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Influence of Neem oil on Ovipositon Deterrence of Uzifly Exorista Bombysis

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ABSTRACT:- Pests and diseases are important factors affecting the productivity of silk worm. Many kinds of pests and diseases of Mulberry and silk worm along with appropriate measures to control them, have been identified. Besides being susceptible to different diseases, the silkworm, Bombyx mori L. is also attacked by a number of pests. Among the insect pests that attack silkworm, the most formidable one is a dipteran parasitoid, Uzifly.

Fifth instar silkworm larvae were reared in the wire mesh cage and one pair of two day old Uzifly were released into the cage for oviposition. Sixty Uzifly eggs on the body of the fifth instar silkworm larvae were selected (Silkworm larvae having minimum one egg and maximum two Uzifly eggs were selected) and treated with 0.5, 1 and 1.5 µl of neem oil / 1µl of acetone with help of automizer to record the egg hatchability. Controls and Carrier controls were maintained to compare the results and the experiments were replicated six times. At 0.5µl, 1µl and 1.5µl of neem oil/1µl of acetone oviposition of the adult Uzifly on silkworm larvae recorded on an average was 126.83±0.477, 108.83±0.703 and 90.17±0.654 respectively where as in the control and carrier control it was recorded as 169.33±0.615 and 164.67±0.333 respectively. From the results it is evident that neem oil treated resultants reduced the oviposition of Uzifly on the fifth instar silkworm larvae compared to the controls and the oviposition of Uzifly on the fifth instar silkworm larvae reduced with increase in the concentration of neem oil.

Key words:- *Silk worm (Bombyx mori) Uzifly(Exorista bombysis) Neem oil, Oviposition deterrence.*

I. INTRODUCTION

The extracts from seeds of neem tree *Azadirachta indica* A.Juss (Meliaceae) are known to possess toxic, antifeedant , repellent, growth regulating and fecundity reducing properties for various insect pests (Schmutterer, 1990).

Neem is known to disrupt insect moulting by antagonizing ecdysone and this leads to defects in the insects and the insecticidal performance of neem product in controlling pests of forest tree species. They found that adult emergence, mortality and oviposition of pests decline due to neem product treatment (Schmutterer, (1995), Murugesan *et al.* (1998)

Nathan et al. (2007) observed that in sub-lethal concentrations, neem could cause deformations in the planthopper *Nilaparvata lugens* (Stal) (Hemiptera: Delphacidae) nymphs. Neem contains at least 35 biologically active principles of which azadirachtin, a triterpenoid is the predominant active ingredient in the seeds, leaves, and other parts of the tree (Mulla *et al.*, 1999).

The growth regulatory effects of azadirachtin are mostly concerned with its interference in the neuroendocrine system of the insects (Mordue & Nisbet 2000). The main hormones involved in growth regulation in insects are ecdysone and 20-hydroxy-ecdysone (moulting hormones) and juvenile hormone (JH). They are respectively produced in the prothoracic glands and corpora allata, through stimulation of hormones secreted in the brain (Wigglesworth 1972).

Mordue and Blackwell (1993) had used neem derived botanicals to suppressed fecundity and sterility, reduced insect oviposition, egg hatchability, post embryonic development and progeny production.

Carvacrol, carveol, geraniol, linalool, menthol, terpineol, thymol, verbenol, carvones, fenchone, menthone, pulegone, thujone, verbenone, cinnamaldehyde, citral, citronellal and cinnamic acid have been evaluated as ovicides against *Musca domestica* eggs (Rice and Coats, 1994). Garlic oil which is an oviposition deterrent has been found to be highly toxic to eggs of *Plutella xylostella*. Oviposition of diamond black moth (*Plutella xylostella)* has been reduced by a neem based product (Liu and Liu, 2006).

Petroleum extract of neem (Rajana Saxena and Beenam Saxena, 2000), *Jatropa curcas* seed oil (Adebowale and Adedire, 2006), powdered leaves and extracts of *Vitex negundo* (Rahaman and Talukder, 2006), plant lectins derived from *Cicer arietinum* (Govindan and Jeyarajan Nelson, 2008) were reported to have significant oviposition deterrent and other biological activity against insect pests. Naumann and Isman (1995) reported that 1 % crude oil emulsion significantly reduced the proportion of eggs laid by *Spodoptera litura* on treated plants.

