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ANNUAL REPORT

Bureau of Insect Pest Control

1972

Components of Insect Pest Control

Year in and year out the work of the Bureau of Insect Pest Control falls into three general catagories - survey, evaluation and control. This year saw the addition of another category and one which, in the long run, may become the most important - research.

Survey takes many forms including aerial observation and mapping, ground checking, trapping, twig sampling, tree condition and even the receipt of telephone calls. Put any two of these or, in some cases all of them, together and one has the ingredients needed to make an evaluation.

Many factors need to be considered in making a determination as to the effect a certain pest will have upon a tree or group of trees. Just as important is the effect this pest will have upon people living in or otherwise using the area. Having made a determination as to the existing problem a decision is then made as to the necessity for control measures.

If control is called for all possible alternatives must then be considered. The only tools available today which might afford immediate relief of the outbreak situation are chemicals. At times the most efficaceous chemical in terms of the pest or organism must be by-passed in favor of one less toxic to certain non target organisms in the area. This would, of course, include man.

This leads to research which is our fourth general category in insect pest control. Although chemical control is the result of past research it has never been considered by many in the field as the utlimate answer. Such things as biological manipulation, altering stand compostion and such simple things as maintaining vigor in the tree or trees concerned, in the long run, may allow us to live in harmony with the pests.

Gypsy Moth Under Scrutiny

There are very few insect pests in the United States which have been studied as much as the gypsy moth. Despite this vast effort by the Federal Government and the various states involved it seems that the amount of information yet needed to fully understand the insect is inestimable.

Bowing to pressure from those states recently invaded by the gypsy moth and those states in imminent danger of being invaded, the Federal Government has allocated money to various states and universities to further study the pest.

The Bureau of Insect Pest Control has entered into a cooperative agreement with the Agricultural Research Service, U.S.D.A. to conduct certain phases of the planned research. Basically the agreement is to intensify present research on the sampling of gypsy moth populations and factors responsible for changes in them. The original agreement also called for the testing of aerial applications of Bacillus thuringiensis to determine its efficacy against the moth. This phase had to be dropped here in Massachusetts due to lack of suitable areas. We do not have the vast areas of outbreak being experienced by nearby states.

Two general areas of the State were chosen in which to establish research plots - Cape Cod and Central Massachusetts. In an attempt to find forested areas which would remain undisturbed by man for at least five years and with suitable gypsy moth populations the plots were established at Hawks' Nest, land owned by the Department in Harwich, and on the Springfield Water District land in Ludlow. Federal as well as Department personnel have conducted intensive research on both of these areas during the year.

Some of the more important aspects of the study include the following: an attempt to determine the impact of the insect on the physiology of the trees through measurement of the starch content in the roots as this is important in the production of sugar necessary for tree growth and vigor; a determination

Of the presence of parasites and predators, including small mammals and birds, affecting control of the gypsy moth; and a careful analysis of each stage of the insect with particular emphasis on size and number of egg masses.

Data collected during the first year of this study will be analyzed this coming winter. It is hoped that if the proper data is taken, it can be computerized. Eventually one would be able to determine, throught the computer, the possible effect of a current gypsy moth population on the trees.

Insect and Disease Highlights

Gypsy Moth

First order of business at the beginning of each fiscal year is the gypsy moth aerial survey. Reports had been received of severe defoliation in the neighboring states of Connecticut and New York. The program commenced with a certain amount of apprehension. Suprisingly the total acreage observed defoliated upon completion of the survey was only 18,700 acres. Considering the total acreage of the State our problem with gypsy moth was minor. Because of location, however, certain areas became major problems.

The gypsy moth is becoming more of a people problem than a tree problem. This was clearly illustrated in certain communities on Cape Cod this year. An analysis of complaints received would undoubtably show that the major concern relative to the pest is the nuisance it creates rather than the damage it might do to the trees.

Ground survey work, in the fall, indicated that in the towns of Orleans, Harwich, Dennis, Sandwich, Brewster, Yarmouth and Barnstable, a total of 29,000 acres had a population of gypsy moth capable of complete defoliation the next summer.

