"When our aircraft tug broke down for the last time, we replaced it with something reliable from John Deere."

E. K. Jones, Jr., President, Iowa City Flying Service, Iowa

If it weren't for E. K. Jones, Jr., and his John Deere 850 Tractor, a lot of airplanes might never get off the ground.

Thirty times a day, he uses his John Deere to pull airplanes out of the hangars.

"It's a real nice tractor, and I haven't had any trouble with it," says Jones, after 1,046 hours of service.

But things weren't always so easy. Until a couple of years ago, he hauled airplanes with an old aircraft tug that gave him nothing but trouble.

"Every time it broke down, we had problems."

Which explains the feature Jones likes most about his John Deere 850 Tractor.

"It's maintenance free!"

Small enough, yet big enough.

When his old aircraft tug finally died, Jones needed more than something reliable. He also needed something that was big enough to pull planes as heavy as six or seven thousand pounds. Yet small enough to be economical to buy and operate.

So he bought the 22-PTO-hp John Deere 850.

It has a compact, water-cooled, 3-cylinder diesel engine that has enough power and stamina to pull airplanes around, day in and day out, year after year.

And because it's a diesel, it's more economical to operate. Which is important to Jones because sometimes he runs his tractor all day long, non-stop.

A better tractor, even for pulling airplanes.

The fact that Jones uses a John Deere Tractor to haul airplanes certainly displays its versatility.

And there are some good reasons why people use a John Deere 850 Tractor for so many different things.

It has a well-spaced, 8-speed transmission, and a differential lock. It has a 3-point hitch (Category I), 540-rpm PTO, an adjustable drawbar and a complete line of power-matched equipment. And you have a choice between traction and high-flotation tires as well.

Built to last.

Of course, like all John Deere Tractors, the 850 is built to last.

"The way it's been running, it will probably be running as long as I'm in business," says Jones.

And E. K. Jones, Jr., and the Iowa City Flying Service plan to be in business for a long time.

The fact is, John Deere Diesels are helping lots of people get projects off the ground.

Take one for a ride at your nearby John Deere dealer.

Try out the 22-PTO-hp 850, the 27-PTO-hp 950, or the 33-PTO-hp turbocharged 1050.

Then ask about John Deere leasing, renting and financing plans.

See for yourself why people like E. K. Jones say, "You may pay a little more, but it lasts longer."

Nothing runs like a Deere.

For more information, write John Deere, Dept. 67, Moline, Illinois 61265.

*Maximum PTO horsepower at 2600 engine rpm for the 850 and 2400 engine rpm for the 950 and 1050 by official test.
resting spot underneath a leaf’s surface. It begins to migrate from the foliage it feeds upon at night to resting locations on the tree’s trunk or on signs, treehouses, stone walls, and other ground sites during the day. In the evening, it moves back up the tree.

Bark flaps of burlap or other materials wrapped on a tree trunk make a suitable resting spot and thus a trap for the gypsy moth. Here they can be collected and either killed or monitored. Research on the use of bark flaps for estimating populations, determining larval behavior, and aiding biological controls is being investigated by Wallner of the Forest Service in Connecticut.

**Chemicals**

Scientists now agree, as do most arborists, that pesticides are only a piece of the puzzle for total gypsy moth control. However, spraying insecticides is still the most thorough method of control and they cannot be ignored at this time to treat the gypsy moth.

If a trapping program in Virginia shows an isolated infestation, the Forest Service uses an intense spray program to wipe it out. According to John Weidhaas, extension specialist in entomology at Virginia Tech, the Forest Service will use Dimilin, an insect growth regulator, because it is highly specific to caterpillars. It is not approved for populated areas. Spraying occurs in the second or third week of May. Hitting the gypsy moth in its early instars is vital for any chemical to give maximum effectiveness. The application of Dimilin has been cut in half under acceptable weather conditions and then sprayed a second time in June.

Many chemicals are available, often limited by state regulations and to licensed applicators. The following chemical insecticides are registered: carbaryl (Sevin), trichlorfon (Dylox), acephate (Orthene), Imidan (a phosphate-type insecticide), Bidrin (a toxic insecticide used by injection), Malathion, and Methoxychlor. Diflubenzuron, (Dimilin), which prevents the gypsy moth from molting, is only registered for forest treatment.

At the Otis methods development center, where Charles Schwalbe directs the research, insecticide screening is a large project. The center screens biological and chemical compounds from industry to determine their toxicity to the gypsy moth.