The neem oil and pyrethrum flower powder were reported the best control of pulse beetle when these products were used at the rate of 50 mg per ml per 100 g of faba bean seeds (Bayeh and Tadese, 1996). Neem seed powder, pepper (*Piper longum* L.) and persian lilac (*Melia azederach*) seed

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powder were reported to protect the bean seeds from bruchid beetle's attack for up to 120 days (Negasi and Abage, 1992).

Neem oil were very effective against pulse beetles till sixteen weeks to reduce oviposition, percent eggs hatching, progeny emergence and seed damage when applied at the rate of 2.5 ml kg-1 seeds (Chinwada and Giga,1993).

Hence in the present work an attempt has been made to investigate the influence of neem oil as the oviposition deterrence of Uzifly on the silkworm larvae.

II. MATERIAL AND METHODS

Neem oil was purchased from local Ayurvedic shop. 0.5, 1 and 1.5 µl of neem oil was dissolved in 1 µl of acetone and used for the treatments.

A. Silkworm rearing

Disease free eggs of the cross breed (PMxCSR2) silkworms were used in the present investigation. Silkworms were reared at room temperature. The mulberry leaves harvested from the irrigated mulberry garden were used as food for silkworm. Silkworms were fed four times daily.

Sixty fifth instar silkworm larvae were reared in the wire mesh cage after treating with 0.5, 1 and 1.5 µl of neem oil and then a pair of two day old Uzifly were released into the cage and allowed to oviposite for two days to observe oviposition deterrence. Controls and Carrier controls were maintained to compare the results and the experiments were replicated six times.

B. Statistical analysis

The results of the ovipositonal deterrence were expressed as mean ± standard Error (SE) and the data was subjected to ANOVA using sheffee Dunkan and Dunnet as post hoc test using SYTAT version 2011 ($P<0.05$) and ($P< 0.01$) .

III. RESULTS

A. The effect of neem oil on the oviposition deterrent of Uzifly

Sixty, fifth instar silkworm larvae were reared in the wire mesh cage after treating with 0.5, 1 and 1.5 µl of neem oil, then a pair of two day old Uzi fly were released into the cage and allowed to oviposite for two days to observe oviposition deterrence. It was observed that neem oil spray on fifth instar silkworm larvae deterred the oviposition of the Uzifly and was dose dependent (Graph: 3. 1.2.).

B. Control and carrier control

The oviposition of Uzifly on the fifth instar silkworm larvae of the control and carrier control were observed and recorded on an average was as 169.33±0.615 and 164.67±0.333 respectively. Uzifly oviposition deterrence was reduced on the fifth instar silkworms treated with neem oil when compared to the control and carrier control (Graph: 3.1.1).

C. Treated

- **The influence of 0.5µl of neem oil/1µl of acetone on the oviposition deterrence of Uzifly**

Ovipostion of Uzifly on the treated fifth instar silkworm larvae with was observed and it was noted that the eggs laid by the Uzifly on the treated silkworm larvae were on an average was 126.83±0.477.

- **The influence of 1µl of neem oil/1µl of acetone on the oviposition deterrence of Uzifly**

The oviposition behavior of adult Uzifly was affected due to spraying of 1µl of neem oil/1µl of acetone on the fifth instar silkworm larvae and eggs laid by the Uzifly on the silkworm larvae were recorded as 108.83±0.703.

- **The influence of 1.5 µl of neem oil/1µl of acetone on the oviposition deterrence of Uzifly**

Uzifly oviposition was very much affected due to spraying of 1.5µl of neem oil/1µl of acetone on the fifth instar silkworm larvae and eggs laid by the Uzifly on the treated silkworm larvae reduced to 90.17±0.654 when compared to the control and carrier control.

From the above results it is evident that neem oil reduced the oviposition of Uzifly on the fifth instar silkworm larvae when compared to the controls. Neem oil proved to be a good deterrent for the oviposition of the Uzifly. It was observed that the oviposition of Uzifly on the fifth instar silkworm larvae treated with neem oil reduced as the concentration of neem oil increased.

