

# **Annual Castor Research Workers' Group Meeting**

**May 15-17, 1998**

**University of Agricultural Sciences  
Bangalore**

## **PROCEEDINGS**



**(Indian Council of Agricultural Research)  
Directorate of Oilseeds Research  
Rajendranagar, Hyderabad-500 030**

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RAJENDRA NAGAR,  
HYDERABAD - 500 030.  
INDIA.

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Hebbal Campus, Bangalore**

## **P R O C E E D I N G S**

***(Indian Council of Agricultural Research)***  
**Directorate of Oilseeds Research**  
**Rajendranagar, Hyderabad-500 030**

## INTRODUCTORY SESSION

Date: 15.5.1998

Chairman: Dr N.B. Singh  
Asst. Director General (OP)

Rapporteurs: Dr G. Nagaraj  
Dr H.C. Pathak

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The introductory session started with welcome address by Dr B.R. Hegde, Director of Research, UAS, Bangalore. He reviewed the castor scenario in India and expressed his happiness over the encouraging position of castor and its foreign exchange earnings to the tune of Rs. 650 crores approximately. Castor has varied uses and has scope for its conversion to many value added products.

Dr C. Hanumantha Rao, presented Research Highlights for the year 1997-98. He explained the good position regarding maintenance and utilization of castor germplasm. Disease and pest resistant types have been identified. Development of male parents and superior male combiners are also being identified at different centres. Diversification of pistillate lines is also being carried out. There are many promising entries namely PCS-124, SKI-60, JI-240, JI-225, DCH-354, DCH-161, DCH-252, RHC-51, JHB-846, JI-20, SKI-131, RHC-51, JHB-846, JI-20, SKI-131, DCH-190, DCH-200, PCH-30, DCS-33, DCS-71, JI-104, DCH-171, DCH-178, SHB-642, JI-102 and SKI-80 under various stages of testing. The breeder seed of 32q produced against indent of 33q.

Agronomic management namely 75% RDF + 25% N through inorganic fertilisers gave good yields. The RDF could be reduced to 50% with azospirillum. Sowing immediately after onset of monsoon, weed free management, and optimum plant population gave significantly good yields under rainfed condition. A spacing of 150 x 75 cm with GCH-5 hybrid gave higher yields at Talod. Castor + Groundnut in 2:1 ratio gave higher yields in Sourashtra region. Orissa has good potential for castor cultivation under rice fallow situations. Dr Hanumantha Rao also outlined the pest and disease scenario and explained the research work being carried out on important pests and diseases. He cited the list of some lines identified as tolerant/resistant to important pests and disease. Soaking of seed for 24 hrs. in 1% carbendizim was helpful in reducing wilt incidence.

Dr Rao cited some areas which needed thrust in future programmes like resistance to wilt, *botrytis*, development of diverse pistillate lines and short duration varieties, training on seed production, cropping system (Rice fallow) and suitable extension machinery. Use of castor in ericulture and growing of castor in waste and marginal land with improved technology was also emphasized.

Dr Bisalaiah, V.C., UAS, detailed on the castor situation in India vis-a-vis world. With 67% area, India produces 70% of the total world's castor production. Gujarat with an average production of 2 tonnes/ha could achieve the highest productivity of 7 tonnes per ha. India exports 2.5 lakh tonnes of castor oil earning around Rs. 650 crores. Irrigated castor accounts for 83% of production while the rest viz. rainfed castor is produced from 50% of the area and hence there is need to improve the latter's productivity. Value added products from castor

needed maximum thrust. Instead of being an exporter of raw-material, India should develop industries and should export finished and high value added products made from castor oil. Research, extension and policy support together should aim at these aspects. Intensive cultivation of mono crop depletes the soil with respect to their nutrients. Upkeep of soil health is of prime importance. Perennial castor needs to be popularised in Wastelands along with its production technology. Seed village concept being advocated by DOR needed sufficient impetus.

Dr N.B. Singh, ADG (OP), ICAR, New Delhi explained that the increased oilseeds production, has resulted in catering the demands of vegetable oil consumers in our country and which is also responsible for the stability in their prices. Indian Prime Minister wanted doubling of agricultural production within the next 10 years. Dr Singh was optimistic that in castor, it can be easily achieved with the present strength in Research and Development. He emphasized that immediate attention is needed to increase the productivity in drylands and wilt, botrytis and smiloooper management and development of low cost technology should be taken as top most priority in the research agenda.

The session ended with a formal vote of thanks by Dr. K. Virupakshappa, Project Director, DOR, Hyderabad.

## SPECIAL TECHNICAL SESSION

Chairman: Dr N.B. Singh,  
ADG (OP), ICAR

Rapporteurs: Dr C. Lavanya  
Sri G.V. Ramanjaneyulu

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The chairman initiated the session with a brief introduction and invited participants from each state to reflect their views on "New and emerging issues in castor improvement".

Dr Pathak, from Gujarat initiated the discussion giving a brief back ground of castor cultivation in Gujarat, stating that productivity has raised from 300 to 2000 kg/ha due to improved technologies.

Wilt is the major problem, even wilt resistant hybrid like GCH-4 became susceptible in the areas where farmers are not implementing the scientific advises like -3 year Crop rotation using resistant variety, cultivation measures like uprooting and burning the wilted plants and non-destruction of stalks after final harvesting causing spread of inoculum. It is confirmed that wherever wilt incidence is high, nematode population is high. A NATP project proposed on nematodes may initiate further work on this aspect.

Under rainfed, castor crop is grown either as a sole crop or mixed intercrop with groundnut, where castor is sown one month after groundnut. After harvesting of groundnut, castor is irrigated and yields are high upto 2500kg/ha. But recently root rot is emerging as the major problem. Screening is taken up at Junagadh under natural conditions, sick plots under development. At S.K. Nagar, a well developed wilt sick plot is developed for screening.

From Karnataka, Joint Director of Agriculture, Hanumantha Reddy delineated the extension problems. Castor is grown in 0.24 lakh ha with a productivity around 1000 kg/ha. Castor is mostly grown as intercrop with Ragi or groundnut. As Ragi is a short duration crop, it is difficult to maintain castor after harvesting Rabi. Thus, there is a need to develop short duration variety or hybrid.

- A suitable castor variety to replace Redgram as intercrop with groundnut in southern parts of Karnataka
- A determinate type is suitable for one picking for irrigated areas
- Suitable varieties for waste lands
- Suitable IPM package to demonstrate.

K. Sree Rangam, Joint Director of Agriculture, Tamilnadu, explained about the castor situations in the state where mostly it is grown as an intercrop with groundnut. After the harvest of groundnut castor takes advantage of the N.E. monsoon and gives good yield. But of late, capsule borer and *Macrophomena* root rot *Semiooper* are problems. So resistant varieties are to be developed to overcome these problems. Drought resistance in initial stages is also an important quality. As far as agronomic practices are concerned, farmers apply fertilizer only to groundnut and not the castor. So there is a need to develop nutrient management package to this

situation. In Erode district farmers have evolved their own way of applying 50-100 g/tree in basin around for last 6-7 years and getting good yield. He stressed the importance of developing suitable varieties rather than hybrids as castor farmers are generally poor and cannot afford for hybrids.

Dr Patel, Asst. Director, Directorate of Oilseed Development raised a question to analyze why many of the older hybrids like GAUCH-1 are still in demand even after many newer ones are released. Dr Pathak explained the desirable character of GAUCH-1 like earliness, triple bloom and good yield where wilt is not a problem.

Dr R.R.Gupta, from CSAUA&T, Kanpur raised the issues of castor cultivations in UP. In Kanpur area castor is grown as a sole crop in kharif as farmers take up wheat in Rabi, a short duration castor variety/hybrid is needed to suite the situation. In some areas where castor and chilli are grown as intercrop medium duration castor is needed.

Dr Satyanarayana, from RARS, Palem described the situation in AP., Castor is cultivated in Mahaboobnagar, Nalgonda, Ranga Reddy and parts of Prakasam by resource constraint, marginal & small farmers. Castor is generally sown late as farmers wait for monsoon. Major problems are Red hairy caterpillar, spodoptera, semilooper, Botrytis and wilt, for which IPM/IDM packages are to be demonstrated. Castor is even taken up in irrigated rabi conditions and suitable packages need to be developed for non-conventional and irrigated areas.

The chairman commented that as water is already scarce, it may not be wise to go for rabi castor. Dr Hanumantha Rao intervened saying that castor is a contingent crop, if rabi paddy cannot be taken up due to failure monsoon. Dr Jagdish from Navbharat Seeds reported that Navbharat has sold 150 tons of hybrid seed in AP, GCH-4 in Prakasam, GAUCH-1 in Telangana region. A farmer from Vinukonda, Prakasam district got 10q/ha, under rainfed conditions.

- Main problem is *Botrytis* due to regular cyclones in Oct/Nov.
- Prophylactic spray of Bavistin is not feasible under continuous rains
- Short duration varieties are needed.

