CONTROL OF THE SPRING GENERATION OF NANTUCKET PINE TIP MOTH[1] WITH INSECTICIDES[2]

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Excellent control of first generation Nantucket pine tip moth larvae resulted with foliar sprays of acephate, dimethoate, oxydemetonmethyl, and Supracide when applied in early May, 1973 to loblolly and shortleaf pines in southern Illinois.

The Nantucket pine tip moth, *Rhyacionia frustrana* (Comstock), is found from Massachusetts to Florida, west to Texas, Missouri, and Illinois (Yates and Beal 1971). The moth seriously injures shortleaf pine, *Pinus echinata* Mill.; loblolly pine, *P. taeda* L.; and Scotch pine, *P. sylvestris* L.; in southern Illinois by killing buds and branches. The growth rate of the trees protected with chemicals is much greater than those not treated (Barras et al. 1967, Beal 1967, Grano and Grigsby 1968, Warren 1965, 1968).

Chemical control has been accomplished by spraying pines with systemic insecticides such as dimethoate (Barras et al. 1967, Rauschenberger et al. 1969, Yates and Beal 1971), Bidrin (Barras et al. 1967), phorate (Barras et al. 1967, Beal 1967, Rauschenberger et al. 1969, Scheer and Johnson 1970), and disulfoton (Barras et al. 1967, Warren 1968).

Because existing control measures were not effective, nurserymen and forest managers in southern Illinois were experiencing damage to pine trees caused by *R. frustrana*. A test was initiated in the spring of 1973 to determine the effectiveness of some newer insecticides in controlling the spring generation of the moth. The insect overwinters as a pupa inside the damaged branch. In southern Illinois the adult moths emerge during warm days in early April and deposit eggs on the needles or twigs. The eggs hatch in 7 to 10 days and the larvae burrow into the base of the needles and later into the shoots. The larval feeding eventually results in the death of the shoot.

METHODS AND MATERIALS.—Insecticide sprays were applied on May 3, 1973, near Simpson, Ill., in an acre planting of loblolly and shortleaf pine ca. 4-6 ft in height. The moth larvae, which developed from eggs deposited in April, were ca. 6.0 mm long and were found feeding at the base of the new pine needles or just under the bark of the new branches. Other than a minute amount of frass at the feeding sites, no noticeable damage was apparent.

Three loblolly and 2 shortleaf pine trees were selected for each treatment. Each of the trees in each plot showed considerable moth damage from the 1972 infestations. In each group of 5 trees, the total number of damaged branches from the 1972 infestation was counted just prior to treatment to insure that the treated trees were highly susceptible to moth damage. Using a 3 gal knapsack sprayer, acephate 75SP, dimethoate 2E, oxydementonmethyl 2E, and Supracide (0, 0-dimethyl phosphorodithioate, S-ester with 4-(mercapto-methyl)-2-methoxy-1,3,4-thiadiazolin-5-one) 2E were applied as foliar sprays until runoff. Each treatment (Table 1) was applied to 5 trees. On June 11, 1973, the number of infested pine branches was counted in each of the treatments.

RESULTS AND DISCUSSION.—All insecticide treatments resulted in excellent control (Table 1). No phytotoxicity was noted in any of the treatments. The untreated trees had an increase in the total number of infested shoots in

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comparison to the previous year. On June 11 infested shoots were easily recognized from the normal condition by the browning and curling of the growth.

Timing the application of insecticides to kill adult or exposed larval stages is particularly difficult during the spring months. Variable weather conditions alter adult emergence and egg hatch from year to year and in a given season. Systemic insecticides tend to translocate to new growth where the larvae feed for nearly a month. Control of larvae already inside branches thus requires less precise timing. Therefore, this type of control is particularly applicable to the spring months due to its variable weather.

Table 1.—Effectiveness of insecticides applied on May 3, 1973 to loblolly and shortleaf pine trees near Simpson, Ill., for control of the Nantucket pine tip moth.

Treatment	Rate LB AI/ 100 gal	Total shoots infested in 1972*	Total new shoots on June 11, 1973* infested	not infested	% infested in 1973	1973 % increase or decrease in infestation compared to 1972
Acephate 75SP	1.0	132	1	495	.2	-99
Dimethoate 2E	0.5	132	1	420	.2	-99
Oxydementonmethyl 2E	0.4	107	0	346	0	-100
Supracide 2E	0.5	113	0	507	0	-100
Check		144	154	418	27	+7

*On 5 trees 4-6 ft in height.

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ABSTRACT

Dochinger, L. S. 1974. **Air pollution problems in nurseries.** New Horizons, p. 1-5. Hort. Research Inst., Washington, D. C.

As urbanization and industrialization intensify, harmful gaseous and particulate emissions will continue to affect nursery and ornamental plantings. Although efforts are being made to control emissions at their sources, plant damage will increase because of our inability to curb chronic air pollution. Nursery crops are injured primarily by ozone, fluorides, and sulfur dioxide, but other phytotoxicants, such as hydrogen chloride, ethylene, oxides of nitrogen, and acidified particles, may be injurious too. Investigations should be accelerated to provide information on (1) the production of genetically superior varieties of ornamentals for community plantings, (2) chemical protection for alleviating injury to shade trees by air pollutants, (3) a more comprehensive understanding of multiple stresses on the whole plant from germination until the completion of its reproductive cycle, and (4) dose-response data on the effects of acute and chronic fumigation on plant growth and yield.