

Growth and yield improvement of rice with osmotic and hormonal priming

ABSTRACT

Low yield of rice has made reaching self-sufficiency level in Malaysia an utopia. Therefore, Malaysia has become a target of rice exporting countries within and outside Asia. To solve this problem, a pre-sowing seed treatment was used as a physiological intervention to alleviate the impeding problems of achieving better growth and yield of Malaysian rice variety MR219. The experiment was conducted in two batches. The first batch involved the use of osmotic salts as the priming agents while the second one involved the use of plant hormones to achieve the same purpose. MR219 rice variety was primed in different salt solutions (calcium chloride dihydrate, magnesium chloride hexahydrate, sodium chloride and PEG 6000) of varying concentrations (50,100,150 and 200 mM) and different phytohormone solutions (indol-acetic acid, gibberellic acid, kinetin, methyl jasmonate and salicylic acid) of varying concentrations (50,100,150 and 200 ppm). The treatments also included 1% (v/v) Zappa solution and water. In all, there were 19 and 21 treatments for osmotic and hormonal priming, respectively. Data on germination percentages, height, number of tillers and productive tillers, tiller productivity percentage and yield were taken. In osmo-priming treatment, the significant highest tiller number per hill was recorded from 40% (w/v) PEG and the control whereas in hormonal priming, it was 150 ppm salicylic acid. In osmotic priming media, the highest number of productive tillers per hill was recorded from 40% (w/v) PEG but in hormonal priming, it was from pre-germination. However, the highest grain yield per hill or panicle was produced by 200 ppm methyl jasmonate for hormonal priming while 50 mM magnesium chloride had the highest yield in osmotic priming. Therefore, it is recommended that, 200 ppm methyl jasmonate and 50 mM magnesium chloride could be used for yield improvement of MR219.

Keyword: Osmopriming; Hormonal priming; MR219; Growth and yield