POPULATION STUDIES AND INSECTICIDAL CONTROL OF SHISHAM LEAF MINER, *LEUCOPTERA SPHENOGRAPTA* MYER. LYONETIIDAE, LEPIDOPTERA

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Abstract

Shisham leaf miner, *Leucoptera spheograpta* Myer, which has been a minor pest in the past becomes occasionally serious in shisham nurseries and apprears in wide spread epidemics in young as well as old plantations almost throughout the country. The pest completes its life cycle in about 30 days and has 9 generations in a year. During severe infestation pre-mature leaf shedding is caused, resulting in a poor and stunted growth of this valuable crop.

In insecticidal trials, out of 5 test chemicals Lebaycid 50% proved most effective against larvae at 0.05% level and against pupae at 0.1% level. Ekalux gave 92% kill in 0.05% dose and 100% kill in 0.1% dose.

Introduction

The shisham leaf miner, *Leucoptera sphenograpta* Myer. (Lyonetiidae, Lepidoptera) is a serious pest of shisham and is destructive to young plants and tender leaves of older trees causing pre-mature leaf fall.

Beeson (1941) reported its life and seasonal histories. The eggs are laid on the under surface of leaf which hatch in 2—5 days. The caterpillars mine into the leaf destroying palisade tissue and large veins between the upper and lower epidermis causing decoloration of leaves. The larval period lasts for 11—28 days during March—May, 7—19 days during the hottest months and 15—30 days during Sept-November. The full grown caterpillar leaves the mine and spins on the upper surface of a green leaf a white glistening web, below which the pupal cocoon is formed. The insect remains in pupal stage for 10 days in March—April, 5—9 days in May—October and 11—22 days in November. There are 9 generations of the pest in a year.

Chaudhry et al (1966) reported a heavy attack of this pest on the leaves of *Dalbergia sissoo* at Peshawar at the end of the growing season during October—November, 1965. During

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April 1974 reports of heavy infestation on young plants were received from Nowshera Forest Division.

On observation the pest was found attacking even the older trees in many areas of N.W.F.P. The linear plantation on Pindi—Peshawar road was severely attacked and 50 to 100% foliage were found damaged. In order to find out effective measures of its control insecticidal trials were conducted.

Methods and Material

One year old shisham nursery at the Pakistan Forest Institute was selected for insecticidal trials against this pest where heavy population of larvae and pupae was available during April.

Extent of infestation was studied by counting the number of infested and uninfested leaves on 20 plants. Mined protion of one hundred infested leaves were carefully opened with the help of fine needles for recording per leaf larval populations. For pupal population counts one hundred leaves with webs on were collected and number of pupae counted per leaf.

Dimecron, Ekalux, Thiodan, Lebaycid and Bidrin were sprayed in 0.01, 0.05 and 0.1% concentrations keeping one hundred plants per treatment including check-no-treatment.

Knapsack sprayer was used in spraying the chemicals. To note the larval mortality after 24, 48 and 72 hours, one hundred infested leaves were collected from each treatment, mined portion opened and number of alive and dead larvae counted. Pupal mortality was observed by noting emergence of adult moths out of hundred pupae collected from each treatment and caged in the laboratory.

Results and Discussion

Population studies:—Shisham leaf miner, *Laucoptera sphenograpta* Meyr appeared in epidemic form in the shisham growing areas of N.W.F.P. and Mianwali shisham plantation. Almost every shisham leaf was found infested by this pest. Due to over-lapping generation the pest was available in all stages in abundance. Larval population was recorded as 1 to 5 larvae per leaf under the mine. The severity of infestation had resulted in pre-mature leaf shedding of most of the trees. The pupal cocoons were formed below the white glistening web with broad x-shaped cross threads on about 30% leaves of the plants. Such leaves when examined had 2 to 8 pupae per leaf. The freshly emerged moths were found sitting on the silken webs for about 20 minutes for stretching their wings and hardening their bodies.

The fresh infestation was reconginzed by small pinches on young leaves which ranged from two to several pinches per leaf. Such pinches expanded into an irregular blotch covering ¼ to ¾ portion of leaves after which the leaves curled up and dropped resulting in stunted growth of the standing crop specially that of nurseries.

Effect of different insecticides on larvae

In this trial Dimecron 100% E.C., Ekalux 25% E.C., Thiodan 25% E.C., Lebaycid 50% E.C. and Bidrin 85% E.C. were tested in concentrations of 0.01%, 0.05 and 0.1% (a.m.) on shisham nursery plants infested by *Leucoptera sphenograpta*. Observations recorded after 24, 48 and 72 hours are tabulated as under:

Percent Larval Mortality of Shsham Leaf Miner

Insecticides	Percent larval mortality after								
	24 hours in % doses of			48 hours in % doses of			72 hours in % doses of		
	0.01	0.05	0.1	0.01	0.05	0.1	0.01	0.05	0.1
Dimecron	20	79	90	40	100	100	50	—	—
Ekalux	81	92	100	100	100	—	—	—	—
Thiodan	34	53	71	87	100	100	100	—	—
Lebaycid	88	100	100	100	—	—	—	—	—
Bidrin	62	85	91	96	100	100	100	—	—
Check	0	0	0	2	2	2	2	2	2

It may be seen from the above data that Lebaycid proved most effective for its knock down effect against the larvae as it gave 100% kill within 24 hours in 0.05% concentration. Ekalux gave 92% kill in 0.05% concentration and 100% kill in 0.1% concentration. A complete mortality of the pest was noticed in the lower dose of 0.01% of Lebaycid and Ekalux in 48 hours while Dimecron, Thiodan and Bidrin gave the same results with higher dose of 0.05%. Normal larval mortality was 2% upto 72 hours.

Effect of different insecticides on pupae

To find out the effect of these insecticides on pupae, one hundred pupae were collected after spraying and caged in the laboratory. The pupal period of the pest is 10 days in March April and most of the adult emergence took place in 13 days. However observations on the emergence of adults were continued for a month and the results are tabulated as under:—

Percent Pupal Mortality of Shisham leaf miner in various treatments

Insecticides	In doses of		
	0.01	0.05	0.1
Dimecron	30	60	81
Ekalux	64	82	89
Thiodan	8	17	30
Lebaycid	66	91	100
Bidrin	12	33	78
Check	2	2	2

The above data show that Lebaycid was the most effective treatment as maximum pupal mortality of 100% was achieved in 0.1% concentration. The lower doses of 0.01% and 0.05% were also comparatively more effective as 66 and 91% pupal mortality occurred in these doses, respectively. Ekalux gave 64, 82 and 89% kill in 0.01%, 0.05 and 0.1% doses, respectively, and was the second best effective treatment. Dimecron, Bidrin and Thiodan gave 81, 78 and 30% pupal kill in the highest dose of 0.1%, respectively. In the check no treatment, 2% moths failed to emerge.

Field Scale Trials

Results on trial of various insectcides revealed that Lebaycid in 0.05% dose against larvae and in 0.1% concentration against pupae was the most effective treatment. Field scale trial of 0.1% Lebaycid against shisham leaf miner over heavily infested canal-side linear plantation gave complete control of the out-break of the pest.

References

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