# PHYSIOLOGICAL AND BIOCHEMICAL CHARACTERISATION OF SELECTED ORTETS AND HYBRIDS UNDER ABIOTIC STRESS CONDITIONS

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Sixteen ortets selected from different agro-climatic regions of India were tested for their initial performance along with seven check clones in the field under two extreme stress situations, *viz*. drought stress at Dapchari in Maharashtra and low temperature stress at Nagrakata in West Bengal. Under severe soil moisture deficit stress conditions, ortets RRSA 98, DAP 35 and GH 1 had better photochemical efficiency in terms of gas exchange and chlorophyll fluorescence. The photosynthetic activities declined sharply during low temperature stress (winter) at Nagrakata. Low temperature stress was found more detrimental to photosynthetic apparatus of young rubber plants than soil moisture deficit together with high temperature. Ortets, DAP 1, RRST 24, GH 1 and GH 9, showed relatively better $CO_2$ assimilation under low temperature stress. Ortets DAP 1, NGK 1 and GH 9 that had better $CO_2$ assimilation under low temperature condition did not perform equally well under drought conditions. The PS II activity of ortets and check clones did not vary significantly under drought conditions, however, it declined sharply in clones tested at Nagrakata during low temperature conditions, indicating the adverse effect of low temperature on photosystem II. Ortets GH 1, GH 9 and RRSA 585 showed better PS II activity during winter season. Soluble leaf protein content decreased in most of the plants tested under low temperature while it increased under drought. Malondialdehyde (MDA), a major lipid peroxidation product was less under low temperature conditions compared to drought in these plants. Among the ortets, GH 1 and GH 3 recorded comparatively high magnitude of reduction in sucrose content under stress in both the locations. Ortets GH 1, GH 3, DAP 1, NGK 1, DAP 35 and RRSA 98 recorded better adaptive traits under abiotic stress conditions in the early stages of growth and may be further shortlisted as potential clones suitable for extreme climatic conditions, which may also yield better, as their selection was primarily based on term performance of yield and other secondary traits in the fields.

**Key words:** Biochemical parameters, Cold stress, Drought, Ortet, Photosynthesis

## INTRODUCTION

Natural rubber (*Hevea brasiliensis*) is cultivated in a wide range of agro-climate like the drought prone region in Maharashtra and Odisha, low temperature affected regions in North East India as well as in Bengal for the past few decades. Exposure to extreme stress conditions in these regions affects productivity of rubber plantations to a greater extent. Rubber clones that are high yielding in the traditional rubber growing region may not yield well in these

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