Schwalbe describes the work like this: “We take registered insecticides and try to define their use patterns. We use the minimum efficient dose to receive the desired control. We improve formulations so they work better, concentrating on microbial insecticides. When you spray one, it doesn’t last long; ultraviolet light breaks it down and rain washes it off. This is the main reason for erratic results.”

Until recently, Schwalbe says, there has not been the concern of these two factors affecting insecticide residual. Research information has made manufacturers more willing to accept the results. The Otis laboratory has made significant progress with stickers to counter the wash effect.

<table>
<thead>
<tr>
<th>Gypsy Moth Food Plant Preferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most Preferred</td>
</tr>
<tr>
<td>OAK</td>
</tr>
<tr>
<td>HAWTHORN</td>
</tr>
<tr>
<td>PAPER BIRCH</td>
</tr>
<tr>
<td>GRAY BIRCH</td>
</tr>
<tr>
<td>APPLE</td>
</tr>
<tr>
<td>SWEETGUM</td>
</tr>
<tr>
<td>TAMARACK</td>
</tr>
<tr>
<td>ASPEN</td>
</tr>
<tr>
<td>WILLOW</td>
</tr>
<tr>
<td>BASSWOOD</td>
</tr>
</tbody>
</table>
of rain. Ultraviolet penetration is a tougher problem.

Sterilized males

Another project Schwalbe’s team deals with is rearing large quantities of sterile male gypsy moths. Cobalt 60 gamma radiation is used. It is important to get the right amount of radiation at the right development of the gypsy moth. This research is now in its fourth year and is still preliminary. Last year, the first field tests were done in Michigan and they will be continued this year. Schwalbe expects that the tests at low level populations will show how well the sterilized males mate and how they move in the field.

Biological agents

Two entomologists, William Yendol from Penn State and Frank Lewis, principal insect pathologist at the Northeastern Forest Experiment Station, gathered sufficient data from studies to help get Bacillus thuringiensis (Bt) registered with the Environmental Protection Agency. After this success, they did the necessary research to register a gypsy moth virus, nucleopolyhedrosis (NPV), named Gypchek. “We did research and development of these microbials for control and utilization in IPM programs for gypsy moth management,” says Lewis.

Bacillus thuringiensis, a spore-forming bacteria, comes in many strains, one of which is registered and produced under the names Dipel, Thuricide, and Bug Time. It kills the gypsy moth in its larval stage. When the insect eats the mixture of spores and crystals, the larva’s gut is paralyzed. Ultimately, the insect starves to death or the bacteria grows and kills the insect by septicaemia, or multiplication of the bacteria in the blood.

“...We have mainly tried it (Bt) by itself,” says Lewis. “We need much more work integrating these things, trying to substitute microbials for pesticides. We present it as an option. Bt works better when applied from the ground than the air.”

The most devastating disease of the gypsy moth is that caused by the specific nucleopolyhedrosis that affects the larval stages of the insect. It is entirely specific to the gypsy moth. Like Bt, NPV is slow acting and harmless to the environment.

An insect becomes infected by eating foliage that has been contaminated with virus-containing polyhedral inclusion bodies (PIB’s). The PIB’s dissolve in the gut of the insect and release virus rods which first cross the gut wall and then infect blood cells. The disease progresses to the fat body and finally to cells of the integument (outer skin). An infected larva will show signs of the disease by loss of appetite, listlessness, a darkening in color, a moist-appearing integument, and often a tendency to climb upward. Infected larva usually die within 9 to 11 days and hang from foliage of bark in an inverted “V” position.

Dr. Yendol says present research is dealing with different forms of Gypchek and its mode of action. This year it will be studied in an attempt to improve the application technology, including aerial application rates, dosages, and its most effective ways to treat egg masses. Work focuses on incorporating the virus into pest management with pheromones, parasites, and insecticides.

Infectious diseases caused by bacterial pathogens are also important in gypsy moth regulation. Unlike NPV, which infects blood cells, these bacteria simply multiply in the fluid portion of the hemolymph (blood) and kill larvae either through the production of toxic substances or by depleting the insects of nutrients. Of these naturally occurring bacteria, S. faecalis and S. marcescens are probably the most effective in killing gypsy moth larvae.

Parasites

Another program to halt the rampage of gypsy moth is occurring in New Jersey under APHIS control. William Metterhouse is running the program which involves field evaluation and monitoring of gypsy moth parasites. Started in 1963, the field and laboratory studies have helped to introduce seven parasites and one predacious beetle into the population in New Jersey and New England.