Dr S.K. Chakrabarthi from DOR, Hyderabad highlighted the following issues:

- Plant type has to be conceptualised for a short duration variety or hybrid with a **single stem**.
- No research has been done on castor plant type in AICORPO trials
- Desirable plant type for single pickings/mechanical harvesting should be of **single spike** nature.
- Shuttle breeding has to be initiated
- Confusion about screening techniques for wilt **complex**
- Necessity of a nematologist under AICORPO
- DOR being a coordinating centre, depends on data from demonstrations which often is not received from AICORPO centres

The chairman assured that a Nematologist can be posted in an identified centre in 9th plan.

Dr R.M. Shah, from a **Pvt.Seed Company Sagar Laxmi Seeds** stressed the importance and use of germplasm collection

- \* Diverse resource of pistillate base to be used
- \* Physiological parameters involved in maintenance of pistillate lines to be identified
- \* Chemicals which can induce pistillate nature to be identified
- \* Environmental conditions connected with development of male flowers to be studied.

The chairman suggested a multidisciplinary team of plant breeders, physiologists and agronomists to work on sex expression in castor.

Dr Ramesh, physiologist, from RARS, Palem explained that in Red Chalka soils due to sudden build up of moisture after heavy rains, plants cannot sustain moisture and produce more biomass, excessive vegetative growth and male flowers. The question of whether increased biomass leads to production of more male flowers is to be studied.

Dr D.S. Rao, Agronomist from Mandore highlighted problems of Rajasthan

- \* Castor is seen as cash crop in nontraditional areas but quality seed is not available
- \* Chemical weed control in Rabi castor to control chinnapodium
- \* Short duration variety for double & multiple croppings is needed
- \* In unfavourable conditions like cloudy weather, high wind velocity, **pistillate lines are** producing more no. of male than female flowers.
- \* Research on castor is to be concentrated in South eastern parts of Rajasthan

Dr Hanumantha Rao, intervened that as southern Rajasthan is under influence of Gujarat, medium duration varieties and hybrids are sufficient. In Eastor region, technology has to be developed. Castor is grown as wind break crop in summer groundnut but no information is available about the technology.

Dr T.G. Nageshwar Rao, Sr. Plant Pathologist, DOR, explained the disease situation in castor. Breakdown of wilt resistance in GCH-4 may be due to existence of race pattern in *Fusarium oxysporum*, perfect screening technologies were developed for wilt but now they have to look in to races also. *Botrytis* has become a major problem in recent years. A propylkatic spray of carbandizim is helpful. As rains were less, the disease incidence was less this year, so no recommendation could be evolved. Intensive studies are required to arrive at a recommendation. Screening the germplasm at hot spots like. Chintapalli, Jagadapur, Baptla, Semiliguda is taken up.

Dr Seetharam, Project Coordinantor, Small Millets mentioned that castor is mostly grown as intercrop with Ragi. The productivity of Ragi has gone up in the last 10 years. So farmers are not going for castor. As the oil extraction process is different in castor, the small productions from intercropping is not economical from farmers. As there is no programme to evaluate varieties for such situations, participatory plant Breeding may be taken up to evolve location specific suitable varieties. Educate the farmer to take up rotation of hybrids with comparable yields so that races are not developed to wilt Fungi.

The Chairman summarized the morning session and cocluded that early duration and medium duration varieties to suit different cropping systems are to be developed. Studies to analyse the



reasons why the older hybrids are still popular are to be taken up. In non-conventional or newer areas identify which maturing group fits into the cropping systems. The message of crop rotation has to be popularised especially in Gujarat as the crop may crash and the situations like cotton farmers of AP may arise any time.

The afternoon session is convened to discuss "Seed production problems". Dr C. Hanumantha Rao invited Dr Pathak to envisage the reasons

1. Rejection of 50% of certified seed
2. Non-adoption of modified method
3. Increase in isolation distance

Dr Pathak presented the following reasons

1. Use of unauthenticated parental seeds
2. Laxity in primary roguing of offtypes
3. Improper and defective roguing of monoecious in female line
4. Placement of rogued plants in the vicinity of seed production plots
5. Non removal of stray or wild castor plants within isolation
6. Non-adoption of staggered sowing of female and male lines of GCH-2 and GCH-4
7. Non-planting of border male rows
8. Improper row proportion ratio
9. Non-adoption of nutrient and pest management practices

**Foundation seed of female line**

1. Inadequate isolation distance
2. Laxity in primary roguing of offtypes

Dr C. Hanumantha Rao suggested for adequate training to seed growers and on the spot guidance before flowering for primary roguing.

- \* Modified method is followed to some extent but farmers are afraid of rejection and thus not coming forward

**Other suggestions included:**

1. A male line with abundant pollen producing capacity needed
2. A non-revertant female line to overcome the problem of maintenance of GCH-4 female line which is a late flowering type and dwarf
3. As the yield of male is higher than hybrid itself, some times farmers irrigate the field, increasing the pistillateness and reducing female seed.

Dr C. Hanumantha Rao highlighted the problems of AP

1. Though Breeder's Seed is adequate, seed producing agencies are not producing enough foundation and certified seed.
2. At APSSDC farm, Kurnool the technical personnel were not properly trained and farmers are unaware of seed production technology.

3. If government agencies are **not** interested, KVKs, NGOs etc. should be encouraged to take up seed production.

Dr N.B. Singh commented that the absence of govt. seed production agencies has to be taken seriously and the issue has to be taken up at higher level, writing letter to secretary, Ministry of Agriculture.

#### **FRONTLINE DEMONSTRATIONS:**

Report was presented by G.V. Ramanjaneyulu, scientist, Extension from DOR. Dr N.B. Singh offered to provide financial assistance to any number of frontline demonstrations to popularise improved technologies. In addition to the regular seven centres, 20 additional centres came forward voluntarily to conduct demonstrations.

Dr Dattatreya, from zonal co-ordinating unit of CRIDA, presented the data from demonstrations conducted at Nalgonda, Mahaboobnagar and Ranga Reddy districts.

The chairman while concluding the session pointed out that

1. Good hybrids are to be popularised
2. Standardise seed production technology
3. Regular training and constant interaction with seed producers
4. Centres to be identified for new areas like North East region.

The session ended with vote of thanks from the Project Coordinator (Castor).

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# PLANT BREEDING

**Date: May 15-16, 1998**

**Chairman :** Dr. A. Seetharam  
Project Coordinator (Millets)

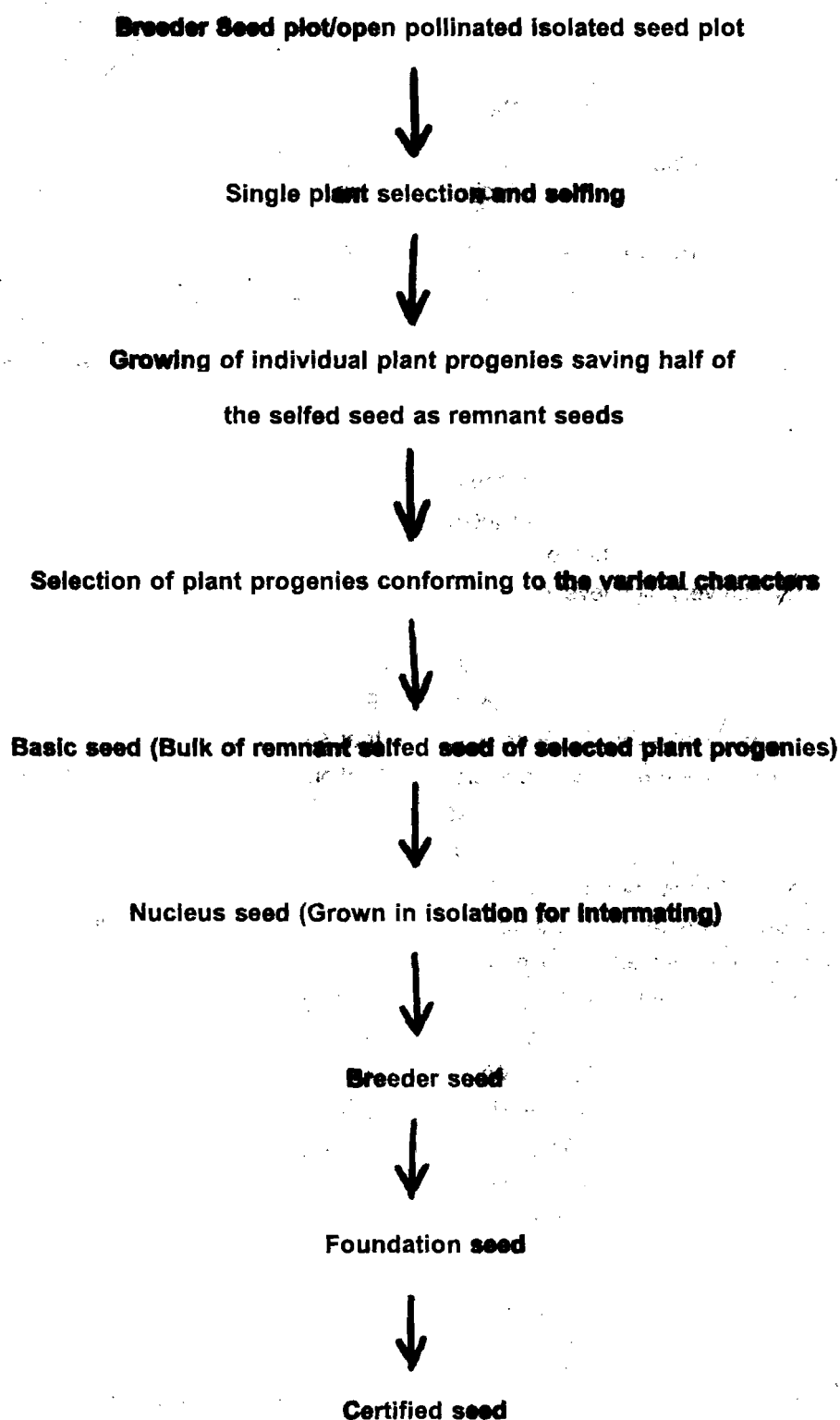
**Rapporteurs:** 1. Dr. S.K. Chakrabarty  
2. Dr. T. Ramesh

