

Effect of drought stress on growth, proline and antioxidant enzyme activities of upland rice

Abstract

Responses of eight upland rice (*Oryza sativa* L.) varieties subjected to different drought levels were investigated in laboratory to evaluate eight local upland rice varieties against five drought levels (0, -2, -4, -6, and -8 bars) at germination and early seedling growth stage of plant development. Data were analyzed statistically for growth parameters; shoot length, root length, and dry matter yield, and biochemical parameters; proline and antioxidant enzymes activity (catalase, superoxide dismutase and peroxidase), were measured. Experiment units were arranged factorial completely randomized design with four replications. The drought-tolerant variety, Pulot Wangi tolerated PEG at the highest drought level (-8 bar) and showed no significantly difference relation to control. However, drought-sensitive variety, Kusam was markedly affected even at the lowest drought level used. Concomitantly, the activity of antioxidant enzymes catalase, peroxidase and superoxide dismutase in the drought-tolerant varieties increased markedly during drought stress, while decreased by drought stress in the drought sensitive variety. Consequently, this led to a marked difference in the accumulation of proline in the upland rice varieties. It may be concluded that the activities of antioxidant enzymes and proline accumulation were associated with the dry mass production and consequently with the drought tolerance of the upland rice varieties.