

THE NEW JERSEY STRIPPER¹

by Peg Crooks and David C. Shaw

Thousands of square miles of forest in the United States have been devastated by gypsy moth since 1869 when experimental insects were accidentally released from their storm-damaged cage. The robust species *Porthetria dispar* had been brought to Medford, Mass. from its native Europe by a French scientist named Trouvelot. He had intended to crossbreed them with silkworms. Since their discovery in and around the Earle Naval Ammunition Depot in 1967, the gypsy moths have spread to every community in Monmouth County, New Jersey with heaviest infestations in the wooded, semi-rural townships.

The pests are called gypsy moths because of their facility in travelling, hitchhiking on cars, campers or shipments of merchandise from infested areas. Beginning infestations are often found around campsites, along highways and even ringing taverns frequented by workers homeward bound from infested worksites.

As the first warmth of spring begins to unfurl the leaf buds (in late April here), the tiny larvae begin to emerge. At this point they have a silken string which acts as a balloon, enabling them to float on the spring breezes to areas where competition for food is not so keen as in their hatching places.

The forest is completely devoid of birds and small animals in those areas where the gypsy moth is busy defoliating the trees. The only sound is like rain and it is the sound of their droppings on the duff of the forest floor. It is not uncommon to see every tree stripped, from their preferred white oak canopy through the understory dogwoods right down to the sub-shrubs on the forest floor. Not a leaf will be left except the poison ivy which they seem to avoid even when starving.

Mortality of the stripped trees varies. An evergreen will die after a single total defoliation. Deciduous trees are weakened but will usually recover after one defoliation. Few survive two years of stripping in a row. Only the strongest can withstand three years of such punishment.

The round-headed larvae are charcoal or

brownish grey with tufts of hair on each segment. They have three light stripes down their backs as well as prominent blue and red spots, making identification positive: five pairs of blue dots followed by six pairs of red dots.

After gorging themselves and growing to three inches or even longer, the larvae goes into the pupal stage, metamorphosing into adults. The pupal cases are dark brown, waxy capsules attached to any hard, rough surface by a few threads of silk.

From late June into August, adults hatch, mate, lay eggs and die. They do not feed in the adult stage. In a heavily infested forest thousands of the orange-brown males flutter erratically, guided in their search for the flightless females by a strong sex scent. The female is dirty white, triangular, heavy-bodied. After mating she lays from 300 to over 1000 eggs in an irregular, chamois or suede-like masses on a tree or any available hard surface.

In an efficient control program from gypsy moth, the first order of business is to establish a central clearinghouse for information. In this case, the offices of the Monmouth County Shade Tree Commission are used. More than 5000 calls may be taken during a season of heavy infestation.

Every report of moths is checked by survey crews. If more than 100 egg masses are found in an acre, that area is mapped for control.

A combined bio-chemical program was decided upon in Monmouth County, with the Shade Tree Commission and the N.J. Department of Agriculture working together. Residential and recreational areas where millions of creeping larvae can simply not be tolerated are marked for spraying with Sevin, generically carbaryl. In remote areas, various parasites and predators are released in an attempt to establish biological control. Theoretically, the control insects will proliferate in the unsprayed areas, then spill over into the treated sections to eventually bring the moth under natural control. This will take time, since the

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gypsy moth is an imported plague and has no native enemies.

Locations of beehives are noted during the overall survey so owners of those in spray areas can be notified and the hives taken to safety. Sevin is deadly to bees and others in the hymenoptera family.

The cooperative county-State-Federal aerial spray program begins in early to mid May when trees are about 80 percent in leaf, enough to hold an effective amount of the insecticide. Work begins at four in the morning to take advantage of the still air of dawn. Target areas are pinpointed on the master survey map, then ktooners are posted to guide the aircraft in the spray pattern. Takeoff is with first light. Rain, wind, fog, or even a heavy dew can seriously hamper operations, postponing or even cancelling a day's plans.

The pilot of the helicopter or fixed-wing craft (both have been used) follows a map as well as the ktooners to direct his spray applications. He lays the Sevin in swaths, side by side, over the designated areas. Some days are plagued with freak air currents that move the spray two or three swaths from its target. On other days hot sun dries the spray before it settles on the foliage. There have been instances of evident pilot error.

Therefore, it is recommended that a survey of the treated areas be made daily after spraying. Should misses be found, it should be in the applicator's contract that he respray the areas at the same fee as the initial application, this to be done before the aerial spray program contract is deemed completed.

The fixed wing craft used in the Monmouth County program have been found even more satisfactory than the helicopters when spraying a large block. They carry more insecticide, cover more area without reloading, keep their pattern more constant and cover more acreage in a day. Since time is of the essence in the spray program, this is a key factor in efficiency. Spray from the fixed-wing craft seems to settle in the proper pattern without much drift.

In conjunction with the cooperative state-county aerial spray program, the Monmouth County Shade Tree Commission uses mist blowers along roadways in infested areas, in the county parks

and on other public property. Such misting is effective in controlling the pests up to 150 feet from the road, and since it does lay the insecticide on the undersides of the leaves, it is particularly efficient.

By treating campsites, public recreation grounds and tree canopies over the roads, hitchhiking moths are stopped dead in their tracks before they can attach themselves to some unsuspecting motorist and spread their population to wherever his destination might be.

The Sevin, or carbaryl, used in the spray program is of low toxicity to birds, mammals and fish. Tests indicate that it is not accumulated and transferred in animal food chains. It offers less hazard to fish and wildlife than the chlorinated hydrocarbon materials used in forest or rangeland control. There have been known instances in the county program of the material damaging automobile paint. Washing the car with warm water and a mild detergent will remove any spray droplets.