Several species of small wasps attack the various life stages of the gypsy moth. One of the

Continues on page 24
NEW
...from Princeton

The “Piggyback” Material Handler

It’s Powerful ... Safe ... Versatile!

Princeton’s mighty “Piggyback” has solved many of the problems that have always plagued heavy-duty, field quality material handlers. The remarkable “Piggyback” is light...strong...fast...durable...AND completely stable on the job!

The Piggyback will lift and load up to 4500 lbs. at a time ... turn quickly in its own length ... navigate curbs, logs, and other obstacles with ease...trudge through gravel, sand and mud, but float over normal soil...and then load itself onto your truck for a piggyback ride home at the end of the day.

How is it Possible?

The Princeton “Piggyback” provides an extremely low ratio of weight to carrying capacity...with complete stability. Stability is achieved by carrying the load weight between the drive wheels instead of in front, as with other fork lifts, and by special hydraulic stabilizer legs. Load is lifted to truck bed height, then rolled over truck bed by a horizontal carriage. Heavy-duty high torque wheel motors allow the “Piggyback” to operate on steep grades or in adverse ground conditions and to drive easily over normal loading area obstructions while fully loaded.

The Piggyback’s 28 h.p. Murphy 2-cylinder diesel provides superior power for all adverse operating conditions.

For additional information or demonstration, write, or call collect:
Rodger Osborne, Sales Manager
955 W. Walnut St., Canal Winchester, Ohio 43110
(614) 837-9096

Dealer/Distributor Inquiries Invited
The “New Concept” People

Gypsy Moth from page 23

most common species, Ooencyrtus kuwanai, is an egg parasite that can attack 30 percent of an egg mass and up to 90 percent of a small egg mass. Apanteles melanoscelus and Phobocanpe disparis wasps attack the larval stages. Another wasp, Brachymeria intermedia, stings the gypsy moth pupae but is most effective when gypsy moth populations are at defoliating levels.

Several fly parasites infect the gypsy moth. The most promising, according to Metterhouse, is Parasitica silvestris. Campsyliga concinnata attacks insects on more than 200 of their hosts. Blepharipa pratensis, another fly, lays its eggs on leaves and the gypsy moth caterpillar eats the eggs when it eats the leaves. A predacious ground beetle, Calosoma sycophanta, which was imported from Europe, attacks both the larvae and adult gypsy moth.

“Parasites provide another regulating factor,” says Metterhouse. “The augmentation of parasites on low gypsy moth populations has become more important. More research is ongoing and all parts of the USDA are cooperating. An example of the cooperation between APHIS-SEH-Forest Service is the evaluation of parasites for vectoring microbial diseases to increase effectiveness of natural controls.

Predators

The gypsy moth’s parasites are usually smaller than the host they attack and develop with a single individual. Predators usually are larger than their prey and consume many host insects during the course of their life. They are very active, live longer, and may prey upon a variety of insects, depending on what is available.

According to Harvey Smith with the Department of Agriculture’s Northeast Forest Experiment Station in Hamden, Connecticut, the importance of predators has probably been underestimated because they consume their prey quickly and leave few if any remains. Woodland mammals can consume large numbers of gypsy moth larvae and pupae in forested areas. Some mammals eat only one life stage of gypsy moth, while others may eat as many as three.

Some mammalian predators of the gypsy moth include the white-footed mouse, shrews, chipmunks, moles, and squirrels. Shrews, which are often mistaken for mice, are voracious insect feeders that consume their weight in prey each day. Unfortunately, mice and shrews are probably not important as predators in suburban settings because they are eliminated by domestic animals such as the common cat and because their natural habitat, forest litter, is frequently destroyed.

Many species of birds have been observed feeding on gypsy moth larvae or adults. Nut-hatches, chickadees, towhees, vireos, northern orioles, catbirds, robins, and blue jays are proba-
bly more important in sparse gypsy moth popula-
tions. Cuckoos and flocking species such as star-
lings, grackles, red-winged blackbirds, and
crows may be attracted to areas where the gypsy
moth exists in large numbers.

Other factors
Numerous factors, often difficult to measure,
contribute to the control and spread of gypsy
moth. Ripe temperatures can trigger heavy
infestations of the gypsy moth. An early thaw
proceeded by severe freezing could reduce pop-
ulations. Unfortunately for residents of the
Northeast and surrounding areas, conditions ap-
pear healthy for the gypsy moth in 1981 and pre-
liminary studies show this year may be the
highest population ever.

