

Response of inbred and traditional rice varieties (*Oryza sativa* L.) to broad spectrum herbicide glyphosate

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Weeds cause serious yield reduction in rice production worldwide and herbicide-based weed management is the most popular method to overcome this problem. Glyphosate, the most effective herbicide in controlling weeds led to decrease the final yield due to off target movements and these adverse effects can supersede by developing herbicide resistant (HR) rice. This study was conducted to determine the most effective glyphosate concentration on cultivated rice varieties and the variability of resistance between them. A preliminary study was conducted with five varieties (Bg300, Bg352, At362, Bg379-2 and H4) to identify the most effective glyphosate concentration. Five different concentrations of glyphosate (0.25, 0.5, 1.0, 2.0 and 3.0 g/l) were applied to plants at three different time periods (2, 3, and 4 weeks after sawing-WAS). Then the most effective concentration was applied to 24 varieties to evaluate their resistance. Complete randomize design was used with three replicates. Plants with $\geq 50\%$ survival were considered as resistant varieties. Preliminary study revealed 0.5g/l at 3WAS, as the most effective concentration where most of the rice varieties showed resistance. Twelve varieties (Bg352, Bg359, Bg362, Bw364, Ld365, Bg366, Bg369, Bg379-2, “Madel” Pachcha Perumal”, “Kalu Heenati” and “Kurulu Thuda”) showed a higher resistance ($\geq 50\%$) compared to others. Agro-morphological characters did not significantly differ among treatments and controls ($p \geq 0.05$) and number of fertile spikelets/panicle and 1000 grain-weight significantly varied ($p \leq 0.05$) indicating a considerable yield penalty. Developing broad-spectrum HR rice varieties offers a novel efficient weed controlling method. Rice varieties with natural HR have a higher potential in rice breeding programs leading to develop new HR rice varieties in future.

Key words: Glyphosate, herbicide resistance, rice

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