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The session started with the presentation of progress of work on castor germplasm by Dr. C.Lavanya, Scientist (Plant Breeding), DOR. The promising accessions for seed yield and economic characters were presented. A total of 1600 accessions were maintained last year in the GMU (Castor), DOR. In this context, the chairman enquired the maintenance methodology of the germplasms collected from different locations. He started the discussion with the question that whether selfing is the right approach for germplasm maintenance since castor is a monotypic genus with very high level of cross pollination. It was stated that through selfing and selection for particular characters there is likelihood of genetic drift and it is desirable to maintain the germplasm without losing its diversity. The similar arguments were made by Dr.K.Virupakshappa, Project Director, DOR; Dr. R.R. Gupta of Kanpur and Dr. R.M.Shah of Sagar Laxmi Seeds. However, Dr. Pathak opined that selfing is the way of maintaining the germplasm since there is large amount of cross pollination. Dr. S.K. Chakrabarty questioned about the characterization of germplasm accessions for morphological characters if maintained by sibmating. After a thorough in-depth discussion, the chairman advised to collect adequate no. of plants during expedition in each of the accession. There is every likelihood that the collected germplasm population would be highly homogeneous. Sibmating of 25-30 plants in each accession is to be carried out. He also told to look for variability within a sample. If it is low, he suggested to go for selfing. The chairman also suggested that genepool for useful economic and agronomic characters may be made. The Project Director stressed on generating genepools for resistance to diseases. While questioned about the efforts to be made for maintaining germplasm accessions the chairman suggested that it is possible to reduce the multiplication frequency to once in five years or so since viability of castor is not lost even upto five or six years. So far the characterization or documentation is concerned the curators may do it with the help of the defined descriptors.

The Project Coordinator (Castor) requested the concerned scientists of Kanpur and Mandor centres to pass on the collected germplasm accessions to GMU (Castor), Hyderabad. Private Companies collecting germplasms from other countries were requested to pass the same to the GMU (Castor), Hyderabad.

The Project Coordinator (Castor) raised the issue of varietal maintenance procedures in castor and initiated a discussion. Dr R.'C. Pathak, described the procedures in details. The chairman remarked that in the absence of inbreeding depression in the crop selfing may be followed at regular intervals to maintain the basic seed stocks. However, progeny testing and selection of the best progenies are highly desirable. The scheme of varietal maintenance is given in the following page.



The chairman enquired about the extent of cross pollination in castor. It was told that the extent of cross pollination depends on the proportion of male and female flowers in a particular genotype, wind direction etc. Necessary studies on the extent of cross pollination with varieties having different ratios of male and femaleness were suggested.

The presentation was followed by the respective scientists. The broad recommendations/remarks (centre wise) are given below:

**a) Sandhiyur**

- i) Breeding objectives for the particular castor growing situations/areas are to be defined.
- ii) A review is needed for shifting the centre from Sandhiyur to Attiyur. Alternatively, the trials yet to be conducted for 1998-99 at Payyur.

**b) Hiriyur**

- i) In view of failure of groundnut/cotton in the last year, large number of demonstrations with castor are to be conducted in Chitradurga and Hasan districts.
- ii) The demonstrations may also be conducted in intercropping situation with ragi
- iii) The post of Entomologist may be filled up soon.

**c) Junagadh**

- i) A root rot sick plot is to be made soon
- ii) Junagadh centre may cater to the needs of Bachao area of Gujarat since it is one of the potential castor growing areas.

**d) Palem**

- i) Characterisation and stabilization of the variety PCS-4 should be done following the appropriate varietal maintenance breeding methodology.
- ii) A regular Breeder, Agronomist and a Technician may be appointed soon

**e) S.K. Nagar**

- i) S.K. Nagar centre will conduct screening of parental materials, varieties and hybrids of AICORPO for nematodes also.
- ii) The promising pistillate lines may be shared with other centres.

**f) DOR, Hyderabad**

- i) There is a need to screen the parental materials for nematode also.
- ii) A new breeding programme for *botrytis* resistance may be initiated.

**g) Kanpur**

- i) To take up trials in intercropping situation with chilli to identify suitable genotype with the help of Agronomist of the centre.

At the end the chairman has made the following remarks:

1. Sibmating should be carried out for germplasm maintenance
2. Gene pools are to be developed for certain economic characters and biotic stresses.

3. Maintenance breeding methodology for varieties is to be followed by all the breeders.
4. Introgression of exotic germplasms in crop improvement programmes be initiated to break the yield barriers, if any. This should be started at the lead centres.
5. Early segregating materials may be supplied to other centres viz. Hiriyur, Kanpur, Sandhiyur etc. by DOR, S.K. Nagar and Junagadh.
6. Research is to be initiated on oil quality. DOR having all the facilities can take the lead.
7. Biotic stresses, particularly wilt being severe and alarming and no hybrid remains resistant for more than five years, there is a need to follow a continuous resistance breeding programme.
8. It is desirable to rotate hybrids with diverse wilt resistance over the years.
9. Mono-spike varieties suitable for a specific situation may be bred for.

The chairman expressed his happiness with the works made by scientists of S.K. Nagar, DOR, Junagadh and Palem. The session ended with a vote of thanks by the Project Coordinator (Castor).

## 2.5. Coordinated varietal/hybrid trial

### i) Initial Varietal/hybrid Trial (Short duration)

Entries: 14+4 (checks); Design: R.B.D. Replications: **Three**  
 Plot size: Gross: 3.6x5.4 (RF&IR) Net: **1.8 x4.5 (RF&IR)**  
 Spacing: 90 x 45 cm  
 Fertilizer (kg/ha)

Rainfed NPK (40:40:0); Irrigated **NPK (75:50:0)**

#### Centres:

Rainfed :		Irrigated
Palem	Mallepally	S.K. Nagar
Hiriyur	Raichur	Junagadh
Sandhiyur	DOR, Hyd	Jalna
Mandor		Aurangabad
Bhavanipatna		

Seed requirement : 1.5 kg/entry

Entry	Pedigree	Sponsoring centre
1. JI-228	(SKP-92 x JI-83) x (JP-65 x JI-81)	Junagadh
2. JI-258	(SKP-92xJI-85) x (VP-1 x EC-97704)	Junagadh
3. SKI-229	(SKP-52xSH-72)	S.K. Nagar
4. 7911	To be given	Kanpur
5. JHB-851	(SKP-1xJI-122)	Junagadh
6. JHB-853	(SKP-13xJI-122)	Junagadh
7. JHB-858	(JP-77xJI-244)	Junagadh
8. SHB-709	(SKP-1xSKI-147)	S.K.Nagar
9. SHB-710	(SKP-49xSKI150)	S.K.Nagar
10. SHB-712	(SKP-1xSKI-131)	S.K. Nagar
11. RHC-63	(VP-1xMI-63)	Mandore
12. NCAH-16	NCAP-1xNC-29)	Nathseeds, Aurangabad
13. NCAH-27	(NCAP-2xNC-30)	Nathseeds, Aurangabad
14. Sagar-14	To be given	Sagar Laxmi seeds
15. DCH-32		
16. GCH-4		
17. DCS-9		
18. LC.		

