ASSESSMENT OF WEED DYNAMICS IN DIFFERENT RICE FARMING SYSTEMS AND ASSESSMENT WEED MANAGEMENT PRACTICES

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ABSTRACT: An experiment is conducted at farmer’s field in Chidambaram Sathamangalam, Cuddalore district of Tamil Nadu, during Navarai 2021 (January 2021-April 2021) to assessment of weed dynamics in different rice farming systems and weed management practices. The experiment has a split plot design with four replications, two main treatments with various rice farming systems, namely M1 - Monocropping and M2 - Annamalai rice + fish + poultry farming system, and three sub treatments with weed management practises, namely S1 - Unweeded control, S2 - twice hand weeding on 20 and 40 DAT, and S3 - pre emergence (PE) application through tank mix of butachlor (50 percent EC) @ 1.25 kg a.i. ha-1 and 2,4-DEE (38 percent EC) at 0.6 kg a.i. ha-1 was done next (S1). Among the agricultural systems, the Annamalai rice + fish + poultry farming system (M2) had the lowest weed population, weed dry matter output, and lowest weed control index (WCI) at 30 and 60 DAT, according to the data. The highest weed population, weed dry matter output, and lowest weed control index (WCI) were observed in rice monocropping (M1) at all phases of crop growth. The lowest weed parameters and highest weed control index were found in the weed management techniques of twice hand weeding on 20 and 40 DAT (S2). PE application through a tank mix of butachlor (50 percent EC) at 1.25 kg a.i. ha-1 and 2,4-DEE (38 percent EC) at 0.6 kg a.i. ha-1. Unweeded control had the most weeds, the heaviest weed load, and the lowest weed control index (WCI). The Annamalai rice, fish and poultry agricultural system with twice hand weeding on 20 and 40 DAT (M2S2) had the lowest weed population, weed dry weight, and highest weed control index during Navarai 2021, among interactions. The Annamalai rice + fish + poultry farming system was then implemented, coupled with the application of PE using a tank mix of butachlor (50 percent EC) at 1.25 kg a.i. ha-1 and 2,4-DEE (38 percent EC) at 0.6 kg a.i. ha-1 (M2S3). As a result, it can be said that the Annamalai rice, fish and poultry farming system outperforms rice monoculture by having the lowest weed population, weed dry weight and maximum weed control efficiency.

Key words: IFS, Annamalai rice + fish + poultry farming system, rice monocropping, weed management, twice hand weeding, butachlor + 2,4-DEE.

INTRODUCTION

Rice (Oryza sativa L.) is consumed as a staple food by more than 60 per cent of the current world population (Maharajan et al, 2014). Moreover 60% of the world’s population currently eats rice (Oryza sativa L.) as a main diet (Maharajan et al, 2014). With an output and productivity of 782 Mt and 4.67 t ha-1, respectively, rice is grown on 167.13 million hectares of land worldwide (FAO, 2018). More than 100 million metric tonnes of rice were produced in 2019–2020 in India, one of the world’s top producers of the grain, on a land area of 43.7 million hectares (Economic Survey, 2020–2021). With a yield of 7.98 billion kg, rice is grown in Tamil Nadu over an area of 2.7 million hectares (Department of Agriculture, Cooperation and Farmers Welfare, 2019). With a total rice producing area of 0.74 million hectares and a rice production of 1.67 billion kg, the Cauvery delta region, often known as the “Granary of Tamil Nadu,” provides a significant portion of the state’s rice production, accounting for 47.02 percent of the state’s overall production (Department of Economics and Statistics, 2017). However, given the current population growth rate of 1.5%, the total amount of rice needed by the world’s expanding population by 2025 is expected to be roughly
the lowest total weed population and weed DMP 14.12 no. m\(^{-2}\), 29.65 kg ha\(^{-1}\) and highest weed control index 94.56 at 60 DAT. This was followed by Annamalai rice + fish + poultry farming system along with PE application through tank mix of butachlor (50% EC) @ 1.25 kg a.i. ha\(^{-1}\) + 2,4-DEE (38% EC) @ 0.6 kg a.i. ha\(^{-1}\) (M2S3). With rice monocropping under unweeded control, the largest total weed population was recorded regardless of the cropping season and crop growth stage (M\(_i\)S\(_i\)). The efficiency of weed control increased as a result of the decrease in weed biomass. This conclusion agrees with that of Pandey et al (1996), Ramachandran et al (2012) and Dadsena et al (2014).

When continuous hand weeding is used and the benefits of fish and poultry are combined, weeds are reduced by 26 to 24 per cent respectively and by about 30 per cent overall (Kathiresan, 2007). The addition of fish to lowland rice cultivation substantially reduced weeds and the occurrence of pests and diseases (Nursandi, 2022).

Less weed counts, weed dry material, and a higher weed control index in Annamalai rice + fish + poultry, along with PE application through a tank mix of butachlor (50 per cent EC) @ 1.25 kg a.i. ha\(^{-1}\) + 2,4-DEE (38 per cent EC) @ 0.6 kg a.i. ha\(^{-1}\) are indicative of the synergistic interaction between the component enterprises of fish culture and poultry with regard to weed control in rice (M\(_i\)S\(_i\)). The initial impetus and supplement for the growth and establishment of fish fingerlings by the use of poultry droppings as a food source might be proposed as the cause of this interaction. This would help to increase the size and consequently, the voracious feeding habits of fish.

The Annamalai rice + fish + poultry treatment, which involved hand weeding twice, outperformed all other treatments in terms of weed counts, dry matter and weed control index. In order to achieve optimal weed control, any weed species that managed to circumvent the complementary weed control effect of the component enterprises viz., fish culture and poultry were physically removed twice, first on 30 DAT and again on 60 DAT. With twice-hand weeding, this observation of improved bio-efficacy in weed control is consistent with reports from Gnanavel and Kathiresan (2002).

In terms of weed control methods, hand weeding twice under the Annamalai rice + fish + poultry treatment outperformed all others in terms of weed counts, weed dry matter and weed control index.

Any weed species that managed to avoid the complementary weed control effects of the component enterprises, namely fish culture and poultry were physically removed twice throughout the treatment once on 30 DAT and again on 60 DAT to ensure the best weed control. In line with Gnanavel and Kathiresan’s (2002) studies, this observation of improved bio-efficacy in terms of weed control was made.

**CONCLUSION**

The results indicated that Annamalai rice farming systems show effective weed control on the various weeds than the rice monocropping. In weed management practice twice hand weeding on 20 and 40 DAT shows better weed control efficiency than the pre emergence herbicides.

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