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Allelopathic Potential of Rice Residues of Selected Rice Varieties (*Oryza sativa L.*) Against *Echinochloa crus-galli*

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Abstract

Allelopathic compounds will play a vital role in sustainable weed control in paddy cultivation in future. Exploitation and implementation of this technology in weed management has been considered as ecologically sound, resource conserving and economically viable method. The objective of this study was to asses the allelopathic traits of rice residues of selected (BG359, LD365, BG407, AT401, BG358, AT362, AT402, BG450, BG300, Herathbanda and Handiran) rice cultivars to control of barnyard grass (*Echinochloa crus-galli*) one of the most destructive weed in Sri Lankan paddy ecosystem. Completely Randomize Design was used with three replicates for each cultivar. According to the research findings, significant differences ($p \leq 0.05$) were observed among cultivars and amount of residue mixed with sand (2.0, 4.0, 6.0 g of ground residue per 500.0 g of sand) in terms of barnyard grass plant height, number of leaves, germination and total dry weight. Among those measured variables germination and dry matter of barnyard grass showed significant reduction when increasing amount of rice residue. Among different cultivars used LD365 showed the highest inhibition % for all above measured variables and the lowest was the Herathbanda. As an example the inhibition percentages of plant height, seed germination and shoot dry weight of LD365 were 60%, 56% and 65% respectively. In contrast, rice cultivar Herathbanda caused 27%, 26% and 26% inhibition respectively for above mentioned parameters. When comparing three levels of rice residue mixture 63% dry weight reduction was observed in 6.0 g rice residue and (51%) 4.0 g and 27% with 2.0 g mixture. Furthermore percentage germination also reduced with increased amount of rice residue mixture. It indicated that highest in 6.0g, which is 49% closely followed by 4.0 g (41%) and the lowest is 2.0 g by 12%. Therefore, it could be suggested that the allelopathic potential of rice residue significantly changes with cultivar and amount of residue mix with soil. Knowledge of rice allelophathic properties of rice residue will offer several possibilities for ecological management of weeds in paddy fields of Sri Lanka.

Keywords: Allelopathy, *Echinocloa crus-galli*, Inhibition, *Oryza sativa*