### ii) Initial Varietal/Hybrid Trial (Medium duration)

Entries: 17+4 (checks) Design: R.B.D. Replications: **Three**  
 Plot size: Gross Net  
 3.6x7.2m (RF&IR) 1.8x6.0m (IR)  
 1.8x6.3m (RF)  
 Spacing: 90x60m (IR); 90 x 45 m (RF)  
 Fertilizers (kg/ha) : Rainfed NPK (40:40:00); Irrigated : NPK (75:50:0)

**Centres:****Rainfed**

Palem  
Hiriyur  
Sandhiyur  
Bangalore

**Irrigated**

S.K. Nagar,  
Junagadh,  
Jalna,  
Mandore,  
Baroda  
Anand  
Sumeerpur  
Talod

Seed requirement : 1.5 kg/entry

Entry	Pedigree	Sponsoring centre
1. JI-259	(SKP-25 x JI-84) x JI-91	Junagadh
2. JI-260	(SKP-4xJH-124) xCO-1	Junagadh
3. SKI-232	(SKI-18xJM-6)	S.K. Nagar
4. SKI-233	(SKP-9xJM-6)	S.K.Nagarr
5. CCI	To be given	Kanpur
6. Chandraprabha	-	Kanpur
7. JHB-864	(GeetaxJI-102)	Junagadh
8. JHB-862	(GeetaxJI 220)	Junagadh
9. SHB-702	(SKP-108xDCS-9)	S.K.Nagar
10. SHB-649	(SKP-72xSKI-147)	S.K. Nagar
11. SHB-632	(Geeta x SKI-150)	S.K. Nagar
12. SHB-690	(SKP-72 x SKI-158)	S.K. Nagar
13. SHB-706	(SKP-72 x RG-737)	S.K. Nagar
14. Jayant-4	VP-1 x -	Jayant Oil Mills, Baroda
15. Jayant-5	VP-1 x -	-do-
16. Sagar-16	To be given	Sagar Laxmi seeds,Aurangabad
GCH-5	-	
GCH-4	-	
48-1	-	
L.C.	-	

**iii) Advanced Varletal/Hybrid Trial-I (Short duration)**

Entries: 8 + 4 (checks)  
Plot size

Design: RBD  
Gross  
5.4x5.4.m (RF&IR)

Repl: Three  
Net  
3.6 x 4.5m(RF&IR)

Spacing: 90 x 45 cm

Fertilizer: Rainfed - NPK (40:40:00) Irrigated - NPK (75:50:00)

**Centres****Rainfed**

1. Palem  
2. Hiriyur  
3. Sandhiyur  
4. DOR, Hyd.  
5. Mandore  
6. Raichur  
7. Targhadia  
8. Bhavanipatna  
9. Kanpur  
10. Dholi

**Irrigated**

1. S.K. Nagar  
2. Junagadh  
3. Jalna  
4. Baroda  
5. Aurangabad

**KVK\***

1. Gaddipalli  
2. Jabua (IR)  
3. Darbanga  
4. Ganjam  
6. Sirohi (IR)

**Dryland (Rainfed)\***

1. Akola  
2. Solapur  
3. Bijapur



Seed requirement: 3 kg/entry

\* plot size: Gross                      Net  
3.6 x 5.4m ;                      1.8 x 4.5m

Entry	Pedigree	Sponsoring Centre
1. JBH-832	(SKP-1xJI-244)	Junagadh
2. DCH-161	(M-584xDCS-9)	DOR, Hyd.
3. PCS-124	(PPLx4x48-1)	Palem
4. SKI-160	(SKP-4xSPS-43-2)x (SKP-7xSKI-6)	S.K.Nagar
5. JI-240	(VP-1x48-1)x JH-130	Junagadh
6. JI-225	(JP-65xJI-91)x48-1	Junagadh
7. JHB-829	(SKP-60xJI-147)	Junagadh
8. DCH-151	M-571 x 48-1	DOR, Hyd.
9. DCH-32		
10. GCH-4		
11. DCS-9		
12. L.C.		

#### IV) Advanced Varietal/Hybrid Trial-I (Medium duration)

Entries: 6+4 (checks)                      Design: RBD                      Replications: 3

Plot size: Gross: 5.0 x 7.2 m (RF & IR)                      Net : 3.6 x 6.0 m (IR)

Spacing: 90 x 60 cm (IR)                      3.6 x 6.3 m (RF)

90 x 45 cm (RF)

Fertiliser (kg/ha)

Rainfed - NPK (40:40:00)                      Irrigated - NPK (75:50:0)

#### Centres:

##### Rainfed

Palem  
Hiriyur  
Sandhiyur  
Darsi

##### Irrigated

S.K.Nagar                      Jalna  
Junagadh                      Talod  
Anand                      Sumerpur  
Mandore                      Aurangabad  
Kanpur (with intercropping with chilli)

Seed requirement: 3 kg/entry

Entry	Parentage	Supplying centre
JI-220	(VP-1 x 48-1)x (VP-1xTMV-5)	Junagadh
SKI-131	VP-1 x SKP-4	S.K.Nagar
RHC-51	VP-1 x MI-51	Mandore
JHB-846	Geeta x JI-122	Junagadh
JHB-831	JP-65xJI-106	Junagadh
DCH-158	M-568x48-1	DOR
GCH-5	-	-
GCH-4	-	-
48-1	-	-
L.C.		

## V) Advanced Varietal/Hybrid Trial-II (short duration)

Entries: 6+4 (checks) Design: RBD Replications: 4  
Plot size: Gross: 9.0 x 5.4 m (RF & IR) Net : 7.2 x 4.5 m (RF & IR)  
Spacing: 90 x 45 cm  
Fertiliser (kg/ha)  
Rainfed - NPK (40:40:0) Irrigated - NPK (75:50:0)

### Centres:

Rainfed	Irrigated	Dryland centres	
1. Palem	S.K.Nagar	Solapur	Jahbua
2. Sandhiyur	Junagadh	Akola	Phulbani
3. Mandore	Jalna	Dholi	Chintamani
4. Bhavanipatna	Baroda	Kanpur	Sabour
5. Raichur	Aurangbad	Kutch	Jhansi
6. Hiriyur	Talod	Bijapur	
7. DOR		Ganjam	
8. Tanghadia		Sirohi	
9. Darsi		Gaddipalli	

Seed requirement: 5.5 kg/entry

Entry	Parentage	Sponsoring centre
DCH-190	DPC-10 x DCS-9	DOR
DCH-200	DPC-9 x Aruna	DOR
DCH-171	M-619 x DCS-9	DOR
PCH-30	VP-1 x RC-335	Palem
DCS-71	Sel. from 217-1-9-4	DOR
JI-102	VP-1 x SH-1	Junagadh
DCH-32		
GCH-4		
DCS-9		
LC		

\* Plot size: (only for dryland centres)

Gross: 3.6 x 5.4m; Net: 1.8 x 4.5 m

## VI) Advanced Varietal/Hybrid Trial-II (Medium duration)

Entries: 4+4 (checks) Design: RBD Replications: 4  
Plot size: 9.0 x 7.2 m (RF & IR), 7.2 x 6.0 m (IR), **7.2 x 6.3 (RF)**  
Spacing: 90 x 60 cm (IR) 90 x 45 cm (RF)  
Fertiliser (kg/ha)  
Irrigated - NPK (40:40:0) Rainfed - NPK (75:50:0)

**Centres:****Rainfed**

Palem  
Hiriyur  
Sandhiyur  
Bangalore/Chintamani

**Irrigated**

S.K.Nagar  
Junagadh  
Jalna  
Mandore

Talod  
Anand  
Darsi  
Sumerpur

Aurangabad  
Kanpur\*  
Dholi\*

\* Under intercropping situation with chilli

Seed requirement: 5 kg/entry

Entry	Parentage	Supplying centre
JI-122	VP-1 x SH-2	Junagadh
JI-104	VP-1 x SH-1	Junagadh
SHB-640	SKP-72 x 48-1	S.K.Nagar
SHB-633	SKP-72 x JI-99	S.K.Nagar
48-1	-	-
GCH-4	-	-
GCH-5	-	-
L.C.	-	-

An evaluation trial consisting of early maturing varieties and hybrids will be conducted in rice fallow situation (after harvesting of paddy) in the following centres:

1. Cuttack,
2. Hazaribag,
3. Bhavanipatna

Note: The following entries will not be tested in the year 1998-99 due to shortage of seeds:

1. DCS -33 promoted to AVHT-II (SD)
2. DCS-57 promoted to AVHT-I (MD)
3. DCH-354 promoted to AVHT-I (SD)
4. DCH-252 promoted to AVHT-I (SD)

All the centres l/c are requested to supply the appropriate quantity of seed materials including state local checks (variety/hybrid) as specified against each trial latest by 30th of May, 1998 positively to the Project Coordinator (Castor), DOR, DOR, Rajendranagar, Hyderabad-500 030.

The following characters are to be recorded in all the trials:

**1. Seed yield per net plot in both rainfed and irrigated conditions at:**

- i) 90, 120, 150, 180 days after sowing for short duration trials.
- ii) 90, 120, 150, 180, 210 days after sowing for medium duration trials.