Awareness of all facets of the gypsy moth—its
life cycle, habits, and controlling agents—can
make a major difference in a preventative rather
than protective program. According to Dr.
Cameron, “As the insect moves down through
the south and west and the initial defense is be-
ond us, we seem to get into the situation in
which we hope it doesn’t get too bad. Then pop-
ulations build up and we try to protect the areas
threatened. It becomes a reactive program that
develops over the years rather than a true man-
agement program with emphasis on preven-
tion.”

“How long it remains, no one is certain,”
says Dr. Lewis. “It is a cyclical insect in Europe; it
subsides and reappears in Europe every seven to
eight years. These cycles appear to be climate re-
lated.” Barring dramatic changes in the climate,
Lewis expects the insect to be at least as serious a

“It will probably take more resources than we
have now,” Lewis says. “All our tools and tactics
are being researched to collectively and select-
ively use for control. Our past experience of a
single control has not solved the problem.
Hopefully, we will have a longer term manage-
ment.”

Nobody is deluding himself with optimistic
predictions. Dr. Cameron says, “We are a long
way from broadly managing the gypsy moth in
the U.S. This is part of the challenge and part of
the work.”

Dr. Schwalbe says, “The gypsy moth is a tre-
mendously cosmopolitan insect. It occurs under
such a variety of situations that there is just no
way that within the extremely near future we will
have the means to control it.”

If anything positive has arisen from this
devastating insect, it could be that government
and industry are working together to solve the
problem. The concept and activity of pest man-
agement has come alive and may soon be a
household word. The gypsy moth could be the
rallying force that makes IPM work.

TWO GREAT GAMES
ONE GREAT GRASS

Super Bowl XIV and the Rose Bowl classic were the great
games. The turf? That was Derby Turf-type perennial
ryegrass.

Derby was selected by George Toma, the man responsible
for the Super Bowl XIV turf and Gus Huntly, turf manager
for the Rose Bowl game, because of the special require-
ments for these special games.

Toma and Huntly wanted a fast-germinating, dark-green,
handsome grass as well as one tough enough to take a
pounding and still look great for the television cameras.

And Derby did it all. Of course, it will do more. It mows
beautifully and thrives when cut at 1½ inches or at 3/16
inch on golf greens. In Southern areas it’s a top choice for
winter overseeding of golf greens.

Derby is also a great mixer, combining with the fine
fescues and bluegrasses to form an outstanding turf.

HERE’S WHAT DERBY WILL DO

- Persists in heavy, compacted, poorly drained areas
  where traffic is not intense
- Tolerates a wide range of soil types from heavy clay to
  sandy
- Retains its deep green color during chilly Southern
  winters
- Germinates in less than a week under ideal conditions
- Thrives when cut to 3/16, 1 inch or 1 ½ inches
- Mixes nicely with fine fescues and bluegrass

A Product of:

INTERNATIONAL SEEDS, INC.

P.O. Box 168, Halsey, Oregon 97348
Telephone (503) 369-2251 • TWX 510/590-0765

Write 122 on reader service card
Drive disease off fairways too, with Daconil 2787.
Daconil 2787 Flowable Fungicide is the product of choice on tees and greens because it controls more diseases than any other turf fungicide. And in 12 years of continuous use, resistance has never been reported.

You can count on it to perform on fairways, too. To help you achieve a longer, more profitable playing season. A better looking course. More enjoyable play. Plus a better return on course investments already made.

Daconil 2787 controls such turf ravaging diseases as dollar spot, leaf spot, red thread and large brown patch on fairways. Its proven residual effectiveness at recommended application rates, plus the fact Daconil 2787 has a built-in surfactant, makes it economical to use.

The 500 formulation of Daconil 2787, introduced in 1978, gives you the additional advantage of fast, easy handling because it flows readily and disperses quickly.

When it comes to disease control, make Daconil 2787 your fungicide from tee to green. Use it on labeled ornamentals around the club house, too. It'll keep your course fit for the masters.

Write 113 on reader service card.

Always follow label directions carefully when using turf chemicals.
THE GROWING ROLE OF PHEROMONES:
FROM INDICATOR TO CONTROL METHOD


Increased ecological awareness by the public has encouraged the commercial development of alternatives to some chemical toxins as means of controlling insect pest species. Among the alternatives which show promise are sex pheromones.

The attractiveness of female moths to males of the same species has been known since the 18th century but it was not until 1959 that the word pheromone was coined and defined as, “A chemical message carrier between members of the same species, and beneficial to that species.”

