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## Role of Phytosterols in Drought stress Tolerance in Rice

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### Abstract

Phytosterols are integral components of the membrane lipid bilayer in plants. They regulate membrane fluidity to influence its properties, functions and structure. An increase in accumulation of phytosterols namely campesterol, stigmasterol and  $\beta$ -sitosterol was observed in rice as seedlings matured. The levels of the major phytosterol,  $\beta$ -sitosterol in N22 (drought tolerant) rice seedlings was found to increase proportionately with severity of drought stress. Its levels were 145, 216, 345 and 364  $\mu\text{g/g}$  FW after subjecting to water stress for 3, 6, 9 and 12 days respectively, while for IR64 (drought susceptible), levels were 137, 198, 227 and 287  $\mu\text{g/g}$  FW at the same stages. Phytosterols were also found to increase with maturity as observed at 30, 50 and 75 days after planting. The activity of HMG-CoA reductase (EC 1.1.1.34) which is considered to be a key limiting enzyme in the biosynthesis of phytosterols was 0.55, 0.56, 0.78 and 0.85  $\mu\text{mol/min/L}$  at 3, 6, 9 and 12 days of water stress in N22 and 0.31, 0.50, 0.54 and 0.65  $\mu\text{mol/min/L}$  in case of IR64 respectively. The elevation in the levels of phytosterols as well as the activity of HMG-CoA reductase during drought stress indicates the role of phytosterols in providing tolerance to stress.

**Key Words:** Rice, sterol, sterol ester, HMG-CoA reductase, drought

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