

Potassium fertilisation reduced late embryogenesis abundant (LEA) gene expression in Malaysian rice (MR220) under water stress condition

ABSTRACT

The application of potassium fertiliser might mitigate water stress effects in developing rice, thus influencing Late Embryogenesis Abundant (LEA) gene expression and growth in the plant tissue. This study was conducted to examine LEA gene expression in its drought tolerance mechanisms and the growth of Malaysian Rice (MR220) when exposed to water stress and potassium fertilisation. Three treatments were developed, namely the control (CF; Continuously flooding + 80 kg K₂O/ha), water stress under standard potassium fertilisation (WS; Water Stress 25 days + 80 kg K₂O/ha) and water stress under high potassium fertilisation (WSK; Water Stress 25 days + 120 kg K₂O/ha). The plant growth and yield components were measured for each treatment with randomly tagged plant by 3 replicates. The result showed that LEA gene expression on WSK was 36% less than on WS, thus indicating that the application of additional potassium fertilisation on MR220 rice might mitigate the water stress effect imposed on this plant. The study showed that high LEA gene expression in WS was accompanied by a reduction in plant growth and yield performance, such as plant tillers, height, number of leaves and grain yield compared to the control and WSK.

Keyword: Rice (*Oryza sativa*); LEA gene; Water stress; Potassium; Drought tolerance