

The Commonwealth of Massachusetts

Department of Environmental Management Division of Forests and Parks

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Annual Report - D. V. Trefry - July 1977 - June 1978

The year 7-1-77 to 6-30-78 saw the continuation of programs begun in earlier years and the expansion of the research into the effects of defoliation by the Oak Leaf Tier. Trapping of male Gypsy Moth adults, introduction of 3 parasites into Gypsy Moth infestations, assessment of the parasite release by recovery from the host after rearing to adult stage, aerial and ground surveys were made for insect and tree disease problems, all carried out in addition to the research on the Oak Leaf Tier.

In june 1977a release of 400 Exorista lavarum, a larval parasite of the Gypsy Moth was made in Montague. Collections of the host caterpillars and rearing through pupation failed to yield any of the released parasites. Rearing of caterpillars from the 1976 sites at which Palexorista sp. and Apanteles liparidis yielded several cocoons thought to be liparidis. These were subsequently identified as a different Apanteles by the Insect Identification Laboratory at Beltsville, Maryland. In the spring of 1978 several sites for parasite release were checked and evaluated. Two sites were selected. One in Hardwick at the Quabbin Resevoir on Schoolhouse Hill and the other in Montague in the Dry Hill area east of route 63. Host egg mass density in Hardwick was at 2,000 - 4,000 egg masses per acre and up to 12,000 masses per acre in Montague.

Three species of parasites were chosen and requested from the United States

Department of Agriculture, Plant Protection and Quarantine Programs, Area Director

and Program Coordinator. They were reared by the New Jersey Department of Agriculture.

Weekly shipments were made via air freight in bio-mailers and the insect released on the day of arrival.

Both sites selected had building populations of host caterpillars. Both sites experienced 100 % defoliation with a general collapse in the Montague site at higher elavations.

Apanteles liparidis were liberated in Montague with 400 on 5/2 and 300 on 5/11 plus 300 on 6/6 and 600 on 6/13 in Harwick giving a total of 1,600.

Exorista japonica was released in Montague with 1,180 on 5/18, 600 on 5/25 and

Exorista Japonica was released in Montague with 1,180 on 5/18, 600 on 5/25 and 300 in Hardwick on 5/25 for a total of 2,080.

Blondelia nigripes was released in Montague with 862 on 5/18, 800 on 5/25 and 200 in Hadrwick on 5/25 for a total of 1,862.

Once each week starting on 5/11 in Montague and 6/1 in Hardwick 100 host caterpillars were collected at each site. Ten each in ten squat, non-waxed 16 oz. ice cream containers. These caterpillars were fed daily on oak leaves until pupation or death took place. Whereas pupation is not yet complete and diapause is suspected with the tachinids no evaluation can be made at this time. Several masses of coccoons were recovered that appear to be Apanteles liparidis. These will be sent for positive identification. Many puparia are appering and are yet to be identified. Collections and identification are necessary for three years before a parasite is considered established in an area.

An aerial survey was conducted over the entire state in mid July 1977. This survey is to locate areas of defoliation or dead and dying trees. 133,100 acres of defoliation were found caused by the Gypsy Moth.150 acres of defoliation were caused by the Larch Sawfly. Oak Skeletonizer and mites accounted for 17,920 acres. 1,140 acres of dead or dying trees were observed. Cankerworms accounted for 5,520 cres on the south shore. 160 acres of Diplodia infection were seen in the state forest on Marthas Vineyard. 5,781 acres of defoliation by undetermined insects was also mapped. Heavy damage from the May 9 &10, 1977 snowstorm was seen to some timber stands. Oak Leaf Tier defoliated 101,545 acres.

In June of 1978 an abbreviated agrial survey was flown in the upper Conneticut Valley for defoliation by the Oak Leaf Tier. This is the area where this insect is causing problems for the red oak stands. No attempt was made to fly a survey in other areas of the state having tier populations due shortage of funds. The survey showed 75,795 acres of defoliation. 6,000 acres proved to be defoliated from insects other than the Oak Leaf Tier. Forest Tent Caterpillars, several loopers, usually in association with the Gypsy Moth caused the 6,000 acres of defoliation.