IV. DISCUSSION

The results of present study indicate that the oviposition response of *Exorista bombycis* was influenced greatly on neem oil treated silkworms compared to the control. Among the concentrations i.e., 0.5 µl , 1 µl and 1.5 of neem oil used at 1.5µl, Uziflies exhibited maximum ovipositon deterrency. However, higher the concentration of neem oil greater was the reduction in oviposition of Uzifly. These results are in agreement with the reports of Velasamy ***et al***., (1987) on *Nilparvata lugens*,, Venkateswarlu *et al.*(1988) on *Spodoptera litura F* and Singh (1990) on *Callusobruchus chinensis* with neem oil.

In the present study, maximum reduction in the oviposition of Uzifly was observed on the silkworms treated with neem oil as also reported by Naumann and Isman (1995) working with crude oil, Kumar *et al.,* (1997) , Roopa patil and Basavana Goud, (2003) with *Azadirachta indica* and Ayyangar and Rao, (1989) with neem on *Plutella xylostella* and also by Jayakumar *et al.,* (2005 a) on *Callosobruchus maculates with Acorus calamus.*

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Presence of Azadirachtin and other tetranortriterpenoids may be responsible for the oviposition deterrency of Uzifly on the treated silkworms with neem oil as also reported by Jeyasankar, *et al.,* 2005 with Neem seed kernel extract against *Callosobruchus maculates*(F.)

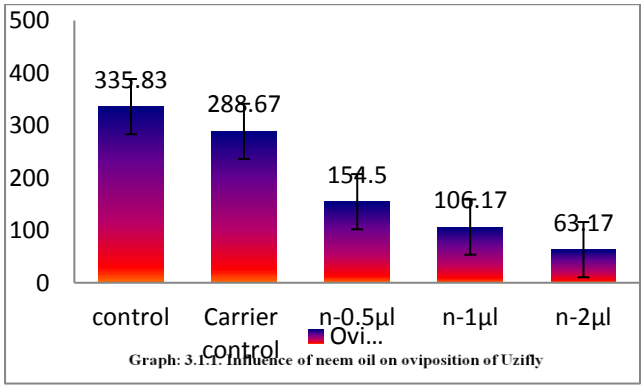
The results of present study on oviposition deterrencey of Uzifly on the treated silkworm larvae with neem oil could be due to the ability of neem oil to induce changes in the physiology and behaviour of the adult of Uzifly, *Exorista bombycis* as also reported by Singh R, (2011).

Neem oil may be active against adult Uzifly to reduce the ovipositon on the treated fifth instar silkworm larvae. This action could be the result of Uzifly sensitivity to neem oil to deter egg laying on the body of silkworm larvae as also reported by Mansour *et al*., (1986) working on *Tetranychus cinnabarinus* and by Dhar *et al*., (1996) with neem against *Anopheles stephensi.*

Secondary compounds present in the neem oil i.e. terpenoids , alkaloids and phenolics and mixture of these compounds might havedeterred Uzifly from the oviposition on the fifth instar silkworm larvae as also reported by Isman, (2006) and Khater HF.(2011).

The interaction between neem oil and treatment doses were significant and all the doses i.e., 0.5, 1 and 1.5 µl proved effective in deterring the oviposition of Uzifly on the neem oil treated silkworm larvae. Similar results were observed by Mathur *et al.* (1985) working on *Callosobruchus chinensis* by using neem kernel powder and Naik and Dumbre (1984) with neem oil and by Ivbijaro (1990) with neem seed treatment on on *Callosobruchus maculates.*

Oviposition deterrence of Uzifly on the treated silkworms with neem oil might be due to neem components detected by the ovipositor of the Uzifly as a signal thereby reduced oviposition as also observed by Chen *et al.* (1996) working with neem seed kernel extracts on oviposition of the oriental fruit fly (Diptera: Tephritidae).



Graph: 3.1.1. Influence of neem oil on oviposition of Uzifly

It appears that the secondary metabolites in neem might have posses oviposition deterrent principles which reduced the oviposition of Uzifly when compared to the control as also reported by Das et al, (2003) working on mosquitoes with Petroleum ether extract of *Zanthoxy lemlimonella and Citrus aurantifolia* and by Rahman, S. (1997) with neem (*Azadirachta indica, A. Juss)* on the larvae of *Culex quinquefasciatus.*

The present study result suggests that neem oil exhibited effective oviposition deterrency against Uzifly, Exorista bombycis. Thus neem oil reduces the damage caused by Uzifly to the silkworm cocoon crops. and can bringing down the Uzi fly population in the sericultural belts.

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