Bureau personnel in cooperation with the above named communities delineated the total areas populated by the gypsy moth as evidenced by egg masses. In keeping with Departmental policy officials in the towns were advised to study

the total areas carefully. Having done this the decision should then be made to attempt control of the gypsy moth on areas where it would afford relief to people. In effect this would cut down to a considerable extent the total acreage to be sprayed.

The recommendation was followed by all of the communities except one. Reasonably good control was accomplished considering the fact that there were many delays due to weather. One other major problem encountered was the spread of first instar caterpillars by wind. Those communities not able to quickly adapt to the new situation found themselves with many areas of unanticipated defoliation.

Heavy egg mass counts on Nickerson State Park in the fall of 1971 indicated that the Park again needed to be sprayed. Plans were formulated during the winter. Having been approached by the Velsicol Company, the decision was made to aerially spray ~~at the~~ rate of 8 ounces of active material per acre an organophosphate insecticide called Phosvel. Wiggins Airways was awarded the low bid.

Spraying by helicopter ~~commenced on~~ the morning of June 5. On June 7 the project was completed and a total of 1500 acres were treated. A follow-up survey indicated certain areas within the Park as having more gypsy moth than could be accepted within camping areas. These pockets were touched up by mist blower using Sevin. The end result was a park relatively free of gypsy moth.

Saddled Prominent

The aerial survey in 1971 indicated 23,779 acres of visible defoliation by this insect. Most of the defoliation was comprised of small areas scattered over Berkshire, Franklin, Hamden and Hampshire Counties. The total acreage is down from the 105,000 acres of the previous year. Now the question remains as to the damage incurred on the hardwood forests particularly those in

Berkshire County. An attempt will be made to asses this damage.

Pine Looper

During 1971 the activity of this pest of the pitch pines on Cape Cod seemed to move from the Eastham-Wellfleet area to Plymouth County on and in the vicinity of Myles Standish State Forest. This is somewhat typical of this insect. Outbreaks usually subside rather quickly.

The aerial survey in 1971 indicated that approximately 10,000 acres had been moderately to severely attacked by the pine looper. Ground survey on Myles Standish showed many trees dead or dying.

A heavy moth flight in June of 1972 indicated that Plymouth County would again have a heavy population of caterpillars.

Hemlock Looper

The 1971 aerial survey indicated that approximately 600 acres of hemlock in the Lakeville-Freetown area and in the Hanover-Pembroke area were completely defoliated by this insect.

Pine Needle Miner

As if the pines on Cape Cod do not have enough troubles with the pine looper, the Nantucket pine tip moth and the gypsy moth they were beset this year with a heavy infestation of the pine needle miner. It was particularly heavy from Plymouth to Brewster. This insect,which mines from one half to three quarters of each needle causes very little permenant damage to the trees, but does create an unsightly appearance.

Excerpts from District Supervisor Reports

District #1

Isolated infestations of the brown tail moth were found in Dennis, Barnstable and Truro. Clipping of winter nests and natural shifting of sand dunes keeps this insect under control.

Observations showed very little Nantucket pine tip moth activity in Yarmouth and Dennis but control measures have been carried out using Cygon 2-E.

Heavy infestations of the eastern tent caterpillar were noted in the Middleboro area and in West Tisbury on Marthas' Vinyard.

There were light to moderate infestations of the wood tick in Barnstable, Plymouth and Dukes Counties. Control measures are taken annually by the local superintendents.

District #2

Gypsy moth survey plots were established in Milton, Foxboro State Park, and Attleboro.

The Foxboro tree removal crew assisted in 20 towns in the control of Dutch elm disease.

A small infestation of pine saw flies was found in Norwood.

District #3

The oak leaf skeletonizer showed a decided decrease in areas that were infested for the past several years.

What is getting to be a problem is the number of complaints received about the wood tick. This pest is really building up.

