PROJECT PROFILE

Title: Studies on response of important tree species to elevated CO2 levels under simulated temperature and moisture regimes at seedling stage

Principle Investigator: Dr. C. Buvaneswaran, Scientist D

Co Investigators: Dr. Rekha R. Warrier, Scientist D

Start and Completion Dates: July 2008 to March 2010

Objectives:

- To investigate response of tree seedlings with reference to the growth and productivity to the elevated CO_2 level under ambient and simulated temperature and moisture regimes.
- To examine physiological changes and nutritional parameters in tree seedlings under enriched level of CO_2 under ambient and simulated temperature and moisture regimes.
- To assess activity of enzymes – CA and RuBisCO in tree seedlings exposed to CO_2 enrichment under ambient and simulated temperature and moisture regimes.

Funding Agency: ICFRE

Total Budget: Rs. 30.0 lakhs

SUMMARY

Under this project, a new facility of 'Automated Open Top Chambers' has been established to conduct climate change research with particular reference to studies on response of tree species to elevated CO_2 as well as temperature.

As per the programme, three months old seedlings of Teak, Casuarina, Eucalyptus, Ailanthus, Neem, and Bamboo were exposed to elevated CO_2 levels in open top chambers at 600 ppm and 900 ppm for a period of three months. Simultaneously, seedlings were also kept as control in open top chambers without CO_2 enrichment. Another set of seedlings were also kept as control outside the chamber in the ambient environment. Observations on growth parameters, dry matter accumulation, basic physiological processes and photosynthetic enzymes (RuBisCO and CA)

activity revealed that there exist both inter- and intra-specific variations in response to elevated CO_2 and temperature levels.

The present study concludes that the response of different tree species to different concentration of CO_2 and under different temperature conditions is highly varying which emphasizes the need to assess all important tropical tree species individually and not to generalize the response of tree species to elevated CO_2. Further, the study also concludes that equivalent to or even greater than inter-specific variation, there exists huge intra-specific variation, particularly in *Casuarina equisetifolia* and *C. junghuniana*, which could be exploited for future breeding programme in developing climate ready genotypes having greater potential to sequester more CO_2. In this context, the 'Automated Open Top Chambers' facility created under this project can be used for evaluation of selection genotypes for greater CO_2 sequestration potential under elevated levels of CO_2 as well as temperature.