Homeowners in sprayed areas have found such happy side effects of the moth control program as a considerably lower population of spring canker worm and holly leaf miners.

New Jersey State law requires that all residents of an area to be sprayed be so notified at least 10 days before the program begins. This is done by first class mail or by hand delivery. Each municipality is responsible to notify the residents in their spray blocks. During the Gypsy Moth Survey the Shade Tree Commission survey representatives answer any questions the homeowner might have about the gypsy moths and about the insecticide to be used, and can show him where to look for signs of the pests, and most important, the homeowner can be shown what he himself can do to help control the plague on his own property. The homeowner is shown how to make a folded band of burlap around a tree trunk to snare the pests at all stages, and how a simple band of tarpaper laid loosely around the base of the tree will attract the pests by the hundreds.

If larvae and pupae are cleaned from these hiding places daily, the insect population and accompanying defoliation will be limited. The pests

can be dropped into cans of kerosene, alcohol, Chlorox or just squashed.

The egg masses should certainly be destroyed as found, too. Anywhere from 300 to over 1000 pests develop from each of the masses. Probably the simplest means of destroying the masses is to paint them with creosote or a solution of creosote and kerosene. Since many people are sensitive to creosote, it is a good idea to wear protective gloves and clothing when painting the masses. Homeowners should be cautioned to paint only the masses, not the whole tree trunk. The creosote could kill the tree if spread over a large portion of the bark.

Enlisting children is often a good way of spreading the word in any public program, and has been highly successful in Monmouth County. Commission representatives have gone into scores of the county's elementary schools, shown slides of the moth and its devastation, and explained to the children what they can do in the control effort. In some communities, the children are taken to actual infested areas and given a first hand demonstration of control. They are taught how to use a spoon to take egg masses from tree trunks, being cautioned to get every egg. If an egg is dropped to the ground, its development will not stop. The larva will hatch on schedule just as if it were still attached to the trunk.

The eggs collected in the coffee cans by the youngsters are destroyed with kerosene or alcohol or are given to the New Jersey Department of Agriculture to use in rearing parasites and predators.

To catch an infestation before maximum damage is done, every person in the area should know where to look for the pest. The gypsy moth is a secretive insect during all its life stages. As a larva it will descend from the tree during the day to hide in crevices in the bark, in the duff of the forest floor or under a rock — any dim, quiet place. It will choose similar spots to rest in the pupal stage. The female wants secret places in which to lay her eggs.

If everyone would take some time every day to seek out and destroy the gypsy moth, millions of the individuals would die before they could reproduce. Look under No Hunting signs, in and

under mailboxes, in hollow trees, in woodpiles and under birdbaths, cellar windowwells, under shingles, under eaves and soffets. Drainpipes are a favorite spot to pupate and for the females to lay eggs.

To protect his trees, the homeowner can spray them with Sevin, 50 per cent wettable powder with a bit of household detergent added as a spreader sticker, this at the rate of two table-spoons per gallon of water. He has the advantage who hits the larvae when they are tiny and easily killed by the spray before they can seriously damage his trees. This is particularly important for fruit trees during the crucial weeks of blossom and fruit set and for newly planted trees that may not yet have gained full strength to withstand a defoliation.

A sticky material called Tree Tanglefoot does a good job of catching the larvae during their early stages and of confusing them when they have become large and strong enough to get through it without being caught. This material is widely available in garden centers. It is spread in a band around the tree trunk, preferably above the reach of children. It can be spread directly on the bark or on an underband of plastic or burlap.

The laboratories of the New Jersey Department of Agriculture in Trenton are the headquarters for the biological control of the gypsy moth plague. It is here that the seven natural enemies now working against the moths were tested then reared for release. Those include an egg parasite, four larval parasites, a pupal parasite and a predaceous beetle. The parasites are tiny wasps and flies. It must be understood that these not only do not have the physical equipment to sting a person or animal, they aren't even interested, and they are not attracted by refuse, either.

More parasites and predators are being brought in from European and Asian countries where the gypsy moth is long established. These are being thoroughly tested to see whether they are clean of any sub-parasites and will not harm any beneficial native insects.

Work is also being done to synthesize the virus normally carried in the digestive tract of the gypsy moths that is released to kill them when population density is such that there is not enough food for

all.

Seeding sex attractants to confuse males and prevent them from mating is another project of the laboratory. As of 1981 season it was not successful.

The moths are raised year round in the laboratory, eggs are refrigerated for a period of winter before they hatch and can be held for months in the cold. Larvae are fed on a mixture of pabulum, powdered milk and molasses. These experimental moths in turn serve as the food for the parasites and predators, during testing and rearing.

When enough of the beneficial insects have been raised, they are released in the unsprayed areas where they can attack the moths, propagate themselves, and spread their kind throughout the infestation.

It must be understood that the gypsy moth is here to stay, not only in New Jersey, but probably throughout the entire United States, the pest continues its spread southward and westward from its New England beginnings. The aim of the control program is to bring the gypsy moth down to a level where we can live with it as we have with the tent

caterpillar, Japanese beetle, cottony cushion scale, boll weevil and other disastrous pests we have survived in the past.

Once the gypsy moth populations are brought under control, spraying will be needed only to cool occasional hot spots. These can be expected since the moth population ebbs and flows and it takes a year or two for the parasite and predator population to catch up with the buildup.

There is no question but that the biological controls are doing a good job where they have become established, but we cannot wait for them in our residential and recreational areas. In these areas, we must rely on a spray program for the time being.

As new weapons come along, they are being tested in the hope of finding even more efficient means of control of *Porthetria dispar*. The systemic insecticide methyl demeton has been tested with some success, but is for the present prohibitively expensive for general use.

Monmouth County Shade Tree Commission
Freehold, New Jersey