There were several reports of Cankerworm infestations in the Reading-Wakefield area.

The fall webworm was still in abundance in Newburyport, West Newbury, Merrimac and Amesbury.

District #4

Sudbury and Hudson have reported problems with wood ticks.

Satin moths have defoliated two poplar trees in Stow and gypsy moths have been found there as well as in Townsend State Forest. In both cases, only in small quantities.

Eastern tent caterpillars were found throughout the area but the heaviest damage was along Route #495 in Littleton.

One cabin at Willard Brook was infested with termites and was treated with chlordane.

District #5

Gypsy moth populations are increasing in a number of areas in Sutton, Douglas and Oxford. One new area of infestation has appeared in Brookfield of the Fiskdale Road.

A total of nine experimental gypsy moth plots were set out in Northboro, Oxford and Douglas.

The maple petiole borer was again prominent in many areas throughout the District causing a great degree of premature leaf drop and some concern.

Oak leaf skeletonizer seemed to be on a downward trend.

Anthracnose is running rampant throughout the District causing premature leaf drop on maples and oaks.

Southern Worcester County received 47 days of removal assistance and 22 days of scouting from the tree removal crew.

District #6

A total of 910 trees in towns entitled to assistance and 68 trees in the State Parks and State property were removed by the tree removal crew.

We were called upon to treat the Crow Hill Headquarters Building for a heavy infestation of termites and carpenter ants.

There was a heavy infestation and subsequent defoliation of the red oaks caused by Periclista in the area from Gardner to Rutland.

District #7

A combination of insects working with the gypsy moth was found including oak leaf tier, elm spanworm, cankerworm and forest tent caterpillar.

Assisted Dr. Becker with his experimental spray project in Granby applying Bacillus thuringiensis to roadside trees for gypsy moth control.

District #8

Very light infestations of gypsy moth found in south and north Berkshire County.

All towns in District #8 that have elms spend the bulk of their appropriations to eradicate and control the Dutch elm disease. Very few towns in the District spray for elm bark beetle which spreads the disease.

All towns in District #8 have elm leaf beetle - moderate to heavy. Some towns spray, others do not - mostly not.

The pine spittle bug has hit hard in the Berkshires this year. It has infested scotch pine and red pine.

The green striped mapleworm has been heavy in various towns - Pittsfield, Otis, Monterey, Savoy and Great Barrington.

The cherry scallop shell moth was found present in South County, mainly Great Barrington, egremont and Oits. Black cherry is the tree species attacked.

The beech scale - nectria is found throughout Berkshire County in beech stands. It is considered the number 2 tree loss after Dutch elm disease.

Report of the Cooperative Gypsy Moth Research Project

Submitted by: D.V. Trefry

Officially, this cooperative project started on 2-28-72. Prior to that time a great deal of unofficial time was devoted to various aspects of the total project as it was then planned. (From 1-1-22 until 2-28-72) Five days were spent reproducing maps of all known gypsy moth defoliation in Massachusetts since 1962 as determined by aerial surveying. Eleven days were spent attempting to locate sites for an experimental spray program for gypsy moth control by the aerial application of B.T. Nineteen man days were spent on this same effort by other bureau personnel.

Five days spent re: setting up laboratory area and office, repainting, equipping, wiring and constructiong map table. Five days spent determining percentage of egg hatch from gypsy moth egg masses and the percentage of parasitism by egg parasites, both Ooencyrtus and Anastatus. Two days were spent collecting egg masses. One day spent attending a meeting at the U.S.F.S. laboratory in Hamden, Conn. Re: The B.T. spray project. The balance of the time for these two months was spent on regular district work.

From 9-1-71 to 12-31-71, twelve days were spent on the co-op project as follows: two days at Hamden re: The B.T. projects, four days attempting to locate possible B.T. sites, four days locating possible starch and intensive study sites and two days research of old records and files. Also from the period 2-1-72 to 2-25-72 two men and a supervisor spent 21 man days with Dave Hubbard of U.S.F.S setting out plots in the Ludlow area in conjunction with the co-op project.

