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## Natural herbicide resistance in Sri Lankan rice (*Oryza sativa* L.) varieties for broad-spectrum herbicides; glyphosate and glufosinate

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Noxious weeds are more prevalent in rice fields in Sri Lanka throughout the cropping season and cause a considerable yield loss. Broad-spectrum herbicides, glyphosate and glufosinate are used to eliminate those weeds from rice fields. The major drawback of the broad-spectrum herbicides is that they possess a detrimental effect on rice plants through off-target movements. These adverse effects can be possibly overcome by developing Herbicide Resistant (HR) rice varieties. Studies on HR rice are limited in Sri Lanka and present study was conducted to screen the natural glyphosate and glufosinate resistance in commercially cultivated rice varieties. Twenty varieties, including four traditional varieties and sixteen inbred lines were selected. Complete Randomized Design with three pots in each ten replicates for each herbicide concentration was used as the experimental design. Recommended concentrations of glyphosate (0.5g l<sup>-1</sup>) and glufosinate (0.05g l<sup>-1</sup>) were applied at 3-4 leaf stage. After application of herbicides, rice varieties with  $\geq 50\%$  survival percentage was considered as resistant to herbicides. Agro-morphological and yield characters were recorded for survived plants. Twelve varieties (Bg352, Bg359, Bg362, Bw364, Ld365, Bg366, Bg369, Bg379-2, Madel, Pachcha perumal, Kalu heenati and Kurulu thuda) showed higher resistance ( $\geq 50\%$ ) compare to other varieties at 0.5g/l glyphosate concentration. Fifteen varieties (At362, Bg250, Bg300, Bg352, Bg357, Bg359, Bg360, Bg366, Bg369, Bg379-2, Bg403, Bg450, Bg454, Bg94-1 and Pachcha perumal) were resistant to glufosinate at 0.05g l<sup>-1</sup> concentration. No significant difference ( $p < 0.05$ ) were found for yield parameters, however certain agro-morphological characters showed significant difference between control and herbicide treated resistant varieties. Results further indicated six varieties (Bg352, Bg359, Bg366, Bg369, Bg379-2, and Pachcha perumal) were resistant for both glyphosate and glufosinate. These broad-spectrum HR rice varieties have a higher potential to utilize in rice breeding programs and could be used to develop HR rice varieties in future.

### Biography

Lakshika R has completed her PhD at the age of 28 years from The University of Western Australia and postdoctoral studies from the same university. She is attached to the Department of Botany at the Open University of Sri Lanka as a Professor in Botany. She has published more than 25 papers in reputed journals, more than 50 communications in national and international conferences, and authored several text books in the areas of Genetics and Plant Breeding. She is actively involved in research projects in the areas of Plant Breeding, Biotechnology and Weed Biology.

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