Project Profile

Title of the Project	:	Contributory factors in the establishment of *Leptocybe invasa* (Fisher and LaSalle) on Eucalyptus plantations in Tamil Nadu
Principle Investigator	:	Dr. N. Senthilkumar
Co Investigators	:	Dr. S. Murugesan Dr. J.P. Jacob
Duration of Project	:	3 years (2012-2015)
Objectives	:	• To study the spatial distribution, seasonality of threatening alien insect species, *Leptocybe invasa* in Eucalyptus plantations in Tamilnadu and workout the correlation with abiotic factors. • To study the host range, host preference, damage potential and biology of *L. invasa.* • To analyze the factors contributing to the settlement of *L. invasa* and effects upon the ecosystem. • To explore natural enemies of *L. invasa* and evolve management strategies to contain threatening alien species.
Funding agency	:	MoEF&CC
Summary/Achievements	:	The spread of Invasive Alien Species (IAS) is recognized as one of the greatest threats to the ecological and economic well being of the country. The eucalyptus gall wasp, *Leptocybe invasa*(Fisher and LaSalle) (Hymenoptera: Eulophidae) is one such species causing severe economic damage to eucalyptus. The Institute of Forest Genetics and Tree Breeding (IFGTB) has already undertaken surveys in the state of Tamil Nadu on eucalyptus gall infestation during 2007 and 2009. Based on the survey, the clone C10 has been abandoned in Tamil Nadu, since it was considered as the most susceptible clone, which farmers once preferred to grow for more biomass. Hence, further propagation and planting of C10 was stopped by TAFCORN, TNPL and many paper companies since 2009. Though there are indications that the outbreak level infestation of the gall wasp has subsidized, there are reports on the existence of gall wasp menace in Tamil Nadu here and there in small pockets. To assess the present situation on the occurrence, establishment and spread of the pest in Tamil Nadu and the damage caused, the study has been undertaken in different *Eucalyptus* growing areas of Tamil Nadu from April, 2012 to September, 2015 particularly in the TAFCORN and TNPL Eucalyptus growing areas in seven Agroclimatic zones viz., Cauvery Delta, North Eastern, Western, North Western, High Altitude, High rainfall and Southern zones respectively in Tamilnadu. Clones viz., C10, C3, C7, C274, C226, C413, C2045, C285, T61, T81,T113,T93, T97, KK5, C271, C283 were raised in aforementioned areas. Of the thirty eight clones, clones such as C10, C3, C7, C271, T61, C283, and KK5 were found infested with gall insect, *L. invasa.* Species in high altitude zone were free from gall insect. Clones C10, C283, C3 and C271 were severely infested with gall insect (80-100%). Clone C413 was planted in almost all the agro-climatic zones surveyed and found promising clone with less gall infestation. The most preferred clones such as C10, C3 and C7 were infested with gall insect in all agro-climatic zones of Tamil Nadu. Clones such as C274, C413, C226 and IFGTB-4 clones were found free from gall insect with promising growth traits. GIS based mapping was also made on gall infestation on Eucalyptus in Tamil Nadu. Population of *L.invasa* starts build up in the month of May and attained peak during July and August when the temperature was found to be high, correspondingly percentage of infestation was also high during said period. Population trend was positively correlated with temperature and negatively correlated with rainfall. Host preference studies have been conducted with no-choice and

		free choice test on 11 selected clones viz., C10, C3, C283, C7, C116, C271, C226, C284, C274 and C413; three seed sources viz., Kennedy River, Emu Creek, and Laura. Of the fourteen hosts tested Kennedy River and Emu Creek were free from gall infestation. Rests of them are preferred by gall insect. The most preferred clone was C10 followed by C3, C7, and C283 etc. Phytochemical screening was also carried out on various clones of *Eucalyptus* such as tannin, phenol, alkaloids, steroids, terpenoids etc. HPLC and GCMS with Electro antenna gram analysis of selected clones revealed that the 1-8 coneole (Eucalyptol), a monoterpenoid found to be a repellent or deterrent to gall wasp. Phenolic compounds in leaves of various clones were also evaluated and found there is a variation in chemical composition among clones which may be the contributory factors for the establishment and distribution of the insect species across difference agroclimatic zones of Tamil Nadu.