Since Feb. 28, 1972 time has been spent generally as follows. Selection or rejection of site and plot locations - 14 days. Starch tree transects for root samples, collecting, cataloguing, delivery 16 days. Parasite study

including egg collection, larvae and parasite collection 31 days. At least 47 man days were spent on the above by other bureau personne;.

One day spent with Dr. Lewis and Norman Dubois re: The B. T. Project in Monson. No areas with in the Commonwealth met the criteria desired by the U.S.F.S., and this phase of the co-op project was deleted.

Two days were spent with Earl Andrews of the Portsmouth office of the U.S.F.S., egg masses were collected for his study of the egg parasites and one day spent collecting egg mass two years old to be subjected to attack by Ooencyrtus. Large numbers of Anastatus emerged from the eggs collected at Ludlow. Days spent at meetings totaled 5 (N.E.F.P.C. & M T W & F), purchasing or otherwise obtaining equipment for various projects took three days. Three days were spent at Nickerson Park re: aerial spraying for gypsy moth control. One day spent with Paul Gallipeau of U.S.F.S. who is conducting the bird study on predation of gypsy by birdlife on selecting possible study areas.

Five days were spent on paper work and reports. (78 days as of 6/16)

The project has been greatly amended and enlarged as time passes. The original study plan consisted of 7 pages for the intensive study plot system. The present study plan consists of 30 pages plus 17 pages of forms to be filled out in conjunction with the plan and keys to accompany same. On 6/19/72 four more studies were included that are not shown above. They are as follows:

1. A sterile male moth release program requiring 15 sites or trees at least 1 mile apart in an area of woodland $\frac{1}{2}$ mile in diameter and a female caterpillar population of approximately 50 per acre.

2. To locate some 55 old government sites used for gypsy moth studies in the past, last used in 1931, no maps or locations other than the town name and forest type at that time available.

3. Locate chestnut oak stands in Berkshire County on high rocky ridges with low bush blueberry and an endemic gypsy population.

4. Locate 1,000 - 1,500 acres of repeated 100% defoliation for past two years equal to soil, topography and forest type of New Jersey for a comparison study. The last 10 days of June were spent in relation to the four new projects.

The collecting technique for the starch samples from the root system of the oak trees seemed to be an arduous and time consuming effort. We devised a technique of collecting by means of an auger and bit brace rather than a hammer and tree surgions goupe. This method was very efficient. Movies of our system have been taken by the U.S.F.S and I have been told that they intend to adopt this collection method.

The following are the areas which were located, checked, evaluated and selected or rejected for a phase of this co-op project. All these areas had defoliation or a known gypsy population in 1971.

Rehobeth	Seekonk	Attleboro	Dover	Westwood
Sharon	Sterling	Montaque	Leverett	Hampden
Monson	Granby	Ludlow	Belchertown	Quabbin
Northampton	Bernardston	Whately	Barnstable	Dennis
Brewster	Falmouth	Harwich	Orleans	Yarmouth

One study area was selected in Ludlow including the Ludlow Town Forest and the Springfield Water Supply and the other study area was chosen on Cape Cod in the area known as Hawks' Nest. The other areas were eliminated from the original project due to low gypsy population, high virus incidence, unable to spray safely, area too small, defoliation caused by other leaf feeders, infestation collapsing or control measures or experimentation on same property in past year.

In addition we are collecting and rearing gypsy caterpillars to learn the identity and range of the parasites and predators in Massachusetts outside the two co-op study areas. Larvae are being collected by the field personnel in Whately, Montague - Leverett, Monson, Quabbin, Dover-Westwood and Rehobeth - Seekonk areas. Collections are made once a week, if possible

100 larvae per collection, brought to Stow and reared in 16 oz. squat, non-waxed ice cream containers.

The U.S.F.S. is conducting a parasite - predator study on the two intensive woodland gypsy moth plot system areas on the cape and in Ludlow.