Gene flow from Clearfield® rice to weedy rice under field conditions

ABSTRACT

Imidazolinone-herbicide-resistant Clearfield® (CL) rice permits the selective chemical control of weedy rice (*Oryza sativa*), a major weed problem in South-East Asian rice growing countries. However, there is major concern involving resistant individuals resulting from gene flow as the cultivated and weedy rice live side by side in the fields. An experiment was conducted in the rice fields of Kuala Rompin, Pahang, Malaysia to determine which Clearfield® rice cultivars and weedy rice cultivars are more prone to hybridization, and the effect on distance between the pollen donor and receptor plants. The experiment was piloted in a split plot design with four replications. Encircled population technique was used to determine the distance between the Clearfield® rice and detection of hybrids (F1). Resistance of progeny was determined after spraying with OnDuty™ and the confirmation of hybrids was done using the SSR primer RM251. Higher survival rate was recorded with cv. CL2 which was significantly different from cv. CL1. Weedy rice cultivar V1 and V2 in CL1 plots differed significantly from the same cultivar from CL2 plots. However, no significant difference was observed between weedy rice cultivars of V3 and V4, either in CL1 or CL2 plots. No survivors were found after second spraying. Suspected hybrids were found up to 5 m however the rate was much lower compared to only 1 m from the CL plots.

Keyword: Herbicide resistance; Hybridization; SSR primer; Progeny; Malaysian rice