

Studies on application, importance and effect of Neem tree (*Azadirachta indica*) oil on effect and intensity of guava insects

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ABSTRACT: In present decade it has been found that nearly 50% of guava crop is infected due to insect pests and diseases. About 150 arthropods attack on fruit trees and cause serious damage in terms of both quantity and quality. Experiments effect of neem oil on intensity of guava insect was carried out in formers field of riverbed area of Ganga in RBD with three replications. Neem oil were used in three concentrations i.e. 0.5, 1.0 and 1.5 per cent. It was found that guava crop infected by majour insect oriental fruitfly (*Daccus dorsalis* H.), Bark borer (*Inderbela tetraonis* moor), fruit borer (*Virachola isocrates* Fabr.), guava fruit fly (*B. correcta*) and aphids (*Aphis gossipii*). It was found that aphids population was 30.5, 15.8 and 10.5 per unit by the 0.5, 1.0 and 1.5 per cent use of neem oil. However, in control treatment aphid population was found 39.5 per unit. Bug population was found 20.3, 10.5 and 3.5 per unit with the use of 0.5, 1.0 and 1.5 per cent neem oil. Among all the three concentrations of neem oil, 1.5 per cent concentration revealed highly significant results. Population of leaf roller (*Tonica zizyphis*), Fruit borer (*Virachola isocrates*), Fruitfly (*Dacus dorsalis*) and leaf weevil (*Myloccerus discolor*) was minimum 3.2, 1.6, 1.0 and 2.3 per unit, respectively. Neem oil form a coating on the insect body, which block the breathing process and suffocating the insect. Neem oil also work as a repellent on certain insect pests and mites also.

I. INTRODUCTION

The neem tree (*Azadirachta indica*) is a tropical evergreen tree native to India and is also found in other South East countries. In India neem is known as "the village pharmacy" because of its healing versatility, and it has been used in Ayurvedic medicine for more than 4000 years due to its medicinal properties. Neem is also called 'Arista in Sanskrit which means 'Perfect', complete and imperishable'. The seed, bark and leaves contain compounds with proven antiseptic, antiviral, antipyretic, anti-inflammatory, anti-ulcer and antifungal and pesticidal properties. The Sanskrit name 'nimba' comes from the term 'nimbatyasyasthyamdadati which means to give good health. The various parts of this tree live neem oil, neem seed cake, neem leaves, neem extracts, neem bark and roots are also used in insect-pests management. Azadiractin can act as a feeding differentiate against a number of insect pests including beetles. It reduces the level of the insect hormone 'Ecdysone' by disrupting the insect's molting process so that the immature larvae can not develop in to adult.

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II. MATERIALS AND METHODS

Guava crop were selected in guava orchards of river bed area of Ganga and experiment were laid out in Randomised Block Design with three replications. For the study of population, method of Atwal and Singh (1990) were adopted. Incidence and intensity of different insect pests were recorded at weekly interval in four directions. Which were tagged selecting 5 branches in each crop and data were recorded on incidence and intensity. Number of insect present per 10 leaves/twig/branch were taken as an unit. Neem oil spray solution was prepared by the following formula :

$$\text{Amount of insecticidal formulation} = \frac{\text{Concentration required} \times \text{volume required}}{\text{Conc. of toxicant in insecticidal formulation volume}}$$

III. RESULTS AND DISCUSSION

Neem oil works in a number of different ways. The oil forms a coating on the insect body, which block the breathing process and suffocating the insect. Neem oil also work as a repellent on certain insect-pests and mites also. It prevents the plants from fungal infection (Quarles, 1994).

During the present investigation, number of insects-pests was observed to attack the guava crops. Among them oriental fruit fly (*Dacus dorsalis* H.), Bark borer (*Inderbela tetraonis* moor), Anarbuter fly or fruit borer (*Virachola isorates* Fabr.) guava fruit fly (*B. correta*) and aphids (*Aphis gossipii*) was found more serious for the relative response to different aspects and data of the observations have been summarised in respective tables (Deepa *et al.* 2009).

It was found application of neem 1.5% revealed significant results in control of insect pests of guava aphid was found 39.5 per unit in control, however 11.5 in 1.5 percent of neem oil spray. Similarly Bug was 25.6 per unit in control and 3.5 per unit in treatment of 1.5 per cent neem oil spray. Application of 0.5 and 1.0 percent also showed effect but is was non significant Chawan (1993). Reported that one percent neem oil prevent neem oil treatment was effective in managing powdery mildew. Neem oil does not persists in the environment for long time and is degraded by ultraviolet light and rainfall. Many neem products have low mammalian Toxicity. Due to less Persistence Time (PT), they may have less of an effect on non target beneficial organisms compared to some of the more traditional pesticides. (Locke, 1994; Gahukar, 2014; Ahmad *et al.* 2015). Researchers found few effects on many insect predators including spiders, ear wings and ants but flowerfly larvae are very sensitive to neem sprays. Schmutter (1990), Girish and Shankara (2008) and Estafania *et al.* (2016) also found similar results in their investigations.

