Oxicidal activity of the wood of *Pterocarpus marsupium* Roxb. (Fabales: Fabaceae) against the teak defoliator, *Hyblaea puera* Cramer

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*Pterocarpus marsupium* Roxb., is one of the most valuable multipurpose forest trees. The wood of this tree is known for its therapeutic and pesticidal properties (WOI, 1985; Ahmad et al., 1989). In this study, we aimed to explore the oxicidal activity of the wood of *P. marsupium* against *Hyblaea puera*. *Hyblaea puera* Cramer (Lepidoptera: Hyblaeidae) is the most important defoliator pest of teak in India. Teak is its principal food plant, but it has several alternative hosts on which it thrives. It feeds on all the leaf tissues leaving only the major veins. *H. puera* causes extensive damage to plantations, resulting in reduced productivity. In India, *H. puera* infestation is a routine annual phenomenon and its defoliation was reported to cause 44 per cent volume increment loss (Nair et al., 1996).

The present investigation was carried out during 2006 at Institute of Wood Science & technology, Bangalore. The wood of *P. marsupium* collected from IWST (Institute of Wood Science and Technology) campus forest, Bangalore was powdered in a pulverizer. 100g of the powdered wood was dissolved in 250 ml of each of the solvent namely petroleum ether, chloroform, methanol, ethyl alcohol, ethyl acetate, acetone and water and kept in sealed round bottom flasks. After 48 hours, it was extracted in soxhlet apparatus until the respective eluting solvents turned colourless. The solvent was evaporated and the dry crude extract obtained was weighed and stored in refrigerator.

A known amount of crude extract obtained from the above process was dissolved in respective solvent in 1:1 proportion and serially diluted with water to obtain the desired concentrations of 0.5%, 1%, 2%. One drop of emulsifier (0.005%) (Tween 20, Sigma Chemical Company) was added to the extract to ensure complete dispersion of the active ingredient.

The moths were collected from the laboratory reared larvae of teak defoliator, *H. puera*. The freshly emerged moths were reared in the glass jar covered with the muslin cloth. The moths were provided with ten percent honey as food. The moths laid the eggs on the muslin cloth. 12-hour-old eggs were carefully taken on a small piece of muslin cloth using fine camel hair brush. 5 replications with 5 eggs each were used for the experiment. The extract was prepared at a concentration of 2%, 1% and 0.5%. It was sprayed on the egg using a micropipette. The cloth with the eggs after complete drying was introduced into glass vials and covered with muslin cloth. Treatment with water and respective solvents served as control. The eggs were observed for hatching after 48 hours. Percentage of egg mortality was calculated. The percentage values were transformed to
ensure normality and variance homogeneity using an arcsine transformation (Zar, 1999).

The ovicidal activity of the wood extracts of *P. marsupium* on *H. puera* did not vary among the different extracts. All the treatments exhibited 100% egg hatch inhibition at all concentrations (Table 1). The control showed 100% egg hatching. *Pterocarpus marsupium* Roxb. demonstrates very unique features which include the medicinal properties of the various parts of the tree namely, heart wood, leaves and flowers. This study has demonstrated the possible ovicidal activity of the wood of *P. marsupium* against *Hyblaea puera* Cramer. This study supplements the findings of earlier workers. It was reported that the wood possess pesticidal properties (WOI, 1985). The leaves were reported to possess antifeedant and repellent property against *Sinoxylon sudanicum* (Reddy and Urs, 1989). The same authors have tested the larvicidal activity of the wood of *P. marsupium* against the larvae of *H. puera* and found effective (Deepa and Remadevi, 2010). Other plants like *Melia azadarach*, *Strychnos nux vomica*, *Jatropha curcas*, *Cassia fistula*, *Gnidia glauca*, *Ricinus communis*, *Vitex negunda*, *Derris indica*, *Clerodendron inermae*, *Lantana caftera*, *Semecarpus kathalekanesis* have been proved to produce varying degree of ovicidal activity on the eggs of *H. puera* (Javaregowda and Krishna Naik, 2006; Ramana, 2005). The present study once again confirms that the *P. marsupium* has anti-insect property. With all the extracts, the lowest concentration tested (0.5%) itself yielded 100% mortality which shows that *P. marsupium* exhibits high ovicidal activity. The antifeedant and larvicidal activity is already well established in this plant. The present study proves that the organic solvent extracts of the wood of *P. marsupium* is highly effective as ovicide.

**CONCLUSION**

The environmental hazards posed by synthetic insecticides provide an impetus for investigations into some ecofriendly and biorational alternatives for insect pest management. The study shows that the crude wood extracts of *P. marsupium* or suitable formulations developed from the wood extracts has significant potential to be used as bio-pesticide.

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**REFERENCES**


Table 1: Ovicidal activity of various extracts of *P. marsupium*

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Concentration in %</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Petroleum ether</td>
<td>100.00±0.00 (90.00)</td>
</tr>
<tr>
<td>Chloroform</td>
<td>100.00±0.00 (90.00)</td>
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<tr>
<td>Methanol</td>
<td>100.00±0.00 (90.00)</td>
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<tr>
<td>Ethyl alcohol</td>
<td>100.00±0.00 (90.00)</td>
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<tr>
<td>Ethyl acetate</td>
<td>100.00±0.00 (90.00)</td>
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<tr>
<td>Acetone</td>
<td>100.00±0.00 (90.00)</td>
</tr>
<tr>
<td>Water</td>
<td>100.00±0.00 (90.00)</td>
</tr>
<tr>
<td>Control</td>
<td>0.00(0.00)</td>
</tr>
</tbody>
</table>

Mean ± SD represents mean percentage mortality of 5 replicates with 5 individuals each. Values within parentheses are angular transformed values.

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