**2. Ancillary characters to be recorded in all replications:**

1. Initial plant stand (net plot) '000/ha,
2. Final plant stand (net plot) '000/ha
3. Days to 50% flowering of primary raceme,
4. Days to maturity of primary spike
5. Av. nodes to primary raceme,
6. Height upto primary raceme
7. Av. number of effective spikes per plant at the time of last picking.
8. Reaction to diseases and pests.,
9. Hundred seed weight (gm)
10. Oil content (%)

## Breeder seed production

Breeder seed production to be taken by the following centres:

Line/Variety	Quantity (kg)	Producing Breeder
VP-1	450	Research Scientist (C&M) GAU, S.K.Nagar-385 506
48-1	200	
Geetha	75	
SH-72	50	
VI-9	50	
LRES-17	150	Scientist Incharge (BSP,DOR, Hyd.
DCS-5	75	
DCS-9	350	
Aruna	300	Jr.Breeder (Castor)UAS (Dharwad), Raichur Sr.Scientist (OS), RARS, Palem
Aruna	200	
Total:	1700	

## List of Research Centres for Seed supply

1. Research Scientist (OS), GAU, Oilseeds Research Station, Junagadh-362 001 (Gujarat)
2. Research Scientist (Castor), Main Castor/Mustard Res. station, GAU, S.K.Nagar, Dantiwada-385 506 (Gujarat)
3. Sr. Scientist (OS), Regional Agril. Res. Station, ANGRAU, Palem-509 215, mahaboobnagar Dist (A.P.)
4. Jr.Breeder (Castor), Reg. Res. Stn. P.B.No.24, Raichur - 504 101 (Karnataka)
5. Prof. & Head, Oilseeds Experiment station, TNAU, Sandhiyur, Mallur (via), Salem Dist. 603 203 (TN).
6. Jr.Breeder (Castor), Agril. Res. Stn. Hiriyur-572 143 (Chitradurga Dist.), Karnataka
7. Sr.Scientist (Oilseeds), Agril. Res. Station, RAU, Mandore-342 304, Jodhpur Dist (Raj.)
8. Plant Scientist (OS), Univ. of Agril.Sciences, GKV Campus, Bangalore-560 065.
9. Managing Director, MAHYCO, P.B.No.27, Jalna-431 203 (MS)
10. Scientist (Castor), Directorate of Oilseeds Res. Rajendranagar, Hyd-30.
11. Associate Dir. of Res., Reg. Res.Station, Bhavanipatna-766 001, Kalahandi Dist (Orissa)
12. Associate Dir. of Res. Reg. Res. Station, ANGRAU, Anantapur (A.P.)
13. Breeder & Head, agril. Res. Station, Darsi-523 027 (Prakasam Dist.)
14. Castor Breeder, Nath Seeds Ltd., Nath House Nath Road, P.B.No.318, Aurangabad-431 005 (MS)
15. Dr.S.A.Patel, Res. scientist (Veg.), GAU, Anand-388 110 Dist. Kheda
16. Res. Scientist, Jayant Oil Mills, 480-482, GIDC Makarpura, Baroda-390 010
17. Assoc. Res. Scientist, Agril. Res. Station, GAU, Talod, Dist. Sabarkantha (Guj.)
18. The Horticultural Arid Horticultural Res. Station, ANGRAU, Mallepally-508 243, Dist. Nalgonda (A.P.)
19. Chief Scientist, AICRIPDA, Targadia, Rajkot, Dist (Guj.)
20. Dr.R.R.Gupta, Sr.Scientist, Dept. of Gen. & Pl.Br., CSAUA&T, Kanpur-208 002 (UP)
21. Dr.B.T.S.Murty, Sr. Scientist (Agro.), Dept. of Agronomy, Central Rice Res. Instt. Cuttack-753 006 (Orissa)
22. Chief Scientist, ACRIPDA, Krishak Bhavan, Solapur-413 002
23. Chief scientist, ACRIPDA, PKV, Krishinagar, Akola-444 104
24. Officer Incharge, Rajasthan agril. University, Sumerpur (Rajasthan)
25. Chief Training Officer, krishi Vigyan Kendra, Bharari, Jhansi
26. CTO, Krishi Vigyan Kendra, Rajgarh Naka, Jhabua (MP) 457 661.
27. Chief Scientist, ACRIPDA, UAS (Dharwad), Bijapur
28. Chief Training Organiser, KVK, Gaddipalli (A.P.)29.Chief Train.Org. KVK, Ganjan (Orissa)
30. Chief Training Organiser, KVK, Sirohi (Rajasthan)
31. Chief Training Organiser, KVK, Darbhanga (Bihar)

# AGRONOMY

Date: 16-5-98

Chairman: Dr D.M. Hegde  
Project Coordinator (Safflower)

Rapporteurs: Dr C.V. Raghavaiah  
Dr S. Manickam

The Project Coordinator (Castor) welcomed the delegates and introduced the chairman Dr.D.M. Hegde to the participants. In his introductory remarks the chairman observed that the conduct of various agronomic experiments at different implementing centres is better this year and requested to put in more efforts to generate situation specific agrotechnologies to cater to the needs of the farmers. The important points that have emanated from the Agronomy experiments conducted during 1997-98 include: a) 50% of the recommended dose of fertilizer can be substituted by FYM/neemcake/castor cake, b) To optimise castor production under resource constraints, the role of certified seed, fertilizer and plant protection is of greater dimension and in the absence of seed and fertilizer the role of plant protection gets reduced; c) The requirement of nutrients for castor + groundnut intercropping system is in variance with the commercial cultivation of either of the component crops as sole crops and castor in the system needs supplemental dose of nitrogen to express better in terms of yield and returns; d) All the frontline demonstrations should serve as windows for improved technological ambience; e) There is a need to make economic analysis of the treatments to draw useful inferences; f) Wherever organic sources of N are employed in the nutrient management trials, there arises a need to analyse the nutrient content of the material used; g) In inter cropping experiments the yields of both the component crops are to be presented and Land Equivalent Ratios to be worked out apart from working out economics; h) In the experiments specifically designed for nutrient uptake in castor, the uptake pattern in relation to different treatments should invariably be presented to derive meaningful influences.

## Recommendations:

1. For obtaining higher production and net returns at S.K. Nagar (Gujarat) seed treatment with Azospirillum or phosphorus solubilizing bacteria @ 50g/kg seed and application of recommended dose of fertilizer (75-50-0 NPK/ha) in conjunction with castor cake 1t/ha or FYM 5t/ha is recommended.
2. The castor seed produce of North Gujarat Agro climatic zone are advocated to irrigate the seed plots of pistillate lines such as VP-1 and Geeta 14 times (Oct. + Nov. 10 days interval and Dec-Feb 15 days interval) each of 60mm depth along with application of 125 kg N/ha to obtain maximum seed yield based on superior expression of pistillateness with less reversion and interspersed staminate flower.

## Experiments to be continued during 1998-99:

### 1. Integrated nutrient management for castor:

Rainfed Centres: Palem, Sandhiyur and DOR

Irrigated: S.K. Nagar, Junagadh and Mandore

**Note:** At Mandore, for green manuring cowpea can be tried in place of cluster bean

**2. Optimization of castor production under resource constraints:**

Centres: Palem, Sandhiyur, DOR, Jagdalpur, Mandore (Irrigated)

**3. Fertilizer management in groundnut + castor intercropping system**

Centres: Sandhiyur and Junagadh

**4. Optimisation of row ratio and sowing time of castor in groundnut + castor intercropping system**

Centres: Junagadh (Irrigated)

**Note:** The trial should be conducted as per the original proceedings circulated in 1997

**5. Assessment of nutrient uptake by castor:**

Centres: S.K. Nagar (Irrigated, Palem (Rainfed))

**6. Evaluation of pigeonpea genotypes for intercropping with castor:**

Centre: Palem (Station trial)

**7. Evaluation of optimum N, P and K for castor:**

Centre: Jagdalpur

**8. Weed management in castor:**

Centre: Bhavanipatna

**9. Use of nitrifying inhibiting materials in increasing N use efficiency in castor:**

Centre: S.K. Nagar (Station trial)

**NEW EXPERIMENTS FOR 1998-99**

**1. Nitrogen management in rabi castor based cropping system:**

Centre: S.K. Nagar (Station trial)

**Treatments:**

Kharif crop (Main plot)

1. Fodder Sorghum
  2. Green manuring
  3. Greengram/cowpea/for pods
  4. Fallows
- Design: Split-plot

Fertilizer N for rabi castor (Sub-plot)

1. 0 kg N/ha
  2. 40 kg N/ha
  3. 80 kg N/ha
  4. 120 kg N/ha
- Replications: 3

**Note:** 1. Uniform dose of recommended  $P_2O_5$  and  $K_2O$  to be applied

2. Castor should be sown on 1-10-98

## 2. Effect of date of sowing on the performance of castor genotypes

Centre: S.K. Nagar (Station trial)

Treatments

Sowing date	Genotype	Design: RBD
D1-15 July	G1-GCH4	
D2-15 August	G2-GCH5	Replications: 3
D3-15 Sept.	G3-GC-2	
D4-15 Oct.		

