

INCREASED LEAF PEROXIDASE ACTIVITY ASSOCIATED WITH DROUGHT TOLERANCE IN *HEVEA BRASILIENSIS*

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Leaf peroxidase activity in polyclonal *Hevea brasiliensis* trees showing high and low biomass were monitored along with the soil moisture availability in deeper layers (1.5 m) during the summer season of 2001. Out of seven trees with high girth monitored, four received very low soil moisture, similar to low girth trees. These high girth trees showed a higher peroxidase activity in their leaves than the low girth trees, which had similar drought stress. The peroxidase activity in the leaves of high biomass trees with higher moisture availability was on par with either of the other two categories. These results suggest that high peroxidase activity in the leaves may be a suitable marker for drought tolerance in *H. brasiliensis* in terms of biomass production.

Key words: Drought tolerance, *Hevea brasiliensis*, Peroxidase, Soil moisture.

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INTRODUCTION

The possible association of drought tolerance with increased activities of peroxidase and ascorbate peroxidase in the leaves and low polyphenol oxidase activity in the bark of polyclonal trees of *Hevea brasiliensis* have been reported earlier (Sreelatha *et al.*, 2003). The success of using a marker for drought tolerance depends on the reliability of the association between that marker and drought tolerance. In a heterogeneous population like a polyclonal plantation of *H. brasiliensis*, it is difficult to identify such reliable markers because of large tree-to-tree variations (Thomas *et al.*, 2000).

Although the earlier results (Sreelatha *et al.*, 2003) have been reproducible with a fair degree of accuracy, the likelihood of some of the trees belonging to high girth or high yield categories having deep root systems and thus obtaining moisture from the deeper layers of the soil, cannot be ruled out. In the present study, this possibility has been investigated in the high and low biomass trees that were grown in the North Konkan region, a drought-prone area in India.

The objectives of the present investigation were to examine whether the high bio-

mass trees had better access to soil moisture than the others and if leaf peroxidase activity could be a reliable marker for drought tolerance in polyclonal trees of *H. brasiliensis*.

MATERIALS AND METHODS

The experiment was conducted in a polyclonal plantation at the Regional Research Station, Rubber Research Institute of India, at Dapchhari, situated in the severely drought-prone (Jacob *et al.*, 1999) North Konkan region of India, during the summer of 2001. Seven trees belonging to high girth and five trees of low girth categories out of the ten trees each belonging to these categories selected in an earlier study (Sreelatha *et al.*, 2003) were examined for their access to deep soil moisture. The peroxidase activity in the leaves of these trees was determined in order to confirm the earlier finding that drought tolerant (i.e., high biomass types) polyclonal trees had an increased leaf peroxidase activity.

The soil moisture content was continuously monitored at a distance of about 1 m from the base of the tree and 0.75 and 1.5 m below the soil surface for the last 14 continuous rain-free days (the most severe summer