

## Oak Leaf Roller Moths Patterns Studied

Oak leaf roller moths at The Pennsylvania State University have proved that a little sex goes a long way. About one ten-millionth of a gram of pheromone, the sex attractant in the abdomen of one female moth, attracts males.

There's more proof that pheromone exists in extremely small amounts in the female. In getting enough material to use in developing a synthetic attractant, Penn State lab technicians extracted substance from some 20,000 female moths. When they were finished, they had less than one-half milligram of useful attractant—about equal to a dozen grains of salt or a few flakes of detergent.

A late June—early July project of collecting oak leaf roller pupae, hatching the moths, and extracting pheromone was a cooperative effort of personnel in the College of Agriculture and the College of Science. The goal of chemists and entomologists is to determine how chemical communication takes place among oak leaf roller moths. Central figures in the research are Dr. Lawrence B. Hendry in chemistry and Dr. Ralph O. Mumma in entomology (chemical pesticides).

The two scientists consider the oak leaf roller project an excellent example of interdisciplinary research. The ultimate goal, of course, is pest management.

The most exhausting task in removing material from the abdomens of 20,000 female oak leaf roller moths is to refine the substance to an effective sex attractant. The trick, says Dr. Hendry, is to determine what kind and how much natural pheromone a female moth has—and then put it back together in synthetic form.

In the field, Dr. Hendry and associates found that one material isolated from the

female attracted up to 7,000 males. This occurred during one week. However, Dr. Mumma and Dr. Hendry believe ideal sex attractant for oak leaf rollers is not one chemical but a combination. Finding this "needle in a chemical haystack" is their immediate goal. When the ideal pheromone is determined, the sex attractant will be used in infested areas to confuse oak leaf rollers and thus keep them from mating, or to attract moths to traps.

Over several years, one million acres of trees have been destroyed in Pennsylvania by the oak leaf roller. While no serious outbreaks have occurred since the early 1900's, damage tends to occur over a number of years. Injury from the oak leaf roller has been severe in recent years in Michigan and several eastern states.

The studies found that male oak leaf roller moths respond to pheromone for only 2 hours during the night in lab tests and give no response during daylight hours.

Authenticity of extracts from female moths was tested in flight chambers where male moths are kept in the new Davy Laboratory, headquarters for chemistry at University Park. Sex attractant material from a female is placed on cotton attached to a pipe cleaner inserted into the flight chamber.

"If any three moths attempt to copulate with the cotton within 25 to 30 seconds, the material is considered a sex attractant," Dr. Hendry explains.

To obtain about 20,000 female moths for the one-half milligram of pheromone, the Penn State scientists started with 60,000 pupae. Not all hatched but the results produced 45,000 moths—half of them males and half females. A crew of young people, mostly students, collected pupae from mid to late June.

Most of the hatching of moths took place in early July. The largest hatch of 7,000 adult moths occurred July 2. That was the day that Patterson Building, headquarters for the department of entomology, saw Room 215 engulfed with about 40,000 jelly jars each containing one pupa. One-ounce jelly jars, the type used in hotels and restaurants, were used as incubation chambers.

## Flood Study Underway In County

Many Lancaster County communities are now being studied by the U. S. Soil Conservation Service to determine

whether they are subject to flooding, according to District Conservationist Orval Bass.

Bass said the special flood hazard inventory will be used by the U. S. Housing and Urban Development in carrying out the Federal Flood Insurance Program.

The District Conservationist said that flood-prone communities are defined as areas subject to flooding by a 100 year frequency storm. Expressed another way, its a community which has about a one percent chance of annual flooding.

Under the study, Bass said areas of each flood-prone community will be located on detailed maps and the sources of flooding identified.

The file and address of the head of the local unit of government having authority to control land use and issue building permits will be listed. This information will be included in a state and national summary, Bass reported.

## Vegetable Field Day Sept. 12

A statewide field day for commercial vegetable growers

will be held September 12 at the Horticultural Research Farm of The Pennsylvania State University, located 10 n. west of the University Park campus on Route 45.

Of special interest to vegetable growers will be machine harvesting of cucumbers and cabbage, variety and fertilizer trials, genetic research with vegetable crops and potatoes, disease and insect studies, and chemical weed control.

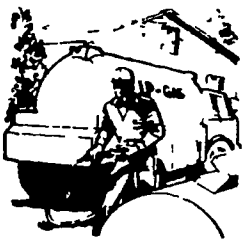
If growing conditions permit it, field day visitors will have an opportunity to sample Penn State's latest achievements in developing high sugar sweet corn. Researchers hope to have some high sugar corn available for visitors to eat at noontime.

Tours of the various research plots will start no later than 10 a.m.

"Vegetable growers should find this field day both profitable and interesting," states Charles J. Noll, field day chairman from the department of horticulture.

Lunch will be served at the Horticultural Research Farm by a local church group.

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