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ANNUAL REPORT

Bureau of Insect Pest Control

1973

A Move in the Right Direction

The Annual Report of last year discussed the beginning of the involvement of the Bureau of Insect Pest Control in research. The ultimate aim of any research conducted by this Bureau is towards the more efficient carrying out of its basic responsibility - the control of shade and forest tree insects and disease.

Due to the fact that any involvement in research necessitates the curtailment of certain of the service functions of the Bureau the normal routine has been altered somewhat. Less time is being devoted to visiting cities and towns for giving advice and rendering assistance in Dutch elm disease problems than in the past. Certain district supervisors and certain of the tree removal crews have been assigned to research projects. In the long run, however, the results of the research, if positive, will benefit all communities in the Commonwealth.

Two of the pernnial problems of the Bureau, Dutch elm disease and gypsy moth, are receiving needed attention at the present time. It appears that we may be approaching a break through in the control of these pests.

Therapeutic Promise

For many years those concerned with the well being of the American elm have dreamed of the day when at the first outward sign of disease the tree could be injected with something that would arrest the progress of the disease or eliminate it. Suddenly two such

products are receiving the attention of arborists and others interested in trees.

The first of these products is an antibiotic called Nystatin. Results at the present time appear most promising. This material is injected into the vascular system of the tree by means of a gravity-feed system. Approximately 100 diseased elms were successfully cured by this method in 1972. This experimental work is being done by Lowden, Inc., specialists in tree work.

The other product is a material called Benomyl and is a broad-spectrum systemic fungicide. It, too, has been injected into the xylem of elms to control Dutch elm disease. Being a systemic it can also be sprayed on elms to protect them from infection by the disease.

Bureau Participation

Following the long standing invitation by the Bureau to the Shade Tree Laboratories to assist where possible in research to benefit the shade tree interests spray machinery and personnel were assigned to Dr. Francis Holmes of the Shade Tree Laboratories. Benomyl was sprayed on a block of elms in Robinson State Park. A control block of equal size was established. Incidence of the disease found in the treated block will be compared to incidence of the disease in the control. At the time of this writing results have not been forthcoming.

Expanded Involvement

By far the major involvement in cooperative research programs has been in the field of gypsy moth. This involvement can be divided into two distinct areas.

In 1972 the Bureau, in cooperation with the U.S. Forest Service, assisted in the collection of data from study plots established in two general areas of the state - Cape Cod and the Connecticut Valley regions. Permanent plots were laid out in order to intensively study gypsy moth population fluctuations. Data is to be collected twice a year.

In the same general areas containing the intensive study plots Bureau personnel are collecting samples of oak roots, both in the fall and in the spring. These samples are dried and carried to the Northeastern Forest Experiment Station in Hamden, Connecticut. In the laboratory facilities there the samples are examined for starch content. It is from this starch which is stored by the tree in the roots that sugars are produced for the development of the tree during the following season.

It has been theorized that following a severe defoliation of a deciduous tree by the gypsy moth that the starch content of the roots is depleted. It is also theorized that the ability of the tree to withstand another defoliation can be determined from this starch sample. If the theories hold true a determination can be made as to whether to spray or not the following season.

Natural Enemies

For many years gypsy moth parasites and predators have been playing their part in Massachusetts exerting a certain amount of control over the gypsy moth. During the past 25 years very little checking has been done to determine species and numbers.

With the advent of increased Bureau activity in the field of gypsy moth the decision was made to attempt an up to date accounting

of the parasite - predator complex.

Inasmuch as weekly and oftentimes biweekly visitations were to be made to areas across the state in line with the cooperative research projects the decision was made to instute a parasite study. The study was an attempt to determine the species of parasites and predators present in Massachusetts.

The egg parasites Oencyrtus Kuvanae and Anastatus disparis were recovered from the field collections. Gypsy moth larvae starting with first instar and continuing to pupation were field collected, brought to the Stow Service Building and reared in specially adapted ice cream containers. The larval parasites identified were the following: Compsilur concinnata, Sturmia scutellata, Brachymeria compsilura, Apanteles melanoscelus, Parasetegina silvestris, a Sarcophagidae, and an as yet unidentified Braconid. On most of the collection areas the predator, Calasoma sychophanta was noted as active.

Pupal parasites were identified as Brachymeria intermedia.

Evidence of the wilt disease was noted at all collection points. Nowhere, however, did it manifest itself enough to cause significant decrease in the gypsy moth populations.

Manipulating the Sex Life of the Gypsy Moth

Early in 1973 another cooperative research study was entered into with the Federal Government. This time with the Agricultrual Research Service. The purpose of this study is the determination of the efficacy of an aerial application of the synthetic gypsy moth sex lure, disparlure, when applied to a large area of light infestation.

One hundred $\frac{1}{4}$ acre plots were established on each of a 16,000 acre treatment block and a 16,000 acre control block. Egg mass counts were made followed by larval counts made weekly on 25 trees in each $\frac{1}{4}$ acre plot.

At the time of this writing the treatment has not been made. Following the treatment virgin female adult gypsy moths will be placed on each of the study plots. Efficacy will be determined by the number of mated females recovered. Theoretically those females placed on the treated blocks will not be mated while those on the control will.

Financial Assistance

During the past fiscal year the amount of money contracted for and which will be reimbursed to the Commonwealth by the Federal Government amounts to $49,600. This money helps defray the costs of the cooperative research projects mentioned above.

