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Determination of critical period of crop-weed competition in transplanted *kharif* rice (*Oryza sativa* L.)

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ABSTRACT

A field experiment was conducted in the farmers' field, Chandamari, Nadia, West Bengal, during *Kharif* season 2003 to evaluate the critical period of crop-weed competition in transplanted *Kharif* rice. The experiment was laid out in randomized block design (RBD) with 8 treatments replicated thrice. From this experiment it was recycled that weed free from 7 or 14 DAT resulted significantly higher yield. On the contrary weed free after 28 DAT onwards did not increase the yield significantly over unweeded control.

Rice is the important staple food crop in India consumed by most of the people of India. In transplanted rice, weeds compete for different growth resources (light, water, nutrients and space) besides giving shelter to harmful insect-pests and disease pathogens.

The critical period for crop-weed competition is the period from sowing upto which the crop has to be maintained in a weed-free environment for remunerative crop production. Thus, critical period is the span of time period after seedling or emergence when weed competition does not reduce crop yield and the time period after seedling or emergence when weed competition does not reduce crop yield and the time period after which weed competition will no longer reduce the crop yield (Balasubramanian and Ravichandran, 1996). Singh and Bhan, 1989 stated that maintenance of weed free period upto 45 DAT was essential to obtain good yield of rice under transplanted condition.

MATERIALS AND METHODS

A field experiment was conducted in the farmer's field at Chandamari, Nadia, West Bengal during *Kharif* season, 2003 in a typical Gangetic alluvial soil of sandy clay loam texture having a pH of 6.9 to find out the critical period of crop-weed competition in transplanted *Kharif* rice. The experiment was laid out in randomized block design where 8 treatments were replicated thrice. The treatments comprised of weed free from 7 DAT, weed free from 14 DAT, weed free from 21 DAT, weed free from 28 DAT, weed free from 35 DAT, weed free from 42 DAT, weed free from 49 DAT and unweeded control. At the end of a particular weedy duration, or at the beginning of maintaining weed-free situation, hand weeding was given at respective treatment plot to make the plot weed free and weed population & biomass of weeds/m^2 was recorded for that particular treatment plot.

24 days old rice seedling cv. *Satabdi* (IET-4786) were transplanted at a spacing of

20 cm x 10 cm with a plot size of 5 x 4 m^2 and fertilizer dose of 60 kg N/ha, 30 kg P_2O_5/ha and 30 kg K_2O/ha. Half N and full dose P_2O_5 & K_2O were applied as basal during final land preparation. Among the remaining ½ N, ¼th of N was top-dressed at active tillering stage and rest ¼th of N was top dressed at panicle initiation stage. The source of N, P_2O_5 and K_2O were urea, single super phosphate and muriate of potash respectively. All the other recommended package of practices were followed to raise the crop.

The density and biomass of weeds were recorded by using quadrates of 0.5 m^2 randomly placed at four spots in each plot. Yields were taken from 3 plots for each treatment and were converted for one hactare area.

RESULT AND DISCUSSION

Effect of crop-weed competition on the yield of rice

It is clear from the Table 1 that both the no. and biomass of weeds increased gradually upto 35 DAT followed by their drastic reduction due to the shading effect of rice plants on weeds.

Table 1 Effect of crop-weed competition on the density & biomass of weeds and on the yield of rice.

Treatments	No. of weeds (No./m^2)	Biomass of weeds (g/m^2)	Yield (Average) t/ha
T_1 Weed free from 7 DAT	28.00	3.36	2.67
T_2 Weed free from 14 DAT	233.33	28.00	2.61
T_3 Weed free from 21 DAT	274.67	35.70	2.08
T_4 Weed free from 28 DAT	421.33	54.77	1.86
T_5 Weed free from 35 DAT	540.00	75.60	1.62
T_6 Weed free from 42 DAT	340.00	51.00	1.60
T_7 Weed free from 49 DAT	253.3	40.53	1.70
T_8 Unweeded control	351.67	59.78	1.38
CD at 5%	88.82	12.35	0.52

Weed free from 7 DAT resulted in the maximum grain yield which was closely followed by and statistically at par with the treatments where weed free situation was maintained from 14 and 21 DAT onwards. Maintenance of weed free situation from 28 DAT did not increase the yield significantly over unweeded control. Competition of weeds with the crops upto 21 DAT did not reduce the yield significantly. But on and from 28 DAT, crop-weed competition reduce the yield which was statistically at par with unweeded control. Therefore, it can be concluded that a weedy period from 28 DAT to 49 DAT is the most critical period of crop-weed competition from the yield reduction point of view in transplanted *kharif* paddy.

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