	6	6.5	8	8.5	535.00	2972.2	2154.5	1021.5	72.50	42.50	20.35	48.37	29.28	1.67	28.12	47.43
dh-86	32	104	5	5.5	6	7	8	9	343.00	1905.6	1438.8	684.7	75.50	44.25	13.75	47.32	30.38	1.57	26.91	47.58
g2-52	30.5	110.5	2	2	3	3	3	3	648.00	3600.0	2610.0	1314.7	72.50	41.75	22.75	55.20	24.85	2.30	32.33	50.37
Mean	30.99	109.44	2.27	2.19	3.39	3.32	3.51	3.46	675.47	3752.6	2821.3	1344.5	74.83	40.86	23.72	56.20	22.18	2.86	32.76	47.67
C.V.	2.64	1.04	6.46	5.82	4.73	6.26	2.97	6.01	3.13	3.0	3.8	5.2	2.53	3.72	7.68	2.70	6.55	10.69	6.59	3.01
S.E.	0.58	0.80	0.10	0.09	0.11	0.15	0.07	0.15	14.96	78.6	75.3	49.2	1.34	1.07	1.29	1.07	1.03	0.22	1.53	1.02
C.D. 5%	1.63	2.25	0.29	0.25	0.32	0.41	0.21	0.41	42.02	220.7	211.6	138.1	3.76	3.02	3.62	3.01	2.88	0.61	4.29	-
C.D. 1%	2.15	2.98	0.39	0.34	0.42	0.55	0.27	0.55	55.65	292.3	280.2	182.9	4.98	4.00	4.79	3.99	3.82	0.80	5.68	-

GENETIC ANALYSIS OF OIL QUALITY, YIELD AND ITS COMPONENTS IN RECOMBINANT INBRED LINES OF GROUNDNUT (*Arachis hypogaea* L.)

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2013

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ABSTRACT

An investigation on genetic analysis of oil quality, yield and its components in recombinant inbred lines of groundnut was undertaken during *kharif* 2011 and *kharif* 2012 at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad. The experimental material comprised of 816 RILs derived from GPBD-4 x GM 4-3 along with these two parents and five checks in 2011 *kharif* and 2012 *kharif* and 86 selected lines evaluated in 2012 *kharif*. These Recombinant Inbred Lines (RILs) were grown in a replicated yield trail by adopting RBD design and observations were recorded on eleven quantitative characters, eight fatty acids, two foliar diseases. Significant genetic variation was observed in Recombinant Inbred Lines (RILs) studied as evidenced by wider range and high PCV and GCV for most of the characters studied.

High heritability with high genetic advance were recorded for 100- kernel weight, pod yield, kernel yield, oil yield, oleic acid, linoleic acid, and O/L ratio. Character association study revealed positive association of pod weight per plant, days to 50 per cent flowering, days to maturity, oil content with pod yield. Oleic acid and linoleic acid were negatively and significantly correlated, whereas O/L ratio had significant positive correlation with oleic acid and significant negative correlation with linoleic acid.

The superior Recombinant Inbred lines identified for pod yield were RIL No. 723 (6549 kg/ha), 192 (6516 kg/ha), 600 (6371 kg/ha), 718 (6227 kg/ha), 750 (6005 kg/ha), for high oleic acid 38 (73.4%), 812 (73.3%), 39 (71.2%), 34 (71%), 816 (68.6%) all these lines are medium resistance (score 5-6).