EFFICACY OF DIFFERENT CONCENTRATIONS OF NEEM OIL AGAINST SHISHAM DEFOLAITOR, *PLECOPTERA REFLEXA* GUEN (NOCTUIDAE, LEPIDOPTERA)

Naveed Ahmed[1], Tanvir Ahmad Qureshi[2] and Muhammad Hamayoon Khan[3]

Abstract

Neem oil was used in 0.5, 1.0, 2.0 and 3.0% concentrations. 100 percent mortality of shisham defoliator occurred in 3.0% concentration after one week of treatment. Maximum mortality of larvae was recorded as 33.33 % each in 2.0% and 3.0% concentration after 24 hours, 44.44% in 2.0% concentration after 48 hours and 56.11% in 3.0% concentration after 72 hours. Percent mortality was not significantly different among different concentrations of neem oil but was different significantly from control treatment.

Introduction

Use of toxic chemicals for pest control is presently discouraged due to their adverse effects, such as, environmental degradation, human hazard, pest resistance, pest resurgence, out-breaks of secondary pests and all that at very high cost of pesticides and their application. These demerits have renewed interest in safe pesticides as ecological sustainability has become a key consideration in pest control (Ismail *et al.*, 1992).

Botanical insecticides are promising alternatives for use in insect management. Botanical insecticides are naturally occurring compounds derived from plant sources. Botanicals degrade rapidly in sunlight, air, and moisture and are rapidly broken down by detoxification enzymes. The rapid degradation of botanicals and their action as stomach poisons make them more selective in some instances for plant feeding pest insects and less harmful to beneficial insects. There are many botanical insecticides, which are safe to be used in pest management along with biological control agents. Neem products are derived from the neem tree, *Azadirachta indica* that grows in arid tropical and subtropical regions on several continents. The principal active compound in neem is azadirachtin, a bitter, complex chemical that is both a feeding deterrent and a growth regulator. Meliantriol, salanin, and many other minor components of neem are also active in various ways. In insects, neem is most active as a feeding deterrent, but in various forms it also serves as a repellent, growth regulator, oviposition (egg deposition) suppressant, sterilant, or toxin (Tess and Weinzieril, 1989).

Evaluations of AZ against numerous species of insect pest have demonstrated neem's diverse biological effects: repellence (Chander *et al*., 2000, Sahayaraj and Paulraj 2000, Zahoor *et al*., 2002), feeding deterrence.

1 Assistant Forest Entomologist, Pakistan Forest Institute, Peshawar

2 Forest Chemist, Pakistan Forest Institute, Peshawar

3 Assistant Forest Entomologist, Pakistan Forest Institute, Peshawar

(Isman 1993), reduced growth and abnormal development (Beckage *et al*., 1988), oviposition deterrence (Lohra *et al*., 2001), and also direct toxicity (Ahmed *et al*., 2001). Neem extracts were successfully used against beetle, *Pityogenes chalcographus* L. (Wulf 1991). Neem seed extract controlled more than 80 % population of major stored grain insect pests and grain damage up to 6 months which remained quite effective up to 13 months in a farm level trail in Sindh (Anon., 1991). Similarly, Tahir, *et al*. (1992) used neem extract factor B (NFB) against adults of rice weevil, *Sitophilus oryzae*, and found effective up to 7-10 days after treatment.

Material and Methods

Neem oil was provided by Chemistry Branch of Pakistan Forest Institute, Peshawar. The experiment was laid in randomized complete block design using neem oil in 0.5, 1.0, 2.0 and 3.0% doses with control in three replications. The experiment was conducted under laboratory condition.

Shoots of shisham were sprayed with neem oil in the respective doses and kept in glass chimneys and ten 3rd instar larvae of shisham defoliator, *Plecoptera reflexa* were released on the shoots under laboratory conditions with temperature ranging from 25-30 °c and relative humidity 60 – 70 %. Larvae were allowed to feed on the treated food for 48 hours after which fresh sprayed leaves were provided every day. In the control treatment water was sprayed only and food was changed daily. Mortality data were recorded after 24 hours, 48 hours, 72 hours and one week.

Results and Discussion

The results are tabulated in the following table.

Table 1. Efficacy of Neem Oil against the larvae of *Plecoptera reflexa* Guen.

S. No.	Concentration (%)	Mean percent mortality of larvae after			
		24 hours	48 hours	72 hours	One week
1.	0.5	29.33 a	24.99 a	41.11 a	80.55 a
2.	1.0	26.66 a	36.90 a	36.11 a	83.33a
3.	2.0	33.33 a	44.44 a	44.44 a	83.33 a
4.	3.0	33.33 a	40.27 a	56.11 a	100 a
5.	Control	0.00 b	0.00 b	0.00 b	10 b

Means followed by the same letters are not significantly different at 5% level of probability.

Mortality of larvae started after 24 hours of treatment but the difference among the treatments was not significant. After 24 hours of treatment 33.33 % mortality was recorded each in 2.0 % and 3.0% concentrations, whereas at 0.5 % and 1.0% it was 29.33% and 26.66 % respectively. After 48 hours of treatment maximum mortality of 44.44 % occurred in 2.0% concentration followed by 3.0% giving 40.27 % mortality, whereas 0.5% and 1.0% gave 24.99 % and 36.90% mortality respectively. After 72 hours a mortality of 56.11% was recorded in 3.0% concentration, whereas 0.5%, 1.0% and

2.0% gave 41.11%, 36.11 % and 44.44% mortality respectively. No mortality of larvae occurred in control up to 72 hours after treatment. Percent mortality recorded after one week was 80.55, 83.33, 83.33 and 100 % in 0.5%, 1%, 2% and 3% concentrations respectively as against 10% mortality in the control.

Conclusion

It can be concluded from the above table that percent mortality of shisham defoliator was not significantly different among different concentrations of neem oil but was different significantly from control treatment.

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