

## MICROMORPHOLOGY OF THE LEAVES OF *HEVEA BRASILIENSIS* AND *H. BENTHAMIANA*

Vinoth Thomas and C.K.Saraswathyamma

Rubber Research Institute of India, Kottayam 686 009, Kerala, India.

Submitted: 26 August 2002 Accepted: 30 December 2004

Thomas, V. and Saraswathyamma, C.K. (2004). Micromorphology of the leaves of *Hevea brasiliensis* and *H. benthamiana*. *Natural Rubber Research*, 17(2) : 126-132.

Light and scanning electron microscopic studies of the leaf surface of *Hevea brasiliensis* and *H. benthamiana* revealed that both the surfaces of the leaf lamina are sheathed in thick ornamental cuticle, which is more marked on the abaxial surface. The cuticular ornamentation of both the species appears as a reticulum of buttressed ridges around the stomata on the abaxial surface. The stomatal apparatus appears like a crypt. The buttressed ridges are sculptured with small cuticular continuities that appear as hairy appendages. In *H. benthamiana* the ridges are thick and arranged more or less compactly reducing the width of the stomatal aperture. The cuticle over the laminar nectary is thick and smooth. The cuticular pattern on the adaxial lamina is more or less uniform with long parallel striae arranged closely. The thick cuticle is covered with a thin layer of epicuticular wax. Although different interpretations have been given for the surface sculptures of *H. brasiliensis*, the present study shows that the important component responsible for the leaf features is cuticular in nature. The possible role of cuticle and epicuticular wax in disease resistance and ecological adaptations of *Hevea* is suggested.

Key words: Cuticular ornamentation, Epicuticular wax, Extrafloral nectary, *Hevea benthamiana*, *Hevea brasiliensis*, Leaf micromorphology.

### INTRODUCTION

*Hevea brasiliensis*, the prime source of natural rubber, is a deciduous tropical tree having trifoliate compound leaves with dorsiventral leaflet laminae. The leaf surface of *H. brasiliensis* is highly ornamented and different interpretations have been given for its origin viz., ridge like thickenings of the cell membrane (Bobilioff, 1923), cuticular striations (Rao, 1963; Martin and Juniper, 1970; Sanier and d'Auzac, 1986) and epicuticular wax (Gomez, 1982; Gomes and Kozlowski, 1988; Premakumari *et al.*, 1989; Premakumari and Saraswathyamma, 2000). Rao *et al.* (1988) estimated the amount of epicuticular wax present in different clones of *Hevea* and suggested that it is an ecologi-

cal adaptation. Its role against the invasion of pathogens was suggested by Premakumari *et al.* (1989). The causative organism of the leaf borne diseases of rubber enter into the plant system as fungal hyphae, either through the stomatal opening or by piercing the cuticle. *H. brasiliensis* is more susceptible to leaf diseases than *H. benthamiana*, which has thick and leathery leaves. The significance of cuticular striations and epicuticular wax in regulating the size of the stomatal pore making it difficult for the entry of pathogens is well documented in many plant species including *Hevea* (Martin and Juniper, 1970; Premakumari and Saraswathyamma, 2000). The present attempt is aimed at elucidating the leaf mi-