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EVALUATION OF THREE CHILLIE VARIETIES FOR THEIR DROUGHT TOLERANCE ADAPTATIONS

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The drought tolerance in the three varieties of Capsicum annuum namely var. grossum cv. CA8 (Malu Miris), var. acuminatum cv. MI I (Heen Miris) and var. cerasiforme (Wanni Miris) is known to be in the order Wanni Miris > Heen Miris > Malu Miris. A study was undertaken to understand the features that give greater drought tolerance to some varieties over others.

Leaves of all three varieties are amphistomatous. Stomatal densities on both adaxial and abaxial surfaces showed an inverse relationship to their drought tolerance. The total number of stomata (adaxial + abaxial) per mm^2 of leaf in Malu Miris, Heen Miris and Wanni Miris were 416, 370 and 186 respectively.

To evaluate the functional adaptations to drought the three varieties were grown under three different water regimes for two months. Plants raised in large polythene bags of soil under glass house conditions were given 100 ml. of water either daily, every other day or once in three days. With increasing drought, root fresh weight and root length decreased in all three varieties in a similar manner without any varietal differences at different water regimes. Root dry weights however, showed an interaction of variety with water regime. With increasing drought, the more tolerant varieties maintained a higher root dry weight. Consequently, their percentage root dry weight ($DW/_{FW}$ X 100) increased with drought. This effect was greatest for Wanni Miris, intermediate for Heen Miris and lowest for Malu Miris. Such increase in % dry weight of roots without an increase in root fresh weight or root length indicated an accumulation of solutes for osmotic adjustment.

Estimation of soluble sugars indicated that with increasing drought more tolerant varieties tend to accumulate greater quantities of reducing sugars in their roots.

Results indicated that two ways in which greater drought tolerance was achieved are (a) ability to partition more soluble sugars to roots for osmotic adjustment and (b) reduction of stomatal densities.

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