

REVIEW ARTICLE

**PHYSIOLOGICAL CONSTRAINTS FOR CULTIVATION
OF *HEVEA BRASILIENSIS* IN CERTAIN UNFAVOURABLE
AGROCLIMATIC REGIONS OF INDIA**

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Jacob, J., Annamalaiathan, K., Alam, B., Sathik, M.B.M., Thapliyal, A.P. and Devakumar, A.S. (1999). Physiological constraints for cultivation of *Hevea brasiliensis* in certain unfavourable agroclimatic regions of India. *Indian Journal of Natural Rubber Research*, 12(1&2) : 1-16.

The recent research in the stress physiology of *Hevea brasiliensis* is reviewed focussing on two distinct, but adverse agroclimatic zones, namely the North Konkan and the North Eastern regions of India where the crop has been successfully cultivated. The North Konkan region experiences drought for about five to six months every year concomitant with high intensities of solar radiation and high temperatures, occasionally rising beyond 41°C during the day. In the North East, the winter season lasts for two to three months with the minimum temperature falling as low as 5°C at least for brief periods in night, but the days can be relatively warmer with abundant sunlight. In both these unfavorable regions, with suitable agromanagement, polyclonal seedlings of *Hevea* establish reasonably well and with some added care, bud grafts of high yielding clones also could be grown. Stress induced inhibition in leaf photosynthesis was found to be a major cause for poor crop growth in studies conducted in both the regions. High light intensity concomitant with an environmental stress aggravated the stress induced inhibitory effects on photosynthesis. Photoinhibition of photosynthesis was evident in the quantum yields for carbon assimilation and Photosystem II activity. The CO₂ saturated rate of photosynthesis and *in vivo* carboxylation efficiency of the leaf were inhibited during drought and low temperature stresses. High intensity of solar radiation led to an imbalance between the light and dark reactions of photosynthesis in stressed *Hevea* leaves. This caused increased diversion of photosynthetic electrons for the production of active oxygen species which caused oxidative stress leading to senescence of the stressed leaves exposed to high light intensities. Therefore, partial shading to young plants experiencing stresses like drought and chilling is advisable. The *Hevea* germplasm pool may be a repository of inherent antioxidant and stress tolerance/avoidance traits which could be used in the crop improvement programmes for unfavourable agroclimatic regions.

Key words : Agroclimate, Ecological sustainability, Environmental stress, *Hevea brasiliensis*, Non-traditional area, Oxidative stress, Photosynthesis, Stress tolerance.

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