Business as Usual

In any fiscal year the first order of business is the aerial survey to determine current defoliation by forest defoliators. The primary objective of the survey is the gypsy moth. Other defoliators, however, are observed and recorded.

Results of the survey, confirmed at a later date on the ground, are as followes:

1. On Cape Cod from Barnstable to Chatham a total of 11,470 acres were defoliated by the gypsy moth.
2. In Southeastern Massachusetts from the Dover-Westwood area south to Seekonk gypsy moth defoliated 1,980 acres.
3. In the Connecticut Valley region of the state a total of 7,130 acres were defoliated by the gypsy moth.

4. In the Berkshires the saddled prominent was noted as being at its lowest ebb in years with only 2,503 acres recorded as defoliated.

5. In terms of acres defoliated the pine looper surpassed all others with a total of 34,565 acres in Plymouth County and 8,175 acres on the upper Cape in Barnstable County.

6. In Essex County in the vicinity of Essex, Manchester and Gloucester somewhat less than 1,000 acres of mature hemlock has been moderately to heavily defoliated by the hemlock looper. A tree completely defoliated by this insect stands very little chance of recovery. The forester in Essex County has been alerted to this fact and it has been suggested that immediate salvage is the only way for an owner to realize any monetary gain.

GENERAL CONDITIONS

Gypsy Moth

Nickerson State Park was rendered relatively free of gypsy moth following the aerial application of Phosvel mentioned in the last Annual Report. A follow-up egg mass survey in the fall revealed very few egg masses remaining on the 1500 acres. Where a few egg masses did remain on critical areas the federal people charged with the quarantine of the gypsy moth touched up the areas with ground equipment using Sevin.

During the latter part of May and early June of 1973 the towns of Orleans, Brewster, Harwich, Dennis, Yarmouth and Barnstable again combined forces under a single contract and aerially sprayed 24,280 acres with Sevin - 4 Oil to control the gypsy moth. All reports at this time indicate that the program was very successful. The combined cost for the six communities at the rate of $3.25 per acre was $78,910.00.

The most critical area of the state at the present time is the Counties of Bristol and Norfolk. Gypsy moth has slowly been building in this area for the past two or three years. The towns of Westwood and Dover continue to have a problem and are now joined by the towns of Sharon, Foxboro, Easton, Mansfield, Seekonk, North Attleboro and Rehobeth.

The one other area of the state with heavy and somewhat widespread outbreaks of gypsy moth are the towns of Monson, Ludlow, Granby and Belchertown.

Recommended Procedures

The successful control of the gypsy moth through the cooperative efforts of the group of towns on Cape Cod opens up a new approach to the control of this pest. In an area of any size the most practical method of control is by aerial application. The larger the area the more economical the project becomes. The banding together of a group of communities with the mutual problem allows the contracting to be handled through one contractor.

The Bureau of Insect Pest Control will assume the responsibility for determining the technical aspects of the program, i.e. delineating the overall outbreak area, timing the application, determining that the climatic conditions are fovaorable and giving general advice to town officials.

Dutch Elm Disease

This perennial problem continues unabated despite efforts of cities and towns and the Bureau of Insect Pest Control to stem the tide. Communities, homeowners and those responsible for state owned land continue to lose valuable elms each year. 1972 was no exception.

These efforts are not completely in vain, however, as losses would be far greater if nothing were done. Under present conditions and with present knowledge the control of the disease is expensive. The cost of removal of an individual elm may run as high as four to five hundred dollars. Multiply this figure by the thousands of elms lost annually and one becomes aware of the expense.

Problems Compounded by Problems

As if the local tree man did not have enough problems with the Dutch elm situation he is now confronted with another. The prompt removal and destruction of the diseased elms is presently the major deterrent to the spread of the disease. Many of the tree men are forbidden to burn the wood in open dumps. They are also forbidden to use the sanitary landfill. In order to cover the law the diseased wood should be burned or buried. If we are to continue to save elms this problem must be resolved.

Fall Webworm

During the past three years fall webworm, a late summer feeder, has been particularly prevelant in northern Essex County and in spots along I 495. In the summer of 1972 reports were received that the area of northern Worcester was involved in a severe outbreak of this insect. It does very little damage to the affected trees but the nests do create a very unsightly appearance and evoke many phone calls and letters.

Pine Looper

Following the 1972 aerial survey it was determined that a total of 42,740 acres of primarily pitch pine were defoliated by the pine looper. The outbreak extended from Dennis to Plymouth with by far the major portion found north of the Cape Cod Canal. The towns of

Plymouth, Bourne, Carver and Wareham combined for a total of 34,565. Of this total 29,600 acres were in the town of Plymouth.

Unfortunately many pines are dead or dying due to the severe defoliation incurred by this insect and many more will be put under extreme stress by a second year of this defoliation. To alleviate the situation it has been recommended by the Bureau that those areas or individual trees in danger of a second attack or those suspected of being under first year attack be sprayed with either Sevin or Malathion. The problem facing us is that little or no experimental work has been done on the control of the pest. The above named insecticides would appear to be the most logical choices.

If all goes well and history repeats itself the outbreak should subside this year. Disease usually manifests itself during the second year of an outbreak resulting in a population crash.

Summation

Bureau activity during the past year has proceeded along two lines - research involving two of our major problems and the surveying and determining of major outbreaks in the state. The present research should help us solve the problem of major outbreaks in the future. The aim of the present research to arrive at solutions causing little or no harm to the total environment resulting in practical control of the major pests.

7/23/73