1. **INTRODUCTION**

Wheat is an important crop worldwide and in India. Its production increased from mere 11.0 million tones during 1960-61 to 95.85 million tones during 2013-14. This eight-fold increase in wheat production had been mainly due to the adoption of short stature high yielding varieties, increased fertilizers use, irrigation and herbicides. Wheat grain provides 21 per cent of the food calories and 20 per cent for more than 4.5 billion people in 94 developing countries (Braun *et al.*, 2010).

The food grain requirement of India in 2025 is estimated to be around 300 million tones which has to be elevated from the current estimated production of 252.56 million tones (Government of India, 2012). To achieve this future target, food grain production must increase at annual rate of more than 4 million tones per year in coming years. Wheat stands second to rice under food grain with a production of 90.23 million tones in 2011 – 2012. Better agronomic practices for wheat production are required for sustaining its yield (Prasad, 2012).

Among several constraints of wheat production, weed infestation is the major one (Zimdahl, 2004). Weed interference is one of the most important but less noticed factor, contributing towards lowering the yields of wheat. Weeds not only reduce the crop yield, deteriorate the quality of farm produce but also trim down the market value of crop. They mainly compete with crop for nutrients, moisture, space and solar radiation.

Most of the wheat growing area in our country is irrigated, which serve the weeds a suitable habitat. Numbers of reports are available which indicate that the yield of this crop is reduced by 15-50 per cent or some time even more depending upon the weed density. The losses caused by weeds have been estimated to be much higher than those caused by insect pests and diseases together (Fakkar and Amin, 2012). However, weeding has never been a priority due to a variety of reasons. Weeds can be controlled manually which is laborious, time consuming, energy intensive and possible only on small scale. Mechanical means are economical but it control only inter row weeds, not intra row weeds. In such situations, herbicides offer more ideal, practically effective and economical means of reducing early weed competition and crop production losses. So, chemical method of controlling weeds is most effective, efficient, up-to-date and time saving (Ashiq *et al.*, 2007). The present situation of labour shortage and increase in wages has worsened the situation (Yaduraju, 2012). Their management plays an important role in enhancing wheat productivity. Weeds growing in
association with irrigated and heavy fertilized crop decline its yield by 15 – 40 per cent or even higher besides lowering down the quality of produce by way of weed seed contamination (Yadav et al., 2006b). Therefore, weed management is a basic requirement and major component of crop production system (Young et al., 1996). Besides the common broadleaf weeds, grassy weeds like Phalaris minor, Avena fatua, Poa annua is also invade wheat fields. Of these Phalaris minor is considered more damaging (Inderjit and Kaushik, 2009).

Due to industrialization, labour constraints at peak growth period, small family size and under specific situations where weeds are very difficult to be removed manually, the herbicide use becomes inevitable. The chemical control of weeds in general has been realized to be more cost effective and easy compared to manual weeding (Yadav and Malik, 2005; Garcia-Martin et al., 2007).

Herbicides form potent tool to check the mixed flora of weeds in close row crops like wheat where manual or mechanical weeding is most difficult and certain grassy weeds evade farmers hoe because of botanical mimicry at early growth stage (Yasin et al., 2010). The herbicide isoproturon was widely recommended in north-western states of India to control Phalaris minor (Singh, 2006). In order to avoid problem of herbicides resistance, alternate herbicides and herbicide mixture can be employed to widen the weed control spectrum (Das and Yaduraju, 2012).

With these considerations, a field investigation entitled “Bio-Efficacy of Herbicidal Weed Control on Production Potential of Wheat (Triticum aestivum L.)” was conducted during Rabi, 2014-15 at the Instructional Farm, Department of Agronomy, Rajasthan College of Agriculture, Udaipur with the following objectives:

✓ To find out the effect of weed management on growth and yield of wheat.
✓ To study the effect of weed management on weed dynamics.
✓ To evaluate the economic viability of treatment.