

INSECTICIDAL TRIAL FOR THE CONTROL OF POPLAR DEFOLIATOR, *ICHTHYURA ANASTOMOSIS* STEPH. (NOTODONTIDAE: LEPIDOPTERA)

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Abstract. In the insecticidal trial conducted against poplar defoliator, *Ichthyura anastomosis* at Mingora (Swat), Sevin 85% S.P. gave 100% mortality of larvae in .01% concentration. Thiodan and Hostathion also killed 100% larvae in highest concentration of 0.05% while in 0.01% and 0.25% concentration Hostathion gave 99% and 98.6% mortality and Thiodan killed 93% and 91.5% larvae, respectively. Lorsban and Gusathion gave 93% and 72.5% mortality of larvae in highest concentration of 0.05%.

In second trial conducted at Charsadda during 1977 against the pest, Nuvacran, Tamaron, Sevin and Decis gave 100% mortality of larvae in 0.01% dose. Sumithion in 0.025% and Lorsban in 0.05% concentration also gave 100% mortality of larvae within 3 days of treatment.

Introduction. Poplar defoliator, *Ichthyura anastomosis* Steph is a very serious pest of poplars in Pakistan. It has been reported as a pest of willow in Europe by Hampson (1892), in North America by Seitz (1913) and in Asia by Beeson (1941). In Pakistan it was first recorded by Chaudhry et al (1969 and 1970) found it to be a common hairy caterpillar on poplars almost all over the country. Chaudhry and Ahmad (1973-74) worked out its biology and population dynamics, also reported its out-break causing complete defoliation of compact and linear plantations of poplars and willow in various localities.

Realizing serious growth losses due to defoliation, insecticidal trials were conducted to evolve effective measures for the control of the pest.

Material, method and results. Sevin 85% EC, Gusathion 50% EC, Lorsban 50% EC, Hostathion 40% EC and Thiodan 35% EC were tried in 0.01%, 0.25% and 0.05% concentrations at Mingora (Swat) in October, 1976. Five trees were kept in each treatment and replicated thrice. Experiment was laid out on split plot randomized design. Spray was conducted with the help of a knapsack sprayer.

To record the comparative efficacy of each chemical treatment, observations were taken 24 hours after treatment by counting larval population on three branches of each tree.

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The larval population in various treatments was as below:—

Chemical	Concentration	Population of poplar defoliator 24 hours after treatment				Mortality
		Repli 1	Repli 2	Repli 3	Average	
Sevin 85% EC.	0.01	—	—	—	0	100
	0.025	—	—	—	0	100
	0.05	—	—	—	0	100
	Check	30	45	100	58	—
Gusathian	0.01	15	44	42	24	4
	0.025	12	14	30	20	47
	0.05	2	14	—	5	73
	Check	19	49	37	35	—
Lorsban 40% EC.	0.01	8	15	40	21	63
	0.025	11	4	40	18	68
	0.05	1	1	10	4	93
	Check	31	36	92	56	—
Hostathion 40%	0.01	—	1	5	2	98
	0.025	3	—	2	2	99
	0.05	—	—	—	1	100
	Check	20	39	295	118	—
Thiodan	0.01	2	12	18	7	92
	0.025	12	6	—	6	93
	0.05	—	—	—	0	100
	Check	35	54	164	84	—

In statistical analysis 'F' test showed that insecticidal treatments are highly significant. To test the relative efficacy of insecticidal treatments 'F' test was applied and the results showed that Sevin, Hostathion and Thiodan are highly significant than the rest but are mutually non significant.

To compare the effectiveness of Sevin and Dimecron on the larvae gone into web inbetween two tied leaves for hibernation, a large scale trial in 0.025% concentration was conducted in poplar nursery at the Pakistan Forest Institute Peshawar in the end of October. Spraying was carried out with the help of power sprayers in separate plots keeping a check

plot for comparison. Larval population in all stitched leaves was recorded 3 days after treatment. Effect of chemicals on hibernating larvae gone in web:

Chemical	Total No. of larvae in stitched leaves	No. of dead larvae after 3 days of treatment	Mortality %
Sevin 0.25% Concentration	72	24	33.0
Dimecron 0.025% concentration	80	48	60.0
Check no treatment	78	9	12.0

As the larvae had become inactive due to cold weather and were not feeding even the systemic insecticide like Dimecron did not give complete mortality of concealed larvae. The caterpillars which tried to come out from the webbed leaves for feeding purpose were killed by contact action of chemicals.

