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TIMING	WEEDS TO BE CONTROLLED			HERBICIDE
Early Spring	crabgrass carpetweed Florida pusley	goosegrass oxalis pigweed	poa annua stinging nettle	 Chipco Ronstar G
Spring	<i>The following weeds can be controlled with one or more of the herbicides listed on the right:</i>			 Chipco Turf Kleen Chipco Turf Herbicide MCPP Chipco Turf Herbicide "D"
	buckhorn and other plantains chickweed clover curly dock	dandelion English daisy ground ivy knotweed red sorrel	speedwell stitchwort wild garlic wild onion yarrow	
Summer	bahiagrass chickweed crabgrass	dallisgrass nutsedge	sandbur wood sorrel	 Chipco Crab Kleen
Fall	<i>The following weeds can be controlled with one or more of the herbicides listed on the right:</i>			 Turf Kleen Chipco Turf Herbicide "D" Chipco®Buctril® Chipco Turf Herbicide MCPP
	buckhorn and other plantains chickweed clover curly dock dandelion English daisy	ground ivy henbit knotweed lambquarters mustards pepperweed red sorrel	shepherdspurse stitchwort speedwell wild garlic wild onion yarrow	

For more information regarding the Chipco line, consult your distributor or Rhodia representative.

Please read labels carefully and use only as directed.

RHODIA INC. AGRICULTURAL DIVISION
Monmouth Junction, New Jersey 08852



SEX PHEROMONE TRAPS USEFUL IN CONTROLLING TREE BORERS

By David G. Nielson, Ph.D., Project Leader, Woody Ornamentals Laboratory, Department of Entomology, Ohio Agricultural Research and Development Center, Wooster, Ohio.

Borers are the most damaging and difficult to control group of insect pests that attack shade trees and shrubs. Now, after more than five years of experimenting with synthetic sex attractants, a major breakthrough has been made in controlling one important group of borers, the clearwing moths. These moths usually lay eggs on bark surfaces, and larvae hatching from the eggs tunnel into the bark. Consequently, borers are vulnerable to insecticides only from the time they hatch until they chew their way under the bark surface. It is during this short time period that a lethal pesticide residue must be present on bark surfaces to prevent attack and damage.

Before cancellation of DDT and dieldrin registrations, landscape managers applied these materials in the spring before adult emergence began, confident that lethal residues would persist throughout the hatching period of borer larvae. Other insecticides with shorter residual life must now be used. Therefore, we must know when adult borer emergence begins so a short-lived residual

spray can be applied just before larvae begin to hatch. Until now there has been no economical way to predict seasonal borer emergence.

Clearwing Moths: Clearwinged moths include some of the most common and destructive borers of trees and shrubs. Although most moth species fly at night, clearwing moths fly during the day. They resemble wasps or bees in both physical appearance and behavior, but they cannot sting. They feed only on nectar, if at all, and probably live no more than a week. Consequently, they do not cause damage themselves.

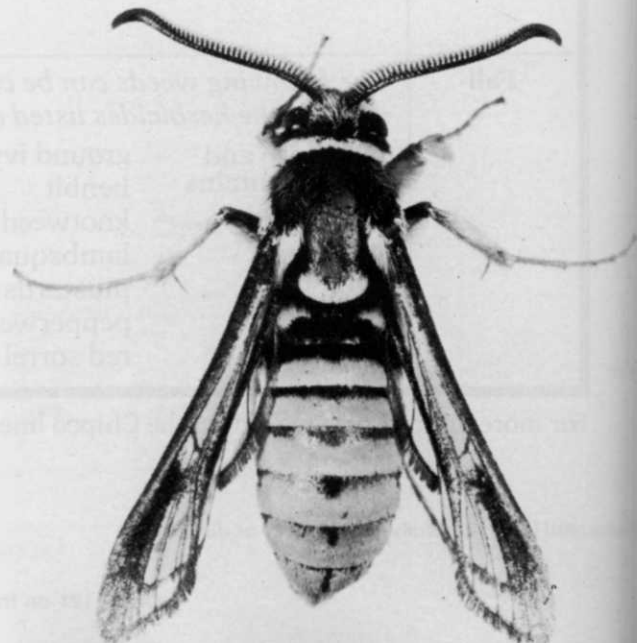
Soon after female clearwing moths emerge from host trees or adjacent soil, they begin to emit a sex attractant odor into the air. Males detect the odor (called pheromone) with their antennae and fly upwind towards the female until they locate and mate with her.