Organisms other than insects possess pheromones, but insect pheromones are our primary interest. Subsequently, pheromones were categorized according to their function, leading to “trail pheromones”, “aggregation pheromones”, “alarm pheromones”, “territoriality pheromones” and “sex pheromones”. The promise offered by sex pheromones as an alternative to insecticides is that they could be used in insect control without detrimental side effects on nontarget organisms and the ecosystem, and this has been the major driving force behind much pheromone research.

The first sex pheromone was identified in 1959, and today pheromones or attractants are known for more than 350 species of Lepidoptera belonging to 29 families (there are of course many more pheromones known—belonging to the Coleoptera, Hymenoptera and Diptera). The pheromones of the Lepidoptera are generally blends of relatively simple chemicals whose subtlety is a factor in maintaining species integrity. Within this blend components may be identified as causing long range orientation while others are classified as close range pheromones.

Although improved instrumentation has lessened the difficulty in isolating and identifying pheromones, and although there is frenetic activity in the field testing of pheromones, the commercialization has only recently begun to pick up momentum.

As you well know, there are two steps involved in pest insect population management. There is monitoring or surveying and there is the control or regulation of the numbers to an acceptable economic level. In both steps pheromones can play an important part. The Albany International system is used for control through mating disruption. Normally the female releases her pheromone, and the plume is carried downwind. A male can orient to the plume and find the female. However, when the air is permeated with the synthetic pheromone, the male is unable to find the female. For this strategy to succeed, the synthetic pheromone must be disseminated over a period of time minimally equal to the duration of the adult stage of the target pest. Our system used to obtain this controlled release is based on hollow fiber technology; that is, the pheromone in the fiber diffuses out of the open end at a steady rate. The rate of release is dependent on the internal diameter of the fiber, and of course, on the environmental temperature.

In 1980 we treated 66,500 acres of cotton in the United States and South America by this disruption technique for control of the pink bollworm. The material was aerially applied, with an average of three applications. The rate of application averaged 20 grams per acre of formulation which is equivalent to 1.52 grams of synthetic pheromone per acre. Other insects against which products have been commercially used with success are the western pine shoot borer in the Pacific Northwest and the tomato pinworm in Mexico.

Development of application methods is also an integral part of creating diversity for the system; besides aerial application, hand and ground application equipment are available.

For monitoring, the pheromone system is composed of a trap and a lure. Information obtained is (a) presence of specific pests, (b) population density (although this is a very complex question), and (c) the determination of peak emergence on which to base a subsequent treatment. Traps come in a variety of shapes and types. Sticky traps include the delta trap, the ice-cream carton trap, and the wing trap. Advantages of

Continues on page 30
Why Pay More for Less?

LONG 2-cylinder diesel tractors are priced up to 25% LESS than competitive models of comparable horsepower.

- LONG 2-cylinder tractors are precision engineered for outstanding fuel efficiency and performance to give you MORE for LESS.

- LONG 2-cylinder diesels give the small farm operator, turf care professional, and weekend gardener a choice of three small utility tractors with power matched attachments to handle a variety of jobs at LESS cost.

- LONG 2-cylinder diesels provide MORE of the features of larger tractors, including: live PTO; category I 3 pt. hitch (I & II on 310 std. model) with draft and position control, automatic depth control, variable wheel spacing, and lights. Hydrostatic steering is optional. Available with turf or farm tires.

- The LONG 24 PTO h.p. 260-C and 28 PTO h.p. 310-C are MORE than small garden tractors, they are compact size, fuel-efficient farm tractors with power enough for garden, turf, and small-acreage farm operations — yet, cost LESS than many smaller horsepower garden tractors.

- Why pay MORE for a competitive 2-cylinder compact or standard size tractor, when you can own a quality-built LONG tractor for LESS money?

Quality-Built, Fuel-Efficient 2-Cylinder Diesels — Priced Up To 25% Less*

Dealer Inquires Invited

See your Long dealer, or contact: Write 129 on reader service card

Box 1139 (1907 N. Main St.), Tarboro, NC 27886 Tel. (919) 823-4151
Box 918 (2610 Hwy. 77 North), Carrolton, TX 75006 Tel. (214) 242-5102
Box 3928 (3863 W. River Dr.), Davenport, IA 52806 Tel. (319) 324-0451
Box 167 (Hwy. U.S. 41 South), Tifton, GA 31794 Tel. (912) 392-3600
Box 13263 (1920 Channel Ave.), Memphis, TN 38113 Tel. (901) 774-6523
Box 259 (#8 Long Lane), Mechanicsburg, PA 17055 Tel. (717) 697-8277
906 Harney St., Vancouver, WA 98660 Tel. (206) 695-1259

* Tractor retail price comparison brochure available on request.