In an other field trial conducted at Charsadda in August, 1977, Lorsban, Decis, Sumithion, Tamaron and Nuvacron were tried in 0.01%, 0.025% and 0.05% concentrations. Four poplar plant were kept in each treatment and were replicated five times. This experiment was laid out on split plot randomized design. Population of the larvae was taken before treatment, 72 hours and 120 hours after treatment on each tree included in the experiment.

The data so collected are tabulated below:—

Chemicals	Concentration %	Population of larvae			Mortality % 72 hours; after treatment	Mortality % 120 hours after treatment
		Before treatment	72 hours after treatment	120 hours after treatment		
1	2	3	4	5	6	7
Lorsban	0.01	160	12	3	93.0	98.0
	0.025	50	3	2	94.0	98.0
	0.05	89	—	—	100.0	100.0
	Check	143	91	50	36.0	65.0
Decis	0.01	50	—	—	100.0	100.0
	0.025	137	—	—	100.0	100.0
	0.05	99	—	—	100.0	100.0
	Check	24	18	15	25.0	38.0
Sevin	0.01	28	—	—	100.0	100.0
	0.025	53	—	—	100.0	100.0
	0.05	30	—	—	100.0	100.0
	Check	146	98	75	33.0	48.0

Table—Continued

1	2	3	4	5	6	7
Sumithion	0.01	94	8	4	92.0	96.0
	0.025	64	1	—	98.0	100.0
	0.05	39	—	—	100.0	100.0
	Check	70	42	37	40.0	47.0
Tamaron	0.01	45	—	—	100.0	100.0
	0.025	81	—	—	100.0	100.0
	0.05	29	—	—	100.0	100.0
	Check	76	49	25	36.0	67.0
Nuvacron	0.01	98	1	—	99.0	100.0
	0.025	83	—	—	100.0	100.0
	0.05	89	—	—	100.0	100.0
	Check	150	95	73	37.0	51.0

Decis, Tamaron and Sevin gave 100% mortality of larvae in the lowest concentration of 0.01% while Nuvacron in 0.025, Lorsban and Sumithion in 0.05% dose gave 100% kill of larvae 3 days after treatment as against 34% natural mortality in check.

Complete mortality of larvae was however achieved in all treatments 5 days after spray.

Acknowledgement. The authors are thankful to Mr. M. Afzal Cheema, Assistant Biometrician, Pakistan Forest Institute, for statistical analysis of the data.

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INTRODUCTION TRIALS OF RANGE PLANTS AT SARI, SUB-ALPINE ZONE

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Summary. Out of ten exotic species/ecotypes sown at Sari (Kaghan) in May, 1977 at moderate slope on eastern aspect nine germinated. The percent cover and forage production of *Trifolium pratense* and *Vicia sativa* was significantly greater in October 1977, compared to other species. The difference in the number of plants of species established did not show any significance.

Study area. Sari is situated in the sub alpine zone, 7 km southeast of Shogran, at an elevation of 2900 metres. Growing season is from April to October. The soil is shallow and has a moderate amount of organic matter suitable for plant growth. Annual average rainfall is about 1,000 mm and snowfall 500 cm.

Method. The following 10 species/ecotypes were sown in the last week of May, 1977 in a randomised block design, replicated 3 times. Sowing was done in 1 x 0.5 metre patches spaced at 1 x 2 metres. The patches were made by working the soil upto a depth of 50 cm. A depression of about 15 cm was made to hold the water. Seed was sown in 3 lines in each patch at a depth of 1.5 cm. Five patches sown to each species formed the unit of replication.