## 3. Response of castor to sulphur application under rainfed condition:

Centres: DOR, Palem and Mandore

Treatments :  $3 \times 3 + 1 = 10$

Source of S	Dose of sulphur (kg/ha)	
S1 - Single super phosphate	0	Design: RBD
S2 - Gypsum	10	Replications: 3
S3 - Elemental sulphur	20, 30	

For seed requirements: The centres can write to

1. GCH-4 Dr. H.C. Pathak, Sr. Scientist (Castor & Mustard), GAU, S.K. Nagar, Gujarat
2. DCH-177 Dr. S.K. Chakrabarthy, Scientist (Plant Breeding), DOR, Rajendrangar, Hyderabad-30

For biofertilizers: Mr. S. Manickam, Agronomist TCRS, Sandhiyur (TN) will supply (250g each) Azospirillum and PSB to the following centres:

Centres: Palem, S.K. Nagar, DOR, Jungadh and Mandore.

A total of 340 frontline demonstrations are stated to be organised by 27 (7 regular and 20 voluntary centres) spread across the country during 1998-99.

The chairman in his concluding remarks exhorted that the frontline demonstrations should be conducted based on improved technologies and compared with farmers practice. A special monitoring team will be constituted to evaluate frontline demonstrations at various centres.

The session came to a close with a vote of thanks proposed by Dr. C. Hanumantha Rao, Project Coordinator (Castor).

**Proposed Programme for FLDs in Castor during the year 1998-99**

Sl.No	Centre	No. assigned	Type of Demonstration	No. proposed
<b>Regular centres</b>				
1	Junagadh (GAU)	15	1. Whole package 2. Cropping system 3. Component Technologies	5 5 5
2	Mandore (RAU)	25	1. Whole package 2. Cropping system 3. Component Technologies	19 - 6
3	Palem (ANGRAU)	15	1. Whole package 2. Cropping system 3. Component Technologies	8 1 6
4	Semiliguda/Bhavanipatna (OUAT)	15	1. Whole package 2. Cropping system 3. Component Technologies	15 - -
5	S.K. Nagar (GAU)	15	1. Whole package 2. Cropping system 3. Component Technologies	2 4 9
6	Raichur (UAS)	10	1. Whole package 2. Cropping system 3. Component Technologies	10 - -
7	Sandhiyur (TNAU)	25	1. Whole package 2. Cropping system 3. Component Technologies	10 5 10
<b>Voluntary centres</b>				
8	Akola (PKV)	10	1. Whole package 2. Cropping system 3. Component Technologies	10 - -
9	Ananthapur (ANGRAU)	10	1. Whole package 2. Cropping system 3. Component Technologies	5 5 -
10	Ayikudi (KVK)	10	1. Whole package 2. Cropping system 3. Component Technologies	10 - -
11	Bangalore (UAS)	5	1. Whole package 2. Cropping system 3. Component Technologies	- - 5
12	Bijapur (UAS)	10	1. Whole package 2. Cropping system 3. Component Technologies	10 - -
13	Gaddipally (KVK)	10	1. Whole package 2. Cropping system 3. Component Technologies	10 - -



14	Madenur(UAS)	10	1. Whole package 2. Cropping system 3. Component Technologies	- - 10
15	Phulbhani (OUAT)	10	1. Whole package 2. Cropping system 3. Component Technologies	10 - -
16	Sirohi (RJU)	10	1. Whole package 2. Cropping system 3. Component Technologies	10 - -
17	Jabua (KVK)	20	1. Whole package 2. Cropping system 3. Component Technologies	10 5 5
18	Hiriyur(UAS)	20	1. Whole package 2. Cropping system 3. Component Technologies	12 3 5
19	Talod (GAU)	10	1. Whole package 2. Cropping system 3. Component Technologies	1 1 8
20	Derol/Godhra (GAU)	10	1. Whole package 2. Cropping system 3. Component Technologies	5 - 5
21	Bhechau (Kutch) (GAU)	10	1. Whole package 2. Cropping system 3. Component Technologies	4 1 5
22	Sholapur (MAU)	15	1. Whole package 2. Cropping system 3. Component Technologies	15 - -
23	Kanpur (SAU)	15	1. Whole package 2. Cropping system 3. Component Technologies	- 15 -
24	Hyderabad (DOR)	5	1. Whole package 2. Cropping system 3. Component Technologies	5 - -
25	Darsi (ANGRAU)	10	1. Whole package 2. Cropping system 3. Component Technologies	10 - -
26	Mallepalli (ANGRAU)	10	1. Whole package 2. Cropping system 3. Component Technologies	10 - -
27	Yellamanchali (ANGRAU)	10	1. Whole package 2. Cropping system 3. Component Technologies	10 - -
<b>Total</b>		<b>340</b>		<b>340</b>

# ENTOMOLOGY SESSION

Date: 15.5.1998

Chairman: Dr. Puttaswamy  
Professor and Head,  
Dept. of Entomology,  
UAS, Bangalore

Rapporteurs: 1. Dr. M. Lakshminarayana  
2. Dr. A. K. Chakrabarthi

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The Project Coordinator, Dr. C. Hanumantha Rao, welcomed the chairman, Dr. Puttaswamy, Professor and Head, Dept. of Entomology, UAS, Bangalore and the delegates. The Project Coordinator reiterated that the field population of pests should be sufficient enough to deduce logical conclusions from screening trials. The promising entries need to be retested under field conditions and the reaction of entries should be confirmed under artificial infestation conditions. The management practices for the insect pests like redheaded hairy caterpillar, *Amsacta* sp. is available. But the transfer of technology need to be effected.

The Chairman, Dr. Puttaswamy welcomed the delegates to the Entomology Session. Entomologists from five different centres presented results of experiments which were critically discussed. At the end, the chairman made the following remarks. The chairman opined that sound IPM systems need to be developed as the castor is an important crop both as a sole and intercrop. He, further, observed that *Spodoptera* is becoming serious not only on castor but also on other crops. Apart from mass collection of early instar larvae, the workers should test a number of bioagents and bio pesticides. Phermone traps could also be set up to generate information on monitoring and management of the pest.

The Chairman further remarked that the Entomologists should adopt cropping systems approach to understand and appreciate the role of all insect fauna on the crop and in the agro-eco system. The role of castor and insect fauna in the multiple cropping systems such as castor + ragi, castor + cotton, castor + groundnut need to be evaluated.

The DOR, Hyderabad centre has evaluated microbial agents against major defoliator pests. This is an important aspect which needs strengthening. The proven microbial agents can even be evaluated under field conditions. More studies are required on the bio-ecological aspects of the capsule borer. Concerning the screening of germplasm against major pests, the chairman repeatedly stressed for retesting the promising entries and confirming the reaction of such selected entries under artificial infestation conditions.

The Project Coordinator thanked the chairman for efficiently conducting the session and for developing a sound technical programme for the entomologists working on castor.

## TECHNICAL PROGRAMME FOR 1998-99

### 4.1. Survey and monitoring castor pests

The survey should be conducted not only in the research stations but also on the farmers' fields in the surrounding area at intervals starting from beginning of the season. The observations should clearly indicate the population levels of different pests, their natural enemies which are to be reported along with weather parameters. The survey data on the incidence of various insect pests should be recorded on at least 10 plants as indicated in the experiment 4.2.A. and should be expressed per plant basis. The data should provide information on the extent of infestation, stage of the crop, location, previous crop etc.

Centres: S.K.Nagar, Palem, Junagadh, Hiriya, DOR and Sandhiya.

## **4.2. Screening for resistance against castor pests**

### **(A) Screening of germplasm against castor pests**

The germplasm accessions found most promising under satisfactory population levels of insect pests over the last five years are to be retested under field conditions. The request for these selected entries should be sent to the Project Coordinator at the earliest.

#### **Confirmation of reaction of promising entries to pest infestation**

Entries reacting consistently as resistant in field trials should be chosen for screening under controlled conditions. The parameters for screening should be comprehensive and should involve both the insect and the plant.

The germplasm lines should be sown in single rows with susceptibles/local check after every ten entries. Late sowing should be taken up specifically for screening against jassids and white flies in the month of November or even later. From each entry, two to three plants should be selected randomly and from each plant three leaves (lower, middle and top) should be examined for jassids and population/3 leaves per plant should be recorded.

#### **i) White fly**

The absolute population of adult white fly may be recorded from top leaf. The data on white fly pupae recorded from three leaves/plant during peak infestation level should be presented in 0-5 scale where;

0 - No pupae      1 - 1 to 50 pupae    2 - 51 to 100 pupae    3 - 101 to 200 pupae    4 - 201 to 500 pupae, 5 - more than 500 pupae and honey dew secretion with black sooty mould fungus.

#### **ii) Jassids**

Jassids counts (nymph and adults) and hopper burn will be recorded on three leaves in each plant selecting one leaf from top (excluding two topmost leaves) middle (medium maturity) and bottom (leaving one or two bottom most leaves) on the main shoot. Population will be reported as number of jassids/three leaves per plant and % leaf area burnt per plant (average of three plants).