**Ask your participating Long Dealer about his special weekend sales of Long 2-cylinder tractors and power matched implements.**
CONWED HYDRO MULCH® 2000 FIBERS TEST-PROVEN EFFECTIVE IN PREVENTING EROSION

Conwed® Hydro Mulch 2000 fibers were six times more effective in controlling erosion than other fiber mulches in an impartial university test. That could mean six times more protection for your investment in seed, fertilizer, and labor, so you can minimize costly post-job repairs and redos.

As the chart below confirms, Hydro Mulch 2000 fibers were test-proven to have superior soil holding power.

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>&quot;APPARENT&quot; EROSION RATE (Soil Loss)</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pounds/Minute*</td>
<td>Tons/Acres/Hour</td>
</tr>
<tr>
<td>CONWED HYDRO MULCH 2000 FIBERS</td>
<td>0.14</td>
<td>2.35</td>
</tr>
<tr>
<td>Mulch applied at 1600 pounds per acre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AVERAGE OF OTHER MULCHES</td>
<td>0.96</td>
<td>16.08</td>
</tr>
<tr>
<td>Mulch applied at 1600 pounds per acre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BARE SOIL (control plot)</td>
<td>1.99</td>
<td>33.34</td>
</tr>
</tbody>
</table>

*Testing was done on a 2:1 slope. After soil preparation, the plots were seeded and mulched in one operation and allowed to lay overnight. Simulated rain controlled at the rate of four inches per hour was applied until a targeted deterioration of the surface occurred. Product effectiveness was evaluated by "apparent" rate of erosion which was calculated by dividing the total time until deterioration by the weight of the material eroded.

This natural wood fiber mulch is premixed with a highly effective soil stabilizing tackifier for convenient one-step application. It's ideal for hydraulic seeding everything from front lawns to strip mines. And, once it's down, Hydro Mulch 2000 fiber enhances germination by protecting seeds from temperature fluctuations and evaporation of soil moisture.

So, when your reputation is riding on each job, use Conwed Hydro Mulch 2000 fiber, for a job that's done right the first time.

For information, write Conwed Corporation, Fibers Division, 444 Cedar Street, P.O. Box 43237, St. Paul, Minnesota 55164. Or phone (612) 221-1190.

---

Pheromone from page 28

these types of traps are that they are commercially available, easily handled, cheap, and disposable. The negative side is the trap’s efficiency to catch a moth decreases as the number of moths caught increases.

Another type of trap is the wire cone trap. In this design the males are trapped in the upper portion and are unable to find their way out. The non-overloading trap is one in which the moth is attracted into the top portion of the trap, knocked down, by say vapona, and is collected in the lower portion.

The number of captures rises to a point where trap effectiveness drops.

The lure or pheromone dispenser used with the trap must release the pheromone at the desired rate. Generally when the concentration of the bait is increased, the number of captured insects also rises to an optimum point, beyond which the number of captures decreases. Materials which have been used as bait include rubber septa, polyethylene vial caps, beem capsules, dental wicks, cigarette filters, polymer matrices, and a lure composed of a parallel array of hollow fibers. The rate of release of hollow fiber arrays is dependent on the diameter of the fiber and also on their number.

Three insects of interest are the gypsy moth, the Japanese beetle, and clearwing borer. Although Albany International, at this time, does not manufacture products for the consumer market, we believe that this year several gypsy moth products will be introduced for sale to the home owner. It is highly probable that they will be part of a system which will also contain a killing agent. We do sell, however, a monitoring system for this insect. Pheromones are classified as biorational pesticides and as such, when used for insect control, must be registered by the Environmental Protection Agency. For strictly monitoring purposes registration is not required. However, trap and lure combinations purporting to be a control system require a registration.

A product which is commercially successful is aimed at controlling the Japanese beetle. It is known as Bag-A-Bug. This is not an Albany International product but it does use as the attractive source a combination of the sex pheromone and the floral scent.

The 1980 national insect pest priority list of the National Arborist Association identifies several borers, including dogwood borer, rhododendron borer, ash borer, peach tree borer, and lilac borer, in the top forty pests. The pheromone systems for 52 species of clearwing borers are known.