Nantucket Pine Tip Moth on Afghan Pine Christmas Trees in Southern New Mexico

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Introduction

Afghan pine (Pinus eldarica) has become an important Christmas tree species in southern New Mexico. It is a fast growing species that produces a high quality Christmas tree. The recent appearance of the destructive Nantucket pine tip moth (NPTM), Rhyacionia frustrana, on Pinus eldarica in southern New Mexico warrants a review of the pest damage, life cycle, and control measures. NPTM attacks most 2 and 3 needle pines, but is particularly damaging to Christmas tree plantations. The larva mines into the terminal and lateral buds, resulting in dead needles and dead shoots. The pest causes tree deformation, loss of growth and reduced cone production (Pfadt 1985). From an economic standpoint, its presence can result in both value loss for instate sales and quarantine of live Christmas trees scheduled to be shipped into noninfested areas.

Biology

Nantucket pine tip moth has a wide geographic range including the east and southeast U.S. (Baker 1972 and Fig. 1) and it has been a problem in southern California since the 1970's (Sakovich 1982). It attacks most southern and

western pines in addition to many exotic pines including P. eldarica. It was identified as a pest on Afghan pine in southern New Mexico in fall 1985.

The pest is particularly well adapted to multi-flush hosts like P. eldarica. The numerous succulent buds present throughout the growing season provide a continual source of food and protection. Consequently, pest populations can increase dramatically in a short time period and persist throughout the growing season.

Adult NPTM are small gray moths with a wing span of 9 to 15 mm (3/8" to 2/3") The forewings are marked with irregular brick-red and coffee-colored patches. The larvae grow to 9mm (3/8") in length. They are light brown to orange-red with a dark brown head. The pupae are 6mm (1/4") long and are light to dark brown (Sakovich 1982).

An understanding of the NPTM life cycle is essential to successful control. This pest overwinters as pupae in damaged shoot tips. As temperatures warm in the late winter or early spring, the adult emerges, mates and lays eggs on the needles of succulent shoot tips. The emerging larvae feed initially on the needles but by the second instar begin to feed on the buds. Eventually the larvae mine into the bud and feed on the succulent stem tissue. The presence of the feeding larva is first distinguished by a white gluey substance around the bud and later by the dying shoot. The moths can emerge and repeat the cycle up to five times per season in some areas and at least 3 times in southern New Mexico (pers. obs.).

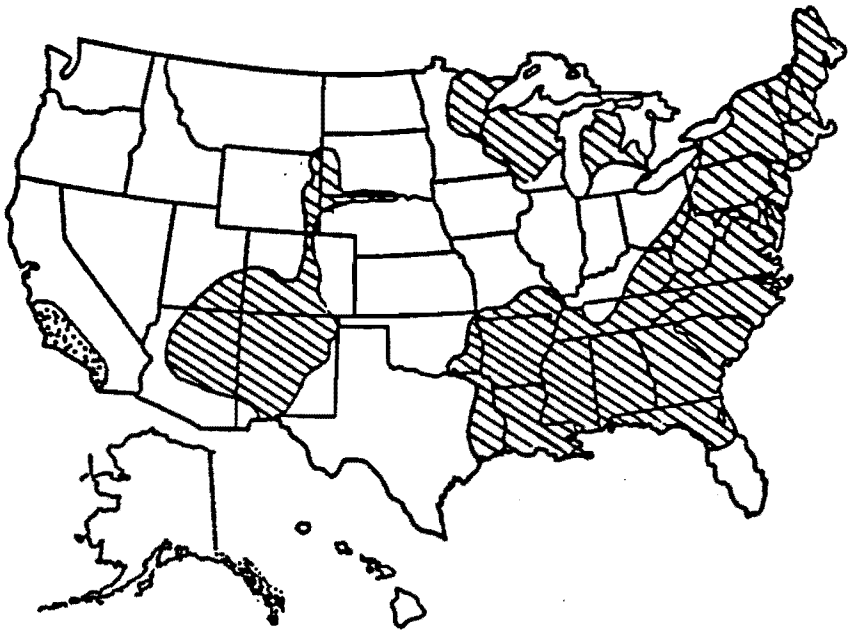

Figure 1. Distribution of 2 and 3 needle pines in the United States. This represents the potential range of the Nantucket Pine Tip Moth.

Monitoring and Control

The timing of effective and efficient chemical control of NPTM requires knowledge of the population dynamics. Successful control measures with pesticide sprays require application when the larvae are in the first and second instar (Garguillo et al. 1983). A method of tracking pest flights is necessary if a blanket prescription of continuous spraying is to be avoided. The use of pheromone traps to monitor the pest populations provides valuable information about population activities. The combination of pheromone trap and degree day models has been effectivly used to predict optimum spray dates (Garguillo et al. 1983). Degree day models utilize pheromone trap information and minimum/maximum temperatures above a threshold for NPTM to predict larval growth and development. With this information sprays can be scheduled to treat the pest at its most vulnerable larval stage. However, more research is needed to adapt degree-day models before they can be used to predict spray scheduals in southern New Mexico.

Current spray dates were scheduled on the basis of peak moth count per flight (Fig. 2). Pheromone traps were installed in January before the start of the NPTM flight. The first flight was sprayed 7 days after the peak moth count was recorded (April 12), and no damage was noted. Subsequent flights probably require two sprays per flight because peak days are harder to distinguish and emergence occurs over a longer period of time. One spray should be applied at the peak and another 10 to 14 days later. This schedule was not followed for the second and third flight in Las Cruces in 1986 and damage did, occur. It should be noted that figure 2 represents one years data and should not be used to predict spray dates.

