Influence of priming treatments on growth and yield of rice under different irrigation regimes

ABSTRACT

This experiment was conducted to determine the effect of priming treatments on growth and yield of rice under different irrigation regimes. In this work, six priming treatments(48-hour priming with 100 mM calcium chloride dihydrate, 24-hour priming with 100 mM calcium chloride dihydrate, 48-hour priming with 40% (w/v) polyethyl glycol(PEG) 6000, 24-hour priming with 40% (w/v) polyethyl glycol (PEG) 6000, 24-hour priming with 100 ppm kinetin and 48-hour priming with 100 ppm kinetin) were tested under two irrigation regimes (normal and water stress conditions). The experiment was laid out in split-plot design with three replications. The main plot consisted of the irrigation regimes while the sub-plot comprised the priming treatments. Plants were assessed using number of tillers, number of productive tillers, rate of photosynthesis, stomatal conductance, intercellular carbon dioxide, transpiration rate, shoot fresh mass, shoot dry mass, 100-grain mass, grain yield, harvest index, grain length, grain width and grain size. The results showed that 48-hour priming with 100 mM calcium chloride dihydrate was 33.74% better than 24-hour priming with 100 mM calcium chloride dihydrate, 48-hour priming with 40% (w/v) polyethyl glycol PEG) 6000 was 26.86% better than 24-hour priming with 40% (w/v) polyethyl glycol PEG) 6000and 24-hour priming with 100 ppm kinetin was 23.69% better than 48-hour priming with 100 ppm kinetin in yield production in both irrigation regimes. Therefore, it is recommended that, subject to further research, rice seed priming with 100mM calcium chloride and 40% (w/v) PEG6000 should not exceed 48hours while priming with 100ppm kinetin should not exceed 24hours for effectiveness and avoidance of resource wastage.

Keyword: Priming duration; Irrigation regime; Water stress; Priming agents; Growth and yield performance