Two to three observations on jassid count should be recorded and the peak incidence should be reported. Similarly two to three observations on hopper burn should be recorded and % leaf area burnt at peak should be reported.

Observations should be taken in the early morning (6 to 8 A.M.) Hopper burn injury should be recorded in the following grades (on plant basis)

0 - No injury	1. Hopper burn upto 10%
2 - Hopper burn 11 to 25%	3. Hopper burn 26 to 50%
4 - Hopper burn above 50%	

#### **iii) Castor semilooper and Spodoptera**

Absolute larval population should be recorded from each plant and extent of damage (defoliation) should be reported based on visual observation.

#### **iv) Castor capsule borer**

Percentage capsules damaged should be presented by recording the total number of capsules and number of damaged capsules per plant.

v) **Thrips**

Absolute population per ~~spike~~ plant should be recorded.

vi) **Serpentine leafminer**

a. **Survey and monitoring**

Incidence on 10 plants/site is to be recorded per cent leaves infested and % leaf area infested/plant to be recorded.

b. **Seasonal incidence**

Weekly observations on June/July sown crop (cv Aruna/suitable local variety) to be taken throughout the crop duration on 5 plants/observation. Three leaves to be sampled/plant and incubated at room temperature in paper bags or plastic containers and pupae emerged from these leaves is to be counted. Means of 5 plants/observation are to be presented in a tabular format against dates of observations alongwith meteorological data. Also record the parasites that emerge and present the % parasitisation as No. of parasites emerged/total no of leafminer pupae.

c. **Screening of germplasm and advanced breeding material**

Observations to be recorded on 3 plants/entry and 3 leaves/plant (top, middle and bottom-most infested leaves).

1. Per cent leaves infested =  $\frac{\text{No. infested leaves/plant} \times 100}{\text{Total no. of leaves/plant}}$

2. Per cent leaf area infested/plant = visually score leaf area damaged as

0 - No. damage    1 - <25%    2 - 26-50%    3. 51-75%    4 - 76-100%.

Work out the mean of 3 leaves/plant and tabulate the means for three plants/entry. Use these as replicates and analyse.

3. **No. of pupae emerged/leaf**

Sample the 3rd leaf from the top (it should be infested otherwise sample the next lower leaf). Sample one leaf/plant; 3 plants/entry and incubate each leaf separately for 7 days and count the pupae emerged. Analyse the data and present the genotype means alongwith statistical parameters.

Centres: S.K.Nagar - White fly and jassid

Palem - Jassid, semilooper

DOR - Jassid, semilooper and whitefly

**C) Screening of advanced lines from coordinated varietal/hybrid trials against major castor pests**

The advanced breeding materials entered into various varietal/hybrid trials should also be screened for their reaction to various pests of castor. The same procedure as indicated above should be followed for screening.

Centres: S.K.Nagar, Palem, Hiriyur, Sandhiyur, DOR and Junagadh

Note: The sponsoring breeders will supply seed material of their entries (about 25-30 seeds) to the above centres.

#### 4.3 Pest incidence in relation to cropping systems and crop production practices

**Material:** One additional replication of all agronomy experiments be left unsprayed **for recording** the observations in respect of insect pest incidence at regular intervals.

Periodic observations should be recorded on the pest incidence alongwith the activity of parasitoids and predators, pest succession and stage of the crop, the possible factors for increase/decrease of the pest incidence are to be worked out or indicated.

In addition, systematic entomological observations can be recorded from farmers' fields, wherever feasible.

Centres: S.K.Nagar, Palem, Sandhiyur and Hiriyr.

#### 4.4. Control of insect pests of castor with botanical and microbial pesticides

DOR will carry out the trial with botanical pesticides and report efficacy of **different botanicals** in controlling major castor pests.

Palem centre will continue to evaluate the microbial pesticides together with **Neem seed kernel** extract and two other botanical pesticides against major castor pests.

Design: RBD; Replications: Three

##### Note:

1. Treatments may be given 2-3 times after observing satisfactory infestation levels of semilooper/spodoptera/hairy caterpillar/sucking pests/capsule borer. The interval between the sprays should be atleast 15 days.
2. Quantity of spray fluid used for each spraying should be mentioned.
3. Observations are to be recorded on insect pests before 24 hours and 3 and 7 days after insecticidal application.
4. Insect population before and after treatment are to be reported instead of % mortality of the insect pests.
5. Castor capsule borer damage should be recorded in terms of % capsules damaged.
6. Treatmentwise yield data should be reported.
7. Cost benefit ratio should be worked out.

#### 4.5. Studies on castor capsule borer

Seasonal abundance in relation to biotic **and abiotic factors and management** aspects are to be studied.

Centres: DOR, Palem

#### 4.6: Integrated pest management of Defoliators of castor

Different components of integrated pest management viz., biological control of castor semilooper with egg parasatoid, *Trichogramma chilonis*, application of Bt formulations, promotion of *Microplitis* incidence, providing perches for bird predation, mechanical control of defoliators are to be carried out at Palem and DOR.

Detailed studies are to be conducted at palem for management of red hairy caterpillar using light trap and vegetative trap technologies in the farmers' fields. Efficacy of different lights in attracting adults of RHC and different vegetative traps in attracting migrating caterpillars are to be evaluated.

**Note:**

1. Wherever specific positions do not exist, the scientist incharge of ~~the~~ centre will assign the programme to the Entomologist provided under oilseed project.
2. The recording and reporting of observations should be done strictly according to the technical programme by all the centres.
3. Data generated on any other entomological experiments on castor or any interesting observations made during regular surveys may be reported by the centres.
4. The specimens of insect pests and their natural enemies are to be sent to Dr.A.K.Chakravarthy, UAS, Bangalore for getting their identification. Dr.Chakravartyh should visit the centres of AICORPO (CASTOR) for collection of these specimens and he should be provided with separate TA and DA.

# **PATHOLOGY**

**Date: 16.05.1998**

**Chairman:** Dr V. Muniyappa  
Prof. & Head  
Dept. of Plant Pathology  
UAS, GKVK, Bangalore

**Rapporteurs:** 1. Dr T.G. Nageshwar Rao  
2. Dr R. Sudhakar

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Dr C. Hanumantha Rao, Project Coordinator (Castor) welcomed the chairman of the session, Dr. V. Muniyappa and introduced him and requested to conduct the pathology session.

While giving brief introductory address, Dr Muniyappa highlighted the important diseases of castor viz. wilt, *Botrytis* gray rot and *Alternaria* and their management. He, further, felt that the breeder should take all simple techniques of screening for resistance where pathologist is not available. He also felt that wide variation existing in castor germplasm lines can be exploited for developing resistant varieties. This was followed by the presentation of Dr D.B. Patel on the progress of research in castor pathology at S.K.Nagar. All the programmes assigned were taken up at the centre.

While participating in the deliberations, Dr. Nageshwar Rao felt that organic amendments for the management of wilt needs to be incorporated in to the soil well in advance before taking up the experiment, so that the antagonistic population stabilise and gives current picture on wilt incidence.

The Chairman pointed out the importance of biocontrol agents viz. *Trichoderma* and felt that these agents have to be exploited further in the management of soil borne disease like wilt.

Dr. Nagaraj felt that all the diseases recorded during the survey have to be presented along with intensities. Dr Muniyappa further felt that artificial screening techniques for *botrytis* is to be perfected so that large number of germplasm/breeding material can be screened in less time. He also felt that germplasm lines are to be tested for subsequent years i.e for atleast 4-5 years, so that correct picture of its reaction to diseases can come out. This was followed by the presentation on report of castor pathology at Palem centre by Dr R. Sudhakar and at DOR centre by Dr.T.G. Nageshwar Rao. All the technical programmes assigned were implemented.

The following technical programme for the year 1998-99 was finalised.

## **TECHNICAL PROGRAMME FOR 1998-99**

### **5.1 Report on disease situation in the state/region**

Locations: S.K.Nagar, Palem, Mandore, Sandhiyur, Hiriyur, DOR and Junagadh

Survey will be conducted two times in the season at 50-80 DAS and 150-180 DAS. Preferably the same plots shall be visited in the second time.

Incidence of wilt and root rot should be recorded on the basis of 100 plants selected randomly from each field. *Alternaria*/Powdery mildew/*Cercospora* leaf spot and bacterial blight may be recorded on 5 plants selected randomly.

Score the leaf spot disease as per 0-9 scale.

For Botrytis incidence primary, secondary and tertiary spikes may be scored using 0-9 scale.

- 0 = No incidence
- 3 = 10% of the capsules infected
- 5 = 11-25%    -do-
- 7 = 26-50%    -do-
- 9 = > 50%    -do-

Collect the information in the following format;

- I.    i) Location,                      ii) Soil type                      iii) Irrigated/Rainfed                      iv) Previous crop
- v) Variety,                      vi) Date of planting
- vii) Monthly weather data during crop growth at AICORPO centre or nearby station covering RF (mm) Rainy Days, Min. Temp. °C Max.Temp.°C and RH%.

