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Natural plant oils kill pine processionary moth larvae

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Introduction

Pine processionary moths (PPM) belonging to the genus *Thaumetopoea (e.g. T. wilkinsoni* Tams. and *T. pityocampa* Schiff) are one of the important forest pests in Europe especially the Mediterranean area. These larvae cause significant economic and ecological damage on the host trees. The larvae feed on pine needles which can stunt tree growth. Besides being a threat to trees they also pose a threat to human and animal health. There is much reluctance to use chemical pesticides to control this pest due to the risks they pose to humans and the environment (Fig. 1). Plant products have long been used in many parts of the world against insect pests. In the search to find environmentally friendly alternatives, six essential plant oils were tested at different times against 3rd and 4th instar larvae of PPM.

Methodology

PPM nests were collected from Pine trees (*Pinus brutia* Ten.) in Isparta, Turkey in the first week of February for the 3rd instar and last week of March for the 4th instar larvae and transferred with aerial container to the laboratory (Fig. 2). Locally obtained oils of oregano, juniper berry, ginger, eucalyptus, rosemary and cedar wood (Fig. 3) were diluted in water (10% (v/v) and the emulsion (10ml) injected into silken nests (Fig. 3). The nests were kept in ventilated plastic containers and the mortality of the larvae recorded 24 and 48 hours post treatment. All tests were kept at 26±2 °C, 50±5% relative humidity. Each experiment was replicated three times.

Results & Discussion

All the oils with the exception of juniper berry oil caused over 60% mortality on 3rd instar larvae at 24 and 48 hours post treatment. Juniper berry caused less than 40% mortality. Only eucalyptus oil consistently gave 100% control. Ginger oil caused between 85 and 100% mortality (Fig. 4). The oils did not produce more than 3% mortality on 4th instar larvae at 24 and 48 hours post treatment. Cedar wood and ginger oil caused 67% and 31% mortality at 72 hours post treatment, respectively (Fig. 5). The oils did cause some larvae to leave the nest. Several studies have shown that the plant oils offer great potentials to control PPM larvae [1, 2, 3].

PPM larvae are nocturnal. Forcing the larvae to leave the nest during the day increases the likelihood of them being killed by predators. The exact mechanism by which the oils kill the larvae is unclear but we postulate that the oils may act as con-

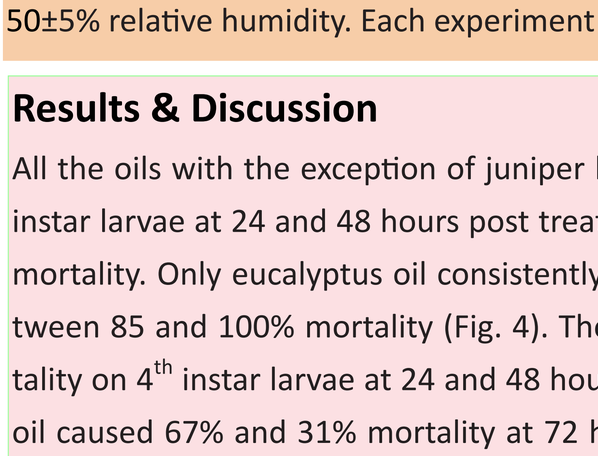

Fig. 1. PPM infested pine trees in Isparta/Turkey (upper) and Intense contact urticaria with associated angioedema on the student face (below).

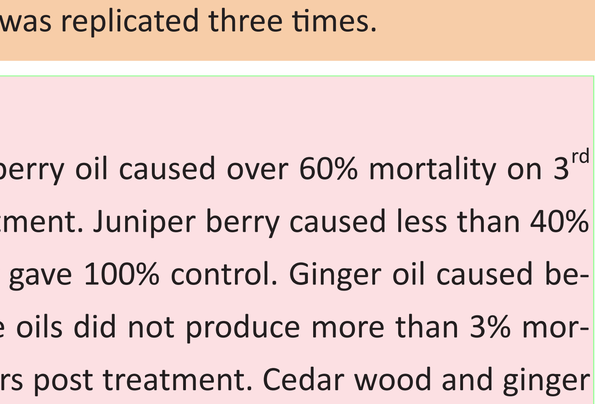

Fig. 2. Field collected PPM nests transferred to laboratory with plastic containers.

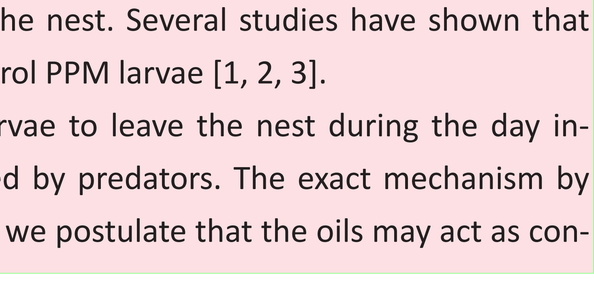

Fig. 3. Locally obtained oils of oregano, juniper berry, ginger, eucalyptus, rosemary and cedar wood .

Fig. 3. Plant oil injections to PPM nests .