R.M. No.	Species	Source
306	<i>Lolium multiflorum</i>	Poland
334	<i>Lolium perenne</i>	Oregon
223	<i>Lotus corniculatus</i>	F.A.O. Rome 11046
206	<i>Medicago sativa</i>	Williamsburg
131	<i>Medicago sativa</i>	F.A.O. Rome 4933
222	<i>Phalaris tuberosa</i>	Anderson (Australia)
281	<i>Phleum pratense</i>	Tivothy
370	<i>Potarium sanguisorba</i>	Anatolia/Turkey
187	<i>Trifolium pratense</i>	Chesapeake
214	<i>Vicia sativa</i>	Warrior

Average percent cover and number of plants of each species were also recorded on each plot. In October 1977, one of the five patches for each species in each replication was taken at random by drawing lots for determining forage production. Green and air dry weights were recorded for the clipped material. Airdry weights were converted for forage production per hectare by multiplying with 20.

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Trifolium pratense (187) Introduced at Sari—May 1977, observations—Oct. 1977



Vicia sativa (214) introduced at Sari—May 1977, observations—Oct., 1977.

Analysis of variance was done to determine significant differences in percent cover, number of plants and forage production and Duncan's multiple range test to determine the difference of means.

Results and discussion. *Medicago sativa*, *Potarium sanguisorba*, *Lotus corniculatus* and *Phalaris tuberosa* were in vegetative growth stage, while *Trifolium pratense*, *Vicia sativa*, *Lolium multiflorum* and *Lolium perenne* were in flowering and fruiting stage. *Phleum pratense* did not germinate.

Establishment: The average number of plants established in each group of five patches for different species is given below:

No. of plants established

Species	Replication			Mean
	I	II	III	
<i>Lolium multiflorum</i>	84	47	24	52
<i>Lolium perenne</i>	8	21	27	22
<i>Lotus corniculatus</i>	21	36	46	34
<i>Medicago sativa</i> (206)	27	68	49	48
<i>Medicago sativa</i> (131)	27	87	37	50
<i>Phalaris tuberosa</i>	84	38	31	51
<i>Potarium sanguisorba</i>	82	88	74	81
<i>Trifolium pratense</i>	38	59	30	42
<i>Vicia sativa</i>	18	52	43	38

There was no significant difference in the number of plants established.

The percent cover: As indicated by the following data, *Trifolium pratense* and *Vicia sativa* have significantly better % cover (0.5 level, Duncan's New Multiple Range Test as compared to the other species.

Percent cover

Species	Replication			Mean
	I	II	III	
<i>Lolium multiflorum</i>	28	19	22	23
<i>Lolium perenne</i>	8	7	9	8
<i>Lotus corniculatus</i>	6	6	9	7
<i>Medicago sativa</i> (206)	10	12	6	9
<i>Medicago sativa</i> (131)	9	10	6	8
<i>Phalaris tuberosa</i>	21	10	8	1
<i>Potarium sanguisorba</i>	25	13	17	20
<i>Trifolium pratense</i>	79	25	67	57
<i>Vicia sativa</i>	19	55	39	37

Forage production: The forage production of *Trifolium pratense* and *Vicia sativa* was significantly greater than all other species (0.5 level, by Duncan's New Multiple Range Test).

Forage production kg/ha—calculated

Species	Replication			Mean
	I	II	III	
<i>Lolium multiflorum</i>	600	1000	1620	1070
<i>Lolium perenne</i>	160	540	600	433
<i>Lotus corniculatus</i>	40	100	120	87
<i>Medicago sativa</i> (206) (FAO Rome)	80	180	100	87
<i>Medicago sativa</i> (131) (Williamsburg)	120	160	120	134
<i>Phalaris tuberosa</i>	160	260	200	207
<i>Potarium sanguisorba</i>	200	340	260	267
<i>Trifolium pratense</i>	2350	500	2040	1630
<i>Vicia sativa</i>	480	3600	1000	1693

Yield from one plot 1×0.5 converted into kg/hectare by multiplying with 20.

Conclusion: *Trifolium pratense* and *Vicia sativa* showed a rapid growth and matured before the start of winter season. The two species outyielded all other species under trial. *Lolium multiflorum* was the next best. These can be introduced in the area to advantage.



Lolium multiflorum (306) Introduced at Sari—May 1977, observations—Oct. 1977.