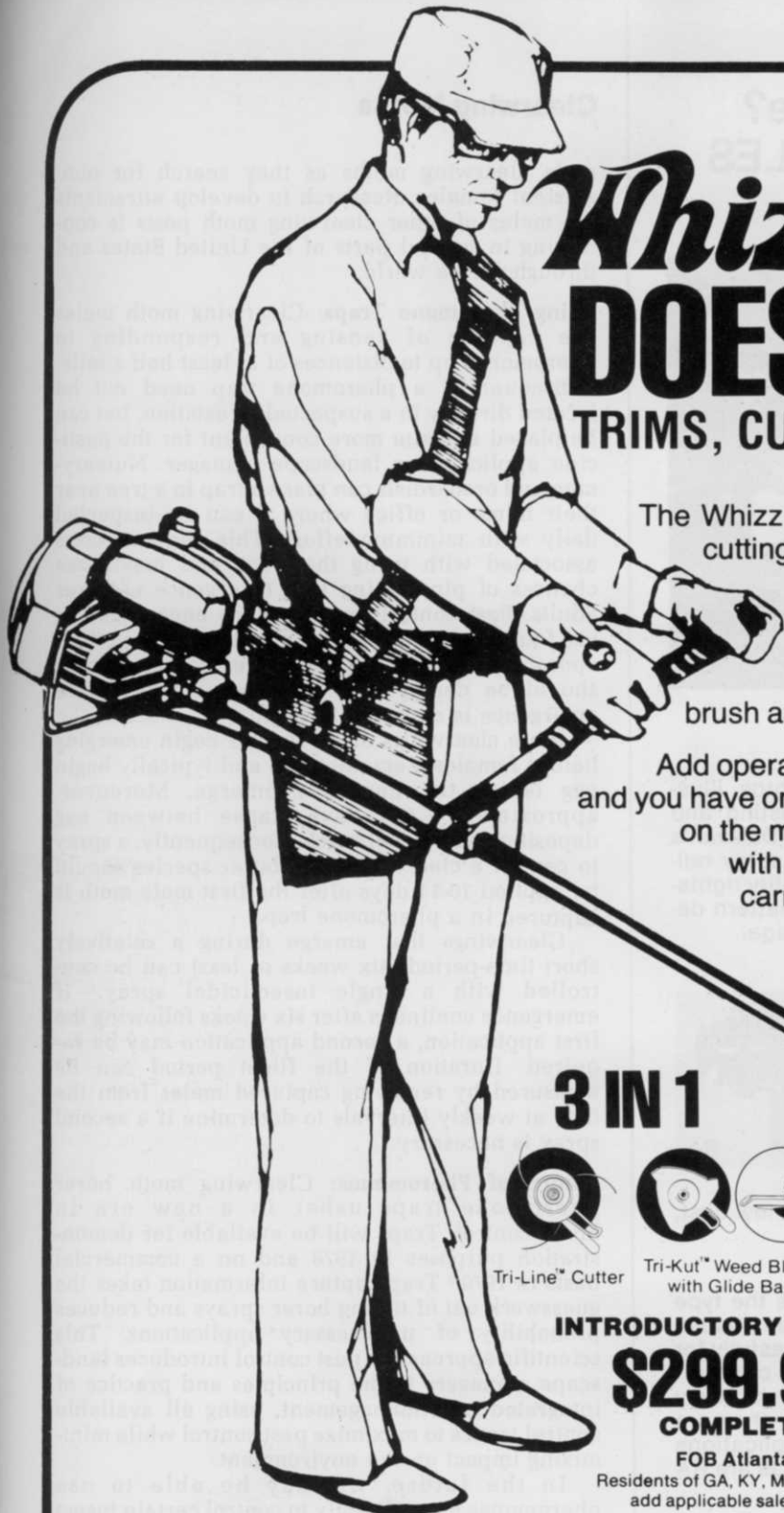
After mating, the female usually deposits her eggs in cracks and crevices on tree bark. Larvae hatch several days later and bore beneath the bark where they construct galleries. Feeding and tunneling by growing larvae damage the plant by weakening limbs and trunks and destroying tissues that transport food and water throughout the tree.