The Oak Leaf Tier, Argyrotoza semipurpurana, (formerly Croesia albicomna or later semipurpurana) is the principle defoliator of the complex causing severe defoliation in the red oak forests of the Erving, Wendell Warwick and Northfield area. Three leaf rollers, Pseudexentera sp., Argyrotaenia sp. and Archips semiferamus are present along withseveral other defoliators of lesser importance. Identification was from collections made by the writer and Parker Snowden of the U.S. Forest Service. Questionable identifications were confirmed by sending specimens to the Insect Identification Laboratory at Beltsville, Maryland.

In the spring of 1977 eleven plots were set out to monitor for tree condition, defoliation, egg deposition, growth or vigor loss, mortality or recovery. Ten plots were in the infested area and one was a check plot set out in the Oakham State Forest. The check plot was a comparable stand on a dry site. The plots in the infested area were established on dry, medium or wet sites. Hilltop, hillside and valley sites were chosen with as many different aspects chosen as possible. At each plot an additional 10 red oaks were selected to have increment cores taken and root samples collected. The increment cores are to show growth loss in compression to the trees in the check plot. Increment cores were also taken from two white oaks and two trees of other species, when available, that are unaffected by the Oak Leaf Tier at each site. This will demonstrate normal growth on each site compared to the defoliated red oak. The root collections are from the red oak trees. These samples were taken for the purpose of starch analysis. This procedure was developed by Philip M. Wargo

technique of estimating the starch reserves as an indicator of tree vigor.* Lack of starch indicates decline or vigor loss and possible mortality. Root samples were collected in **36**tober 1977 and frozen. Two trips were made to the laboratory in Hamden to gain the expertise needed for conducting the analysis with bureau equipment and personnel. A sliding microtome was purchased to slice the root samples at 100 microns consitently. Staining and comparing the samples was carried out in March of 1978. Upon completion of the increment core readings by the forestry student working on the project comparison will be made relating the starch index to the growth loss. The visualtree condition data collected and d.b.h. measurements will also be compared to the above.

Each of the plots mentioned are acre plots. They have been inventoried by
the forestry student this spring. In addition to these plots there are C. F. I.

(continous forest inventory) plots, 1/5 acre, long established in the infested area.

A CETA crew under the direction of Management Forester William Rivers is remeasuring
these plots, taking increment boringsand evaluating the plots for tree condition
and input into the research project. All this data is being key punched by the forestry
student and will aid Rivers in estimating mortality and a dollar loss figure.

Population or defoliation prediction was based on egg counts from branch samples. These samples were taken the fall of 1977. Although the same procedure was used as in the previous year the defoliation was heavier than the egg counts indicated in the given areas. This is perhaps due to the increase in other defoliators that go along with the Oak Leaf Tier. Seventy two sites outside the infested area were sampled to determine if the defoliation seen from the air was caused by the tier. Twenty nine samples had tier eggs. Several others had heavy scale or mite problems.


Pupal collections by Snowden and Trefry showed parasitism to be 12% of the tier population. This is not sufficient for reducing the impact on the red oak stands.

* U.S.D.A. Forest Service Research Paper NE-313 1975.

D. V. Trefre 7-17-28

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	TIER	GYPSY MOTH	OTHER	TOTAL
Amherst	75		contrado filicopo statulos	75
Belchertown	1,960			1,960
Bernardston	- Company viscos	(140?)	780	780
Deerfield	Colling Arment (Phone)		880	880
Easthampton	ACCOUNT CHAIR		20	20
Erving	6,740		atomics. Contains in Applicate	6,740
Hampden	Comple Comple		40	40
Holyoke	Comple Comple Spreads	· Annies (state) (state)	400	400
Leverett	4,440	360		4,800
Montague	1,040	2,560	30	3,630
New Salem	410	130		540
Northfield	4,190		960	5,150
Orange	610	COMPAN COMPANY AND	CONTRACT CONTRACT STATES	610
Pelham	9,640		90	9,730
Shutesbury Sunderland Warwick	16,480 3,800 3,290		ANTONIO MARCONIO MINISTERIO CARRILLO CA	16,520 3,800 3,290
Wendell	16,770	Approximate controls		16,770
Wilbraham	Within times apply	ASSES COMES STATE	60	60
Totals	69,445	3,090	3,260	75,795

Acreage by town from the June 1978 aerial survey.



HOUKOCK