ABSTRACT

INTEGRATED WEED MANAGEMENT FOR DIRECT SEEDED WET RICE UNDER DIFFERENT SEED RATE IN TAMIL NADU AND KERALA

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Field experiments were conducted during rabi seasons of 2005-06 and 2006-07 to study the effect of seed rate and weed management practices on the growth, yield and economics of direct seeded rice under wet condition at Tanjore and Kanchipuram in TamilNadu, and Trichur and Alleppy in Kerala.

The experiment was laid out in split plot design with three replications. The main plot treatments comprised of three different seed rates viz., 80, 100 and 120 kg ha\(^{-1}\). The subplot treatments included eight weed management practices with herbicide and hand weeding combinations. The studies were conducted in four locations by using rice cultivar ADT-43 in Tamil Nadu and Jyothi at Kerala locations. The effective treatments were test verified in larger fields as on-farm trial during rabi 2007-08. To find out the residual toxicity of the herbicides on the succeeding crop green gram variety Co-4 was used.

The major weed flora of the experimental fields at Tanjore, Kanchipuram, Trichur and Alleppy were Echinochloa colomon, E. crusgalli and E. stagnina among grasses, Bergia capensis, Monochoria vaginalis, Sphaeranthes indicus, Ludwigia parviflora and Lindernia procumbens among broadleaved weeds and Cyperus difforium and Fimbristilis miliaceae among sedges.

Among the three different seed rate, 100 and 120 kg ha\(^{-1}\) efficiently smothered the weeds and thus lowered the weed density significantly. The higher weed control efficiency was obtained at 120 kg ha\(^{-1}\) seed rate. Among the weed management practices, Cyhalofop butyl @ 100 g a.i ha\(^{-1}\) at 15 DAS effectively controlled the Echinochloa spp whereas, bensulfuron methyl @ 60 g a.i ha\(^{-1}\) at 20 DAS controlled broadleaved weeds and sedges efficiently. The sequential application of above two herbicides gave total weed control.
The plant height was not significantly influenced by seed rate. Maximum plant height was observed in the weed management practice cyhalofop butyl \( fb \) bensulfuron methyl \( fb \) hand weeding (S8) and this was followed by cyhalofop butyl \( fb \) bensulfuron methyl (S5). The heavy weed infestation in untreated weedy check (S1), severely affected the plant height.

The dry matter production of the rice crop from seedling to maturity stage was higher in 100 and 120 kg ha\(^{-1}\) seed rate. During seedling to tillering stage the tiller production was maximum in cyhalofop butyl \( fb \) bensulfuron methyl (S5) and cyhalofop butyl \( fb \) bensulfuron methyl \( fb \) hand weeding (S8). At later stage hand weeding twice at 25 and 45 DAS (S2) was also comparable with the above two weed management practices.

Higher seed rate of 120 kg ha\(^{-1}\) recorded maximum CGR. The weed management practices played a significant role in CGR at all the stages and hand weeding twice at 25 and 45 DAS (S2), cyhalofop butyl \( fb \) bensulfuron methyl (S5) and cyhalofop butyl \( fb \) bensulfuron methyl \( fb \) hand weeding (S8) resulted in maximum CGR. Seed rate did not play any significant role on 1000 grain weight. It was lower in untreated weedy check (S1). But there was no significant difference between the other weed management practices.

The combination of 100 and 120 kg ha\(^{-1}\) seed rate and weed management practices, hand weeding twice at 25 and 45 DAS (S2), cyhalofop butyl \( fb \) bensulfuron methyl (S5) and cyhalofop butyl \( fb \) bensulfuron methyl \( fb \) hand weeding (S8) produced more number of panicles m\(^{-2}\) and resulted in higher grain yield and low value of weed index.

Test verification of effective treatments in larger plots results revealed, cyhalofop butyl \( fb \) bensulfuron methyl (S5) and cyhalofop butyl \( fb \) bensulfuron methyl \( fb \) hand weeding (S8) were comparable with hand weeding twice at 25 and 45 DAS (S2) at 100 kg ha\(^{-1}\) seed rate and recorded the higher grain and straw yield over untreated weedy check (S1).

The bioassay of residual green gram after the harvest of main crop showed that the herbicides cyhalofop butyl and bensulfuron methyl were safe to the succeeding green gram without affecting its growth and grain yield.

Hence from these studies it is concluded that the integrated approach of using 100 kg ha\(^{-1}\) seed rate and the weed management practice of cyhalofop butyl 10EC @ 100 g a.i. ha\(^{-1}\) at 15 DAS fb bensulfuron methyl 60DF @ 60 g a.i. ha\(^{-1}\) at 20 DAS fb with or without hand weeding at 45DAS shall be followed to get the higher crop yield under direct seeded situation in Tamil Nadu and Kerala.