Notes on Control of the Nantucket Pine Moth, Rhyacionia frustrana (Comstock).

G. A. BIEBERDORF, Oklahoma State University, Stillwater

The adult of the Nantucket pine moth has a wing expanse of about 7/16 of an inch and is reddish brown with silver grey wing markings. The larva is a pale yellow color and, when mature, is about ⅜ of an inch long. It may be found infesting pine plantings throughout most of the central states, including Oklahoma and Texas. In the East it may be found from Massachusetts to Florida. Its host plants are said to be all of the two- and three-needle species of pines. Observations in the forest nursery of the Oklahoma Experiment Station indicate that this insect shows definite host preferences among the various species of pines in the nursery.

The injury is caused by the young larvae entering the undifferentiated tissue of the new growth at the tips of the pine branches. The larvae girdle the tips and cause them to die back. This forces the tree to develop new growth and as a result of this the ends of the branches become many-branched, gnarled and deformed. All branches of the tree may be infested and the indications are that under Oklahoma conditions this is brought about by at least three generations of moths. The most severe damage during the past season occurred during the late summer at which time 100 percent of the tips of the branches of some species of pines were infested.

A commonly used control procedure consists of spraying the infested trees with a DDT spray just at the time when the eggs are hatching and before the larvae have entered the cambium layer. Once in the cambium layer, external DDT spray applications will not effectively control this insect. The infestation is, as a rule, not observed until after the tips of the branches begin to die, and after the previously-mentioned control measures are useless, because the larvae do not come in contact with the insecticide.

In order to control the pine moth larvae, in this stage of its development, it is necessary to apply the insecticide in a material that can carry it into the growing tip where the larvae are feeding or otherwise have it come in direct contact with them. In order to accomplish this, control tests were made with three different insecticides. Infested trees were sprayed with a non-phytotoxic isoparaffin oil[1] to which no insecticide had been added. In addition to this, another group of trees was sprayed with this oil to which the following concentrations of insecticides had been added: 0.25 percent DDT, 0.1 percent Dieldrin, and 0.14 percent of compound 4402[2]. The trees used in this test varied in size from seedings, 12 to 18 inches in height, to trees with a trunk diameter of 6 to 10 inches and a height of 20 feet.

The material was applied with a compressed air sprayer equipped with a nozzle that produced a fine mist spray. The tips of the branches were wet with the oil until the needles just began to drip. The oil spray was applied on September 18-19. On September 25, treated tips were collected and taken to the laboratory where living and dead larvae and pupae were counted and recorded for each of the treatments. The results of these examinations are shown in table I.

It can be seen from the table that the isoparaffin oil alone reduced the

[1] Trade name Soltrol 170.

[2] A Shell experimental insecticide, 1, 2, 3, 4, 5, 6, 7, 8, 8-Octachloro-3a, 4, 7, 7a-tetrahydro-4, 7-methanophthalan.

number of living larvae from 100 percent to 57 percent. When 0.25 percent of DDT was dissolved in the oil the number of living larvae was reduced to 18.8 percent. The oil containing 0.1 percent Dieldrin reduced the number of living larvae to 1.58 percent while the compound #4402 showed a reduction to 30 percent.

The data in table I also indicate that after eight days of exposure to the insecticides there was little if any difference in the number of living and dead pupae taken from the infested tips. Longer exposures and future examinations may possibly show more effective control in the pupal stage.

In passing, it should be mentioned that these were preliminary tests and that they showed some promise as a control for the Nantucket pine moth after the larvae had entered the cambium layer. Indications are that this method would be most useful in reducing pine moth injury on ornamental or landscape plantings.

Table I. Survival in percent of Pine Moth larvae following spraying.

	Soltrol oil only	Sol. with .25% DDT	Diel. 0.1%	0.14% 4402 in Oil	Unsprayed
Live larvae	57.1	18.8	1.58	30	100
Dead larvae	42.9	81.2	98.42	70	0
Live pupae	96.2	79.3	85.1	91.29	93.9
Dead pupae	3.8	20.7	14.9	8.7	6.1