Attractants for Male Moths: The chemical composition of two clearwing moth sex attractants was discovered in 1973. Since that time, attractants have been developed for several destructive species, including lilac borer (= ash borer), dogwood borer, peachtree borer, lesser peachtree borer, and sequoia pitch moth. These attractants are used inside sticky traps to capture



Larvae of a lilac borer inside a branch (above). A classic case of mimicry, yellow jacket (left) and the adult oak borer (right).





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A



B



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RA



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Photo B above shows the type RD Raindrop nozzles boom-mounted. Used successfully for several years on contour-adjustable booms for highway right-of-way spraying, they are also used in aerial applications to reduce spray drift (as are RA types).

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Circle 103 on free information card

Clearwing Moths

male clearwing moths as they search for non-existent females. Research to develop attractants for males of other clearwing moth pests is continuing in several parts of the United States and throughout the world.

Using Pheromone Traps: Clearwing moth males are capable of sensing and responding to pheromones up to distances of at least half a mile. Consequently, a pheromone trap need not be located directly in a suspected infestation, but can be placed at a site more convenient for the pesticide applicator or landscape manager. Nurserymen and orchardists can place a trap in a tree near their home or office where it can be inspected daily with minimum effort. This reduces costs associated with using the traps and maximizes chances of pinpointing first emergence of borer adults. Pest control operators are encouraged to use four or more traps distributed throughout their operating area for a given borer species. Traps should be deployed at least two weeks before emergence is expected to begin.

Male clearwings of all species begin emerging before females. Females mate and typically begin egg laying the day they emerge. Moreover, approximately ten days elapse between egg deposition and larval hatch. Consequently, a spray to control a clearwing moth borer species should be applied 10-14 days after the first male moth is captured in a pheromone trap.

Clearwings that emerge during a relatively short time-period (six weeks or less) can be controlled with a single insecticidal spray.¹ If emergence continues after six weeks following the first application, a second application may be required. Duration of the flight period can be measured by removing captured males from the trap at weekly intervals to determine if a second spray is necessary.

Future of Pheromones: Clearwing moth borer pheromone traps usher in a new era in borer control. Traps will be available for demonstration purposes in 1978 and on a commercial basis in 1979.² Trap capture information takes the guesswork out of timing borer sprays and reduces probability of unnecessary applications. This scientific approach to pest control introduces landscape managers to the principles and practice of integrated pest management, using all available control tactics to maximize pest control while minimizing impact on the environment.

In the future, we may be able to use pheromones more directly to control certain insect pests. Perhaps enough pheromone traps can be used in a given area to capture all male moths before they can inseminate females. Unfertilized females will then deposit only infertile eggs which, of course, never hatch. We are evaluating this so-called "Mass-Trapping" approach to borer control in North Dakota shelterbelt ash trees.

¹Consult your state cooperative extension office or land grant university to obtain information regarding insecticides approved for use against specific borers.

²Contact your local pesticide distributor about trap availability.

WT&T
PROFILE:

THE WHOLESALE NURSERY MARKET



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WHOLESALE GROWERS EXCEED ONE BILLION DOLLARS IN SALES

The wholesale grower and the sod producer are the farmers of the Green Industry. Their problems closely resemble those of agriculture; business is weather dependent, cash flow and labor needs are seasonal, and equipment and supply costs are much greater than the average small business.

The wholesale grower, the subject of this survey, is constantly searching for ways to beat mother nature. Mechanization, new plant cultivars, and improved growing techniques are utilized to boost productivity and hold down prices in the face of rising costs.

WEEDS TREES & TURF discovered a number of changes taking place within the wholesale nursery industry. Short digging seasons have plagued northern growers for three years. Consequently, more northern growers see containerizing as a solution to poor field conditions. Research into hardier, more disease resistant species and cultivars is being sought and encouraged. Regional surveys are underway to reveal unpopular varieties and discover new ones so growers can concentrate on popular plants. One result of specialization and identification of popular varieties may be increased competition. However, an increasing demand for plant material appears to be counterbalancing the effects of competition. A national marketing program sponsored by the American Association of Nurserymen has the goal of increasing the demand significantly.

