

Weed dominance and status of herbicide resistance in *Ischaemum rugosum* in direct seeded rice in the Dry zone

H.M.S. Herath¹, R.F. Hafeel¹, N.P. Manamperi¹, R.M.U.S. Bandara²,
B. Marambe³ and V.R. Kumar⁴

¹Rice Research Station, Ambalantota, Sri Lanka

²Rice Research and Development Institute, Batalagoda, Sri Lanka

³Department of Crop Science, Faculty of Agriculture, University of Peradeniya,
Sri Lanka

⁴International Rice Research Institute, Los Baños, The Philippines

Abstract

Weed species dominance significantly contributes to yield losses in Direct Seeded Rice (DSR) production systems. This study aimed at determining the dominance nature of weeds and development of herbicides resistance in *I. rugosum* populations found in paddy fields. Studies were carried out in 40 farmer fields in Hambantota district of Sri Lanka during *Maha* 2017/2018 (Major growing season; October to February) and *Yala* 2018 (Minor growing season; March-September) using 5 m² sampling size per field. Data were collected from each site at eight weeks after crop establishment. The contribution of each weed species to the weed community in paddy fields was determined using the relative weed density and relative dry weight. Dose responses experiments were conducted using *I. rugosum* against the pre-mixed herbicide formulations; Bispyribac sodium 40 g/l + Metamifop 100 g/l SC, Clomazone 200 g + Propanil 400 g/l and Thiobencarb 400 g/l + Propanil 200 g/l EC. Results showed that the C₄ grasses dominated the paddy fields in both seasons, and they were more competitive in the relatively dry *Yala* season compared to that of wet *Maha* season. The C₄ grasses *E. crus-galli* and *I. rugosum* were the dominant weeds in *Maha* 2017/18 and *Yala* 2018 season, respectively. Three *I. rugosum* populations exhibited possible multiple resistance development to the pre-mix herbicide formulation. Bispyribac sodium 40 g/l + Metamifop 100 g/l SC, containing herbicides with two different modes of action (ALS-inhibitor and ACCase inhibitor, respectively), showing a resistance index (RI) of 1.8, 2.8 and 1.68. Continuous use of herbicide influence the level of dominance of weed species in DSR and hence, weed management practices in the paddy fields of Dry zone should be implemented based on the nature of weed dominance.

Key words: Herbicide resistance, *Ischaemum rugosum*, Weed dynamics

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