Persistence Time of the Neem products are very limited in the environment. Temperature ultraviolet light, rainfall and other environmental factors can degrade neem based pesticides. So repeated application is needed to achive the

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satisfactory results. Because it is an insect growth regulator so effective only in immature stages of insects (Islam *et al.* 2011).

Insect affected by neem products:

These are more than 200 species of insect-pests which have affected by the neem products. Here we present some common and brief information to show the range of effects and the range of species affected.

<u>Insect</u>	<u>Effects</u>
Fruit fly	Arrest pupal development, growth inhibit
Oriental fruit fly	Toxic to larvae
White fly	Repels, retards the growth
Beetle	Retard growth, inhibits feeding, disrupt molting
Aphid	Reduces fecundity, disrupt molting
Gall midge	Toxic
Thrips	Growth retards
Leaf miner	Feeding disrupt molting, disrupt growth
Migratory locust	Stop feeding, converse gregarious nymph in to solitary forms, reduces fitness, Adult cannot fly.
Cricket	Disrupt molting
Mealy bug	Repels, inhibits feeding
Weevil	Inhibit feeding, disrupt growth, toxic
Bark borer	Retard growth, repel adults, and disrupt molting

At present time, application of plant based materials (botanical insecticides). Such as neem oil in pest control has been increased. Product of the neem is safer for the management of pests, compared to synthetic chemicals; their effects in IPM must be evaluated (Tunka *et al.*, 2012; Mathur and Kachhwaha, 2015).

Several studies have investigated the relationship between botanical insecticides and natural enemies of agricultural pests (Islam *et al.*, 2011; Tunka *et al.*, 2012; Usman *et al.*, 2012 and Roychaudhary, 2016).

Table 1: Efficacy of Neem Oil against guava insect.

	Population per unit			
	Control	0.5%	1.0%	1.5%
Aphid (<i>Aphis gossypii</i>)	39.5	30.5	15.8	10.5
Bug (<i>Helopeltis antanii</i>)	25.6	20.3	10.5	3.5
Bark Borer (<i>Inderbela tetraonis</i>)	5.5	4.5	2.3	1.5
Leaf roller (<i>Tonica zizyphis</i>)	15.5	13.6	6.8	3.2
Fruit borer (<i>Virachola isocrates</i>)	5.9	4.2	3.5	1.6
Fruit fly (<i>Daccus dorsalis</i>)	6.2	4.9	2.9	1.0
Leaf weevil (<i>Myllocerus discolor</i>)	10.5	8.3	7.4	2.3
CD at 5% level of significance	6.5	5.6	3.4	2.8

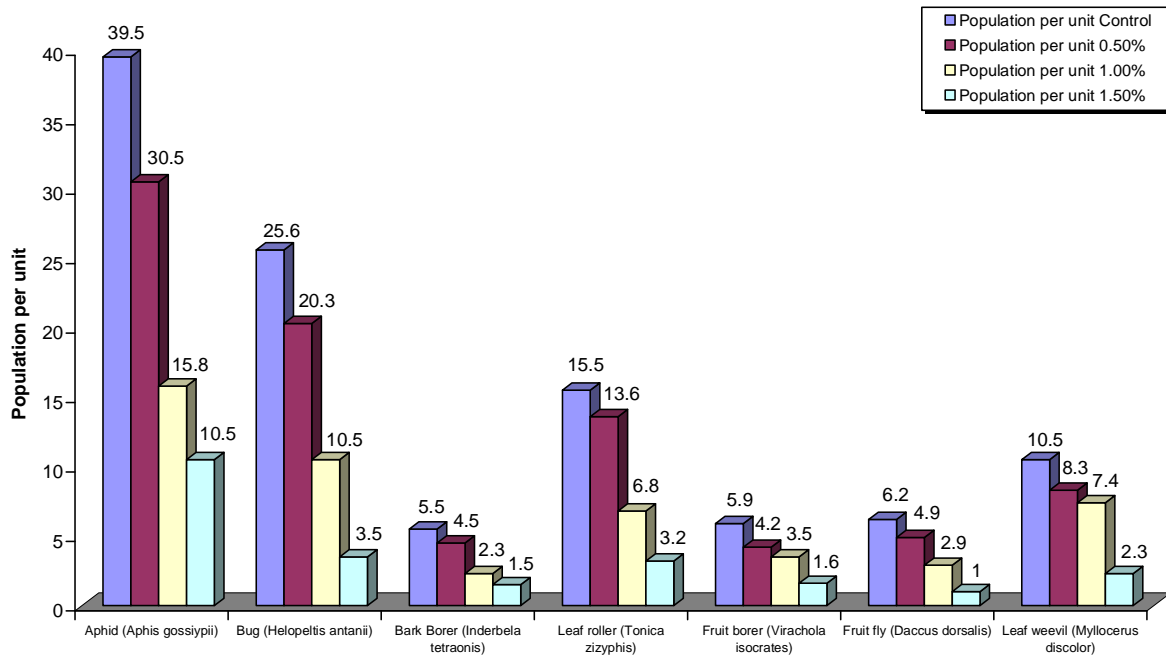
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Fig. 1 : Efficacy of Neem Oil against guava insect.



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