To obtain specific data on the wholesale grower, WEEDS TREES & TURF surveyed 936 firms in the United States. A total of 207 returned the questionnaires for a 22 percent return. The Horticultural Research Institute, Inc., has placed the size of the market at approximately 5,000 firms with 70,000 full-time and an additional 70,000 seasonal employees.

More than 70 percent of the wholesale growers are also involved in retailing. Forty-four percent also do exterior landscaping and 17 per-

Concerns of wholesale growers.

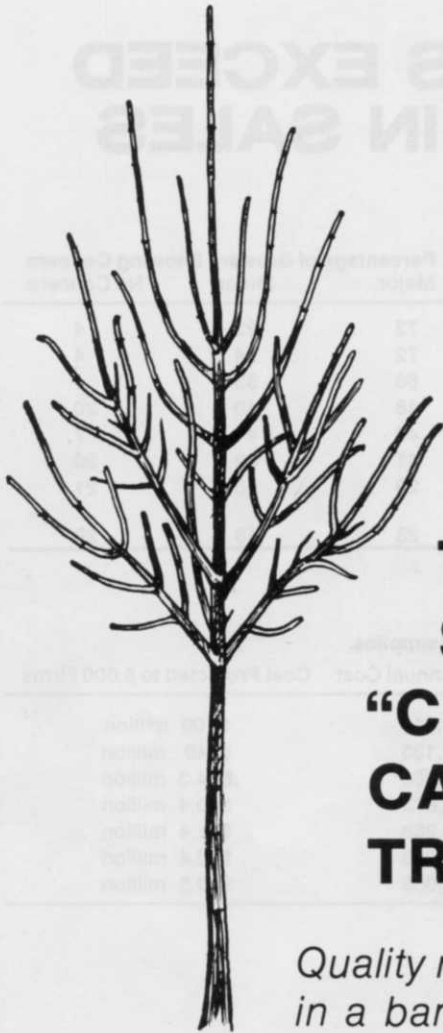
Concern	Percentage of Growers Showing Concern		
	Major	Minor	No Concern
Labor Costs	73	23	4
Government Regulations	72	24	4
Supply Costs	66	33	1
Labor Skill	48	40	20
Property Taxes	48	44	7
Labor Supply	41	39	20
Competition	29	50	21
Local Market Conditions	23	48	29

Annual expenditures for various types of supplies.

Item	Average Annual Cost	Cost Projected to 5,000 Firms
Containers	\$21,814	\$109 million
Fertilizer	\$ 8,133	\$ 40 million
Soil Amendments	\$ 6,869	\$34.3 million
Seed	\$ 4,073	\$20.4 million
Pesticides	\$ 2,288	\$11.4 million
Herbicides	\$ 2,078	\$10.4 million
Fungicides	\$ 2,055	\$10.3 million

Involvement with other types of businesses.

Type	Percentage of Respondents
Retail nursery	70.6
Exterior Landscaping	44
Interior Landscaping	17
Lawn Care	15
Tree Care	15
Sod Production	6
Plant Breeding	1



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cent do interior landscaping. Fifteen percent of the firms do lawn care and tree care. Only one percent indicated they do plant propagation.

Nearly two-thirds of the respondents distribute products in their region only. The average number of acres in production is 122 with a range of one to 1,600 acres. The average number of acres occupied by greenhouses is 1.5 acres.

The growers were asked what percentage of total acreage is used for container stock, shade and fruit trees, and field grown shrubs and evergreens. They were also asked whether or not they plan to increase, decrease or maintain production in the three areas.

The growers reported an average of 17 percent of their acreage is used for container stock and nearly 60 percent plan to increase this area of their business. Six percent plan to decrease container stock production.

The respondents have an average of 35 percent of their acreage for the production of shade and fruit trees. Only 42 percent said they plan to increase shade and fruit tree production. Another 42 percent plan to maintain production and 16 percent expect to decrease tree production.

The largest amount of acreage is used for growing field-grown shrubs and evergreens, 48 percent. Like container stock, nearly 60 percent of the growers expect to increase production. Twelve percent plan a decrease and 31 percent expect to maintain production.

WEEDS TREES & TURF calculated the average gross revenue of a wholesale grower to be \$519,853 based upon responses ranging from \$1,000 to \$15 million. The median of the range was \$230,000. Projecting a total industry gross from a universe of 5,000 firms and the median gives \$1.15 billion, or projected from the average (mean), \$2.5 billion.