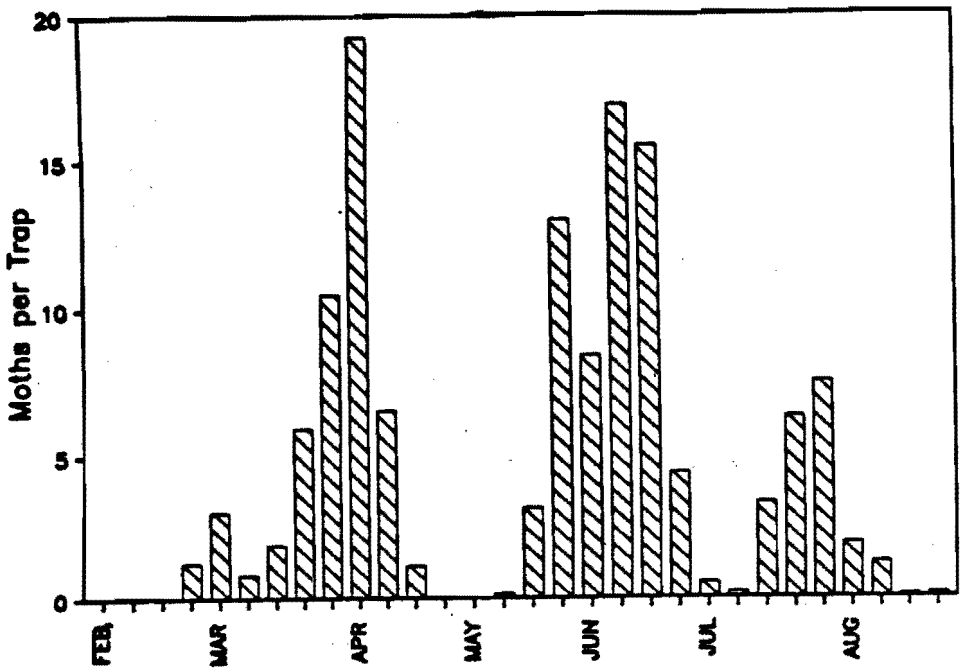

Figure 2. NPTM population dynamics for 1986 in Las Cruces, NM. This data is the average of 20 traps from 3 Christmas tree plantations in Las Cruces, N.M.

Growers should plan to monitor NPTM populations within their own plantations. In a study of NPTM control in Christmas trees Davis (1986) used 1 trap per hectare (2.6 ac). A minimum of 2 traps per site is recommended to safeguard against trap damage and loss of population data (Cade 1983).

Growers should check the traps twice per week before the beginning the flight and three times per week once the flights begin. The objective of the monitoring is to determine the begining of the flight when using the degree day model and the peak of the flight when using the peak plus 7 day spray schedual. Table 1 lists manufacturers of pheromone traps specifically suited for monitoring NPTM.

Table 1. List of NPTM pheromone trap suppliers.

Scentry Inc. (formerly Albany International)
PO Box 426
Buckeye, AZ 85326
(602) 386-6737

Trece Inc.(formerly Zoecon)
PO Box 5267
Salinas, CA 93915
(400)-758-0205

Several systemic and contact type pesticides are registered for control of pine tip moth. The timing and method of application differs depending on the type of material used. Table 2 list the pesticides labeled for use in New Mexico. As always growers should read the pesticide label before applying any of these products to his plantation.

Table 2. List of labeled pesticides for control of pine tip moth.

CHEMICALS	MANUFACTURE	RATE*	MATERIAL COST ($)	SIGNAL WORDS/RU**
DIMILIN 25W	UNIROYAL	4 oz./10-200 gal. water	$125/5 lbs.	CAUTION/YES
ORTHENE TREE & ORNAMENTAL	CHEVRON	1 lb//100 gal. water	$8./lb.	CAUTION/NO
SEVIN XLR	UNION CARBIDE	1 qt./100 gal. water	$24./gal.	CAUTION/NO
DYLOX 80% SP	MOBAY	20 oz./100 gal. water	$30./5 lbs.	WARNING/NO
PYDRIN 2.4EC	SHELL	5.3 - 10.6 fl. oz./100 gals.	$33./qt.	WARNING/YES
CYGON 2-E	PRATT	1 pt./100 gal. water	-	WARNING/NO
DI-SYSTON 156	MOBAY	size dependent	$63./50 lbs.	DANGER/YES
GUTHION 50%WP	MOBAY	.75 - 1.5 lbs./ac.	$16./2.5 lbs.	DANGER/YES

*Read and follow label directions, the rate of chemical can vary with plant size and stocking.

** Signal Words = "Caution" is the least toxic of the three catagories, "Warning" is moderately toxic, and "Danger" indicates the most toxic type pesticides.

RU = Restricted Use (requires pesticide applicators license to purchas and apply).

Little information is available on the effects of shearing on NPTM infestations. Sakovich (1982) recommends that infested material be removed from the plantation. When NPTM is allowed to build up within a plantation, shearing is not an economic alternative to chemical control. The pest can quickly infest the majority of the shoots. The grower must than prune to remove the pest. This pruning may conflict with shearing objectives and result in an unsightly tree. Growers must learn to identify the NPTM, monitor population levels and apply labeled pesticides to control this destructive pest.

Literature

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