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II. Stage of the crop    Disease    % Incidence/grade

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Data collected may be consolidated and presented in tabular form.

## 5.2 Basic studies in castor pathology

### 5.2.1 Development of sick plots

Location: Palem (wilt), Junagadh (Root rot)

### 5.2.2. Development of inoculation technique for *Botrytis grey rot*

Location: DOR

### 5.2.3. Selection/identification of resistant lines for *Fusarium*, *Macrophomina* and nematodes

The germplasm lines and advanced breeding material of known resistance will be screened for their disease resistance in subsequent years also.

Locations: DOR and S.K. Nagar (Wilt), Junagadh (Root rot), Anand (Nematodes)

### 5.2.4 Method of seed treatment for management of seed borne inoculum of wilt

Design: R.B.D.                      Replications: Five

Treatments:

1. Dry seed treatment (Carbendazim 0.1 % a.i.)
2. Slurry treatment
3. Seed soaking for 24 hours in fungicidal solution
4. Soaking seed in water for 24 hrs.
5. Control (no fungicidal treatment)

Locations: DOR, S.K. Nagar and Palem.



**Observations to be recorded:**

1. Germination percentage
2. Wilt incidence at 30 and 60 DAS

**5.3 Screening for resistance**

**5.3.1. Germplasm**

Locations: S.K. Nagar and DOR (Wilt sick plot), Palem (Under high disease pressure)

Inoculum load of sick plot should be recorded in the screening trials. One hundred germplasm lines each with minimum 50 seeds will be supplied by the scientist (Germplasm Unit), DOR to all the three locations. Both resistant and susceptible checks should be included. The same lines are to be tested in subsequent years also.

Locations: Semiliguda, Jagadalpur, Bapatala, Chintapally, Palem and DOR (Botrytis gray rot)

Material: Tolerant lines of germplasm identified at Palem and DOR + two checks (48-1 and Aruna) to be supplied by the GM Unit, DOR to all the six centres.

**5.3.2. Testing advanced generation breeding material (Varieties/hybrids) for their reaction to diseases**

Locations: S.K.Nagar, Palem and DOR in wilt sick plot Mandore (Alternaria blight)

Design : R.B.D. Replications: 3 single row each of 6 m.

Spacing : 30 cm (Susceptible and resistant checks to be sown after every 5 rows)

Sixty seeds of each advanced breeding material identified for multi-location breeding trial shall be supplied by the Project Coordinator (Castor)

**5.3.3. Confirmation of resistance to wilt**

Centres: S.K. Nagar, DOR and Palem

Germplasm accessions and breeding material shall be screened in pot culture using root dip transplantation technique.

GMU, Hyderabad and concerned breeder shall supply 30 seeds of 10 entries to each centre with 9 minimum of 30 seeds for each entry.

**5.4. Disease incidence in relation to agronomic management practices**

Centres: S.K. Nagar, Palem, DOR, Junagadh and Mandore

Experiments: All Agronomy experiments of the centres

Observations: Record the incidence of different diseases with particular reference to key diseases at stipulated crop growth stages viz. 100-110, 130-140 and 170-180 DAS and report only significant findings. One additional replication of all Agronomy trials may be left unsprayed for recording disease incidence.

**5.5. Breeding for disease resistance (Wilt)**

Centres: S.K. Nagar, Palem and DOR

Associate: Breeder of that centre

Selections from F3, F4 and F5 generations may be further evaluated for wilt resistance under sick plot conditions.

**5.6. Role of nematodes in castor wilt disease**

Centre: GAU, Anand

The experiment is to be taken in pot culture to delineate the role of plant parasitic nematodes in wilt complex.

### 5.7. Biological control of wilt disease

Locations: DOR, S.K. Nagar and Palem

- i) Screening of biocontrol agents against wilt pathogen *in-vitro*
- ii) Testing the efficacy of the potential of biocontrol agent, *Trichoderma* sp. against *Fusarium* wilt in pot culture experiments.

#### Treatments:

1. Seed treatment ( $10^7$  spores/ml)
2. Soil application (10 g/pot)
3. Seed treatment + soil application

### 5.8. Management of Botrytis rot with chemicals

Centres: DOR and Palem

#### Treatments:

1. Carbendiazim 0.1%, 2. Thiophinate methyl 0.1%, 3. Chlorothalonil 0.2%
4. Hexaconazole 0.2%, 5. Control

No. of sprays: 2 (1st spray at 50% flowering, 2nd spray one week after 1st spray)

Design : R.B.D.

No. of replications: Four

Variety: DCS-9

### RECOMMENDATIONS

1. Pathologists working on other oilseed crops at the centre should record the incidence of diseases on castor and report the data in tabular form.
2. Susceptible and resistant checks should be interspersed after every 5 test entries in screening trials.
3. Standard methodology should be adopted for trials and data should be statistically analysed and presented in the reports.

### ADDRESS FOR CORRESPONDENCE

1. Asst. Plant Pathologist (Oilseeds), Regional Agril. Research Station, ANGRAU, Palem - 509 215, Mahaboobnagar, AP
2. Asst. Research Scientist (Plant Pathology), C/o. Research Scientist (Castor-Mustard), AICORPO, Gujarat Agril. University, Sardarkrishinagar - 385 506, Dist. Banaskantha (Gujarat)
3. Dr M.A. Raoof- Plant Pathologist, DOR, Rajendranagar, Hyderabad-30- Wilt programmes,
4. Dr T.G.Nageshwar Rao, Pl. Pathologist, DOR, Hyderabad-30 - Botrytis programme
5. Asst. Pathologist ( Sesame), Agricultural Research Station, Mandore, Jodhpur (Rajasthan)
6. Breeder, Oilseeds Res.Station, Salem (TN)
7. Plant Pathologist (Oilseeds), Oilseeds Res. Station, Gujarat Agril. University, Junagadh - 362 001 (Gujarat)
8. S.R. Rao, Breeder, Niger AICORPO, OUAT, RARS, Semiliguda

## VARIETAL IDENTIFICATION COMMITTEE

Venue: UAS, Hebbal campus, Bangalore

Date : 15th May, 1998

The meeting of the Varietal Identification Committee consisting of following members under the chairmanship of Dr.N.B.Singh, Asstt. Director General (OP),ICAR, New Delhi was held in connection with the Annual Castor Research Workers' Group Meeting.

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|---|-------|------------------|
| 1. Dr.N.B.Singh, Asstt. Director General (OP)<br>ICAR, New Delhi        | ...   | Chairman         |
| 2. Dr.B.R.Hegde, Director of Research<br>UAS, Bangalore                 | ....  | Member           |
| 3. Dr.A.Seetharam, Project Coordinator (S.M.)<br>UAS, Bangalore         | ..... | Member           |
| 4. Dr.C.A.Virakthamath, Professor of Entomology<br>UAS, Bangalore       | ..... | Member           |
| 5. Dr.S. Viswanath, Professor of Pathology<br>UAS, Bangalore            | ....  | Member           |
| 6. Dr.N.V. Patel, Dy. Director,<br>DOD, Hyderabad                       | ....  | Member           |
| 7. Dr.Uday Kumar Holla, Seed Officer,<br>NSC, Bangalore                 | ....  | Member           |
| 8. Dr.R.M.Shah, Manager (R&D)<br>Sagar Seeds, Ahmedabad                 | ....  | Member           |
| 9. Dr.K.Virupakshappa, Project Director<br>DOR, Hyderabad               | ....  | Member           |
| 10. Dr.C.Hanumantha Rao, Project Coordinator (Castor)<br>DOR, Hyderabad | ...   | Member-Secretary |

The committee examined three proposals viz., one Variety (JI-122) and two hybrids (DCH-177 and JHB-665). The recommendations on each of the above proposal are given below:

### DCH - 177

The **propoal** of the hybrid, DCH - 177 was considered by the committee and it was found that this hybrid has distinct yield advantage over GCH-4. It has also high degree of tolerance to wilt. Therefore, the committee identified this hybrid for rainfed situations.

### JHB-665

The proposed hybrid was examined by the committee and it was observed that this hybrid has yield advantage of 14% over GCH-4 in irrigated situations and has tolerance to *Macrophomina* root rot. Also, the female has NES system of pistillateness which provides better mechanism in hybrid seed production as the hybridity in GOT can be confirmed within 20 days of sowing and the male line is triple bloom type which will be expressed in the F1, which are the additional advantage in this hybrid. Therefore, the hybrid was identified for the irrigated areas of Gujarat and Rajasthan.

### JI-122

The proposal of the variety, JI-122 was examined by the committee. The proposed variety showed inconsistent performance in terms of yield and reaction to *Macrophomina* root rot. Therefore, the committee suggested that the variety be tested one more year in multilocation trials.

The meeting ended with vote of thanks to the chair and the members by Dr.C.Hanumantha Rao, Member-Secretary of the Varietal Identification Committee.

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