Taking the computation one step further by assuming a markup of 300% at the retail level, growers in the United States produce plant material valued at the retail level for \$3.45 billion (median) or \$7.5 billion (mean). The Horticultural Research Institute, Inc., estimated the value of plant stock at the retail level in 1975 to be \$2.7 billion.

When asked about the direction of profits and sales in 1977, three-fourths of the growers indicated sales had increased, but only 43 percent said profits increased. In fact, 30 percent reported a drop in profits while only 13 percent reported a drop in sales.

Growers say labor costs, supply costs, and government regulations are of most concern. Recent minimum wage legislation is making seasonal labor "more expensive." Labor skill and property taxes are concerns of nearly half the respondents. At the present time, growers do not see competition as a major concern.

Growers described seasonal labor force makeup as 66 percent local labor, 23 percent students, and 11 percent migrant farm workers. Forty-one percent indicated labor supply was a problem.

Expenditures for supplies, based upon averages for various materials, total an average of \$54,125 per year. This figure does not include expenditures for fixtures or equipment. The greatest single expense is for containers, followed by fertilizer, soil amendments, seed, pesticides and herbicides.

The growers listed the average value of greenhouses as \$52,114 and the average value of irrigation systems as \$33,095.

Equipment inventories of growers indicated significant purchases of tractors, mistblowers, boom sprayers, compression sprayers, carts and wagons, and rototillers. Based upon averages, growers own a total of 33,000 tractors, 65,000 carts and wagons, 14,400 rototillers, 10,750 compression sprayers, 8,250 boom sprayers, and 6,500 mistblowers.

The American Association of Nurserymen has recently devised a plan to increase the demand for plant materials on a national scale. It is a voluntary program of contributions based on a percentage of the wholesale growers sales. Called the National Marketing Council (NMC), the group will do basic market research into customer preferences and then create and institute a mass media campaign for the entire Green Industry.

WEEDS TREES & TURF supports the idea and sees it as a program worthy of support. We polled the growers in the survey about the NMC. Unfortunately, only 32 percent said they plan to participate in NMC and only 16 percent thought their customers were interested in contributing to NMC. This hopefully will change as word gets out about NMC. Interested persons should contact the American Association of Nurserymen, 230 Southern Building, Washington, D.C. 20005. The NMC will benefit everyone involved in growing, landscaping and maintaining plants.

WTT

Number of pieces of equipment owned by wholesale growers.

Type	Average Per Firm	Total for 5,000 firms (Projected)
Tractors	6.6	33,000
Wagons	6.1	30,300
Push Carts	4.4	22,000
Motor Carts	2.6	13,000
Rototillers	2.9	14,400
Boom Sprayers	1.7	8,250
Mistblowers	1.3	6,500
Compression Sprayers	2.15	10,750

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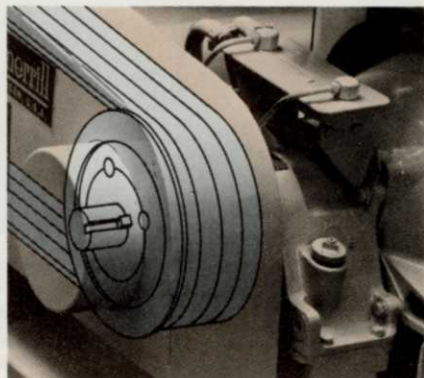


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CONARD-PYLE COMPANY: GROWING WITH THE ROSE



Container roses are grown in covered quonset house. The plastic is removed at the sides to allow free flow of air.

An aerial view shows the 22.5 miles of quonset houses at the container production area of The Conard-Pyle Co. A few of the houses are partially covered with plastic.



The Conard-Pyle Company was incorporated in West Grove, Pa., in 1897 as the Conard & Jones Company to sell seeds and plants through a mail-order catalog. Robert Pyle was employed as a helper in 1899, and with his father, purchased a considerable part of Alfred Conard's share of the business upon his death.

Conard's partner, Morris Jones, retired in 1923 and the company name was changed to the Conard-Pyle Company.

Robert Pyle decided that the business would thrive best if it specialized. He thought the specialty should be an item for which there was a fairly steady demand and which was likely to remain popular indefinitely. He fixed upon the rose. In 1908 he trademarked "Star" and Star Roses was born, the chief prod-