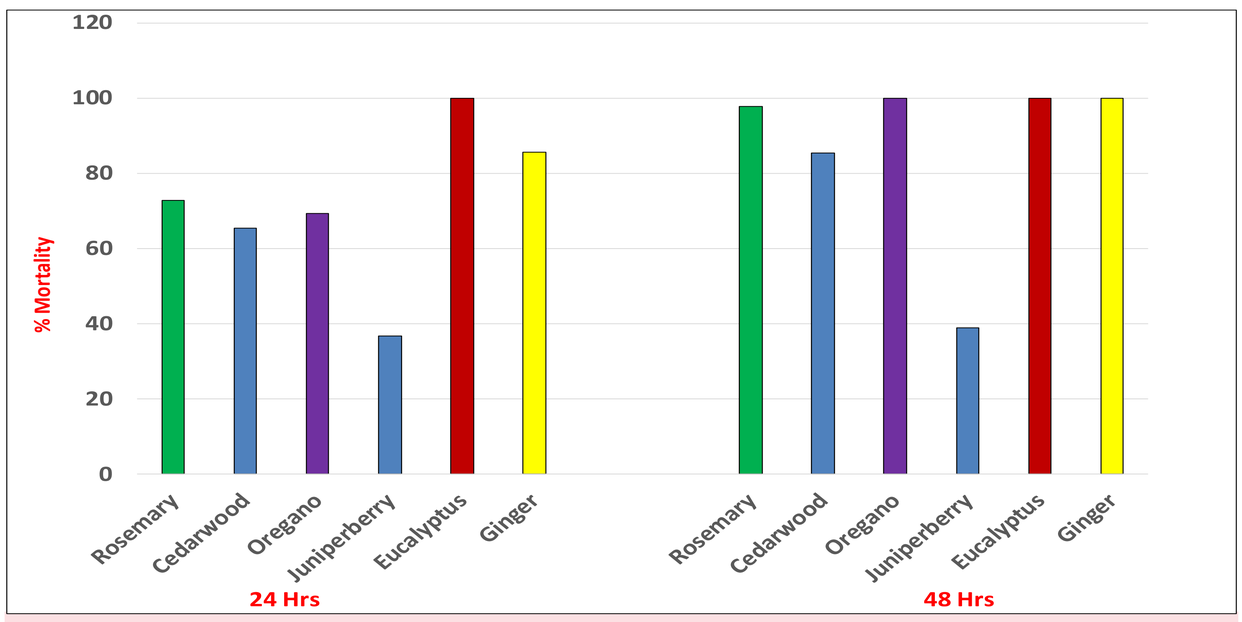

Fig.4. Percentage mortality of the 3rd instar PPM larva at 24 and 48 hours post inoculations of the plant oils.

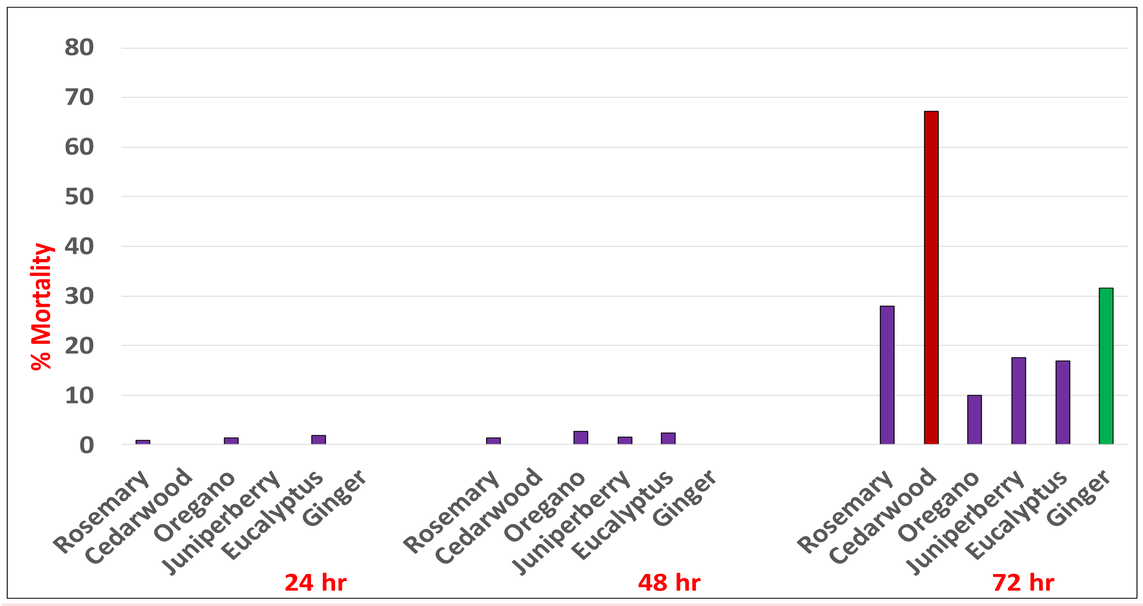

Fig. 5. Percentage mortality of the 4th instar PPM larva at 24, 48 and 72 hours post inoculations of the plant oils.

References

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