An epidemic outbreak of *Craspedonta leayana* (Latreille) on *Gmelina arborea* Roxb. in Cachar (Barak Valley), Assam, India

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*Gmelina arborea* (Family: Verbenaceae) is a fast growing commercially important tree species widely planted in most parts of Assam. *Craspedonta leayana* (Colepotera: Chrysomelidae) is a coleopteran defoliating insect pest of *G. arborea* causing serious damage in the nursery and plantation stages (Beeson, 1941; Mathur and Singh, 1959; Browne, 1968). The regular pest survey on *G. arborea* during the last two years period (2014-2015) revealed that during the period from April – June 2015, an epidemic outbreak of this pest was recorded in the district of Cachar (Barak valley) in Assam. The location near to the Assam University (Latitude 24° 41’ 15.2” N and Longitude 92° 45’ 02.2” E) and in Rosekandi village (Latitude 24° 41’ 57.1” N and Longitude 92° 42’ 06.1” E) areas in Silchar, the *G. arborea* plants were heavily defoliated by the monophagous beetle *C. leayana*. This is the first time observed all the plants planted in these areas were severely affected by this pest.

Anjan Barman (2014) reported that during 2013 serious defoliation by *C. leayana* on *G. arborea* plants planted inside the campus of Tezpur University, Assam. This pest was first observed from Meghalaya in North-East region of India during 1995 (Kumar et.al 1995). The lifecycle of this defoliating pest was studied in detail in laboratory condition and the management strategies were worked out. The trees in this region were completely defoliated by the pests two to three times in a year from April to October. Abundance of pest population showed increasing trend from April to August and attaining peak in August and in decreasing trend from September to October. The insects were undergoing diapause during November to March.

The life cycle involves five larval instar stages (Fig.1.C-G). Total life cycle period was about 33-35 days. The adult beetle lay eggs as a case called ‘ootheca’ underneath the stem branches (Fig.1. B). The larval stage itself takes 18 to 20 days. The full grown larvae pupate on the leaf (Fig.1. H). Young tress of *G. arborea* subject to repeated attack of the insect both larval and adult stages(Fig.1.I) become weak and succumb. Similarly young seedlings of this economically important tree species grown in nurseries are severely attacked by the insect and resulting in loss of healthy planting stock (Fig.1. A).

**Management of Craspedonta leayana**

The native entomopathogenic strain of *Beauveria bassiana* was evaluated for its pathogenicity against the larval and adult beetle stages of *C. leayana* in laboratory condition. Four concentrations viz. $2.4 \times 10^{10}$, $2.4 \times 10^{8}$, $2.4 \times 10^{6}$ and $2.4 \times 10^{4}$ spores/ml were tested on the larvae. Five replications were maintained for each concentration. Twenty larvae were used per replication. Control sprayed with distilled
water was also maintained. The spore concentrations in the final suspension were determined by haemocytometry (Tamuli and Gurusubramanium 2011). Larval and adult mortality was recorded at every 24hrs interval until the seventh day of the experiment. The experiment exhibited that the isolates at the concentrations \(2.4 \times 10^{10}\), \(2.4 \times 10^{8}\) and \(2.4 \times 10^{6}\) Spores/ml were pathogenic to the larvae and the higher concentration \(2.4 \times 10^{10}\) Spores/ml resulting 100% larval and 99.8% adult mortality over a period of 7 days and the concentration \(2.4 \times 10^{8}\) Spores/ml resulted in 100% larval and 99% adult mortality in laboratory condition. The experiment shows that the native entomopathogenic fungus \(B.\) bassiana was very much effective in causing cent percent mortality of the \(C.\) leayana in laboratory condition (Fig.1. J).

The higher concentration of \(B.\) bassiana spore inoculum \(2.4 \times 10^{10}\) Spores/ml was evaluated in the field condition also and found effective in control the pest both in larval and adult stages, causing 91% and 90% respectively.

CONCLUSION

The results of the present study demonstrated that native strain of entomopathogenic fungus, \(B.\) bassiana can be utilized for the effective control of the defoliator, \(C.\) leayana in nurseries and young plantations of \(G.\) arborea. The native strain of \(B.\) bassiana can be well integrated with other eco-friendly approaches that are considered as the best alternatives to chemical pesticides. There is growing interest in the use of entomopathogens for biological control, since they are naturally occurring and environmentally safe and can be easily made available to different user groups.

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REFERENCES


(Deuteromyotina: Hyphomycetes) (BBFF-135) against *Odontotermes* (Rambur) (Isoptera: Termitidae).

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Fig. 1.  A. *Gmelina arborea* tree defoliated by *Craspedonta leayana*,  B. Egg case ‘ootheca’ of *C. leayana*,  C. I instar of *C. leayana*,  D. II instar of *C. leayana*,  E. III instar of *C. leayana*,  F. IV instar of *C. leayana*,  G. V instar of *C. leayana*,  H. Pupa of *C. leayana*, I. Adult beetles of *C. leayana*,  J. *C. leayana* infected with *Beauveria bassiana*  

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