## Eastern Gypsy Moth Study Traces Six-Year Infestation

The Connecticut Agricultural Experiment Station has published a bulletin that describes the rise and fall of the gypsy moth and elm spanworm in Connecticut during the last six years.

The gypsy moth is still a problem in some parts of the state — particularly in eastern and northern Connecticut — but the elm spanworm was killed off a few years ago by a parasite discovered by station entomologists.

John Anderson, chief entomologist at the station and senior author of the bulletin, said it appears that "the general spread of these insects during 1969 to 1974 resulted from winds tending to blow more frequently from the south and west."

The data show "outbreaks of gypsy moth are now persisting for longer periods of time, and that the main directions of dispersal are to the north and east," he said.

"Thus it appears that future infestations in southern or western areas of Connecticut may spread across the state and even into adjacent states as the infestations have done during the early 1970's," said Anderson.

The bulletin contains a town-by-town record of the severity of defoliation experienced in 165 towns during the last six years. Only four towns escaped noticeable defoliation during that time.

Anderson also discusses the effects of aerial spraying programs carried out in 12 towns during the years from 1969 to 1971. He concluded in several cases that insect populations would have collapsed without aerial spraying.

The tables used for the defoliation data employ a location-identifying system called the GeoCode which was developed by co-author Sydney W. Gould. Gould and Anderson feel that the GeoCode could be used to assemble uniformly organized records of damage caused by any disease organism or insect.

The bulletin is available from Publications, The Connecticut Agricultural Experiment Station, Box 1106, New Haven, Conn. 06504.

## Potentials of Foliar Nutrition Subject of Cornell Research

The Horticultural Research Institute recently approved funds to conduct research on foliar nutrition of environmental plants for improved production and maintenance efficiency, reduced nutrient runoff and ground water pollution, and fertilizer conservation.

The work, to be done under the direction of Dr. H. B. Tukey, Jr., Department of Floriculture and Ornamental Horticulture, Cornell University, Ithaca, N.Y., will evaluate the effectiveness of foliar applications to meet the nutritional needs of horticultural plants, both in the commercial production industry and in the maintenance of plants in nonagricultural situations, such as residences and parks.

According to Tukey, mineral nutrients and other substances can be absorbed by the foliage of plants more rapidly and efficiently than those applied to the roots.

"Foliar nutrition offers considerable potential as a more effi-

*(continued)*

## Meet In San Antonio

sented on the biological control aspect of noxious aquatic plants. Papers on the use of plant pathogens for problem plant control are also being presented. Dr. Kerry Steward will present his study on "Factors Affecting Subaqueous Release of Herbicides from Various Invert Formulations." New Research on the white amur will also be presented by several authors including Mondell Beach of Florida's Department of Natural Resources.

The relatively new field of infrared photography for aquatic plant monitoring will be presented by at least two authors presently conducting research in this area. Problems associated with Melaleuca introduction into the Everglades will also be explored.

Social activities will include a Texas-style barbecue, tours for the ladies, hospitality hours, annual banquet and dance and the post-convention tour.

For more information, contact L. V. Guerra, President, Hyacinth Control Society, 134 Braniff, San Antonio, Texas 78216.

cient method of meeting the nutrient needs of plants," said Tukey, "including nursery and greenhouse plants, commercial vegetables and fruits, certain agronomic crops, turfgrass in sod production and landscape plantings around homes and in parks, and forest trees in both seedling nurseries and forest plantings."

In addition, foliar nutrition may be an important aid in reducing nutrient runoff and subsequent groundwater pollution from agricultural land in plant production and maintenance. This practice may reduce the quantities of fertilizers used in the production of some environmental plants, which is particularly important now because of the worldwide shortage of fertilizer and the high economic and energy cost of fertilizer manufacture.

The proposed research will delve into the feasibility of foliar applied nutrients to provide nutrient requirements in plants in combination with root absorption. Research is expected to begin at Cornell University immediately.

## Industry Seminar Includes Parts and Inventory Control

Forty-seven persons including two women, have been awarded certificates by The Toro Company at the completion of its training seminars in parts management and inventory control.

The classes, believed to be the first of their kind in the outdoor power equipment industry, demonstrated the increasing importance Toro gives to the sale of replacement parts for its maintenance equipment for lawn and turf care.

According to R. F. Eldred, general manager of Toro's Parts Division, the seminars were designed initially to increase the professionalism of parts managers, especially in forecasting and record-keeping, and thereby improve customer satisfaction and distributor profits. The present economic climate, which encourages repair rather than replacement of equipment, has made such training doubly necessary, he said.

Encouraged by the success of the first round of classes, Toro will hold future seminars in alternate years, Eldred said. Between seminars, he plans to send divisional staff members out into the field to give on-the-spot training.

## Proposed Plant to Produce Daconil, Bravo Fungicide

A new fungicide plant for Diamond Shamrock is slated for operation in late 1976, announced W. H. Bricker, president of Diamond Shamrock Corporation at the company's annual shareholders meeting.

The plant will produce Bravo® and Daconil 2787® fungicides, and is needed to supply growing demand in existing markets as well as new markets overseas, Bricker said. When completed, the new facility is expected to nearly double Diamond Shamrock's fungicide supplies in the United States.

Construction is scheduled to begin in early 1976 at Greens Bayou, Texas. It will be located adjacent to a "sister" fungicide plant which was in full production last year. The Company maintains other fungicide production facilities in Ashtabula, Ohio and Japan.

*Tree branching texture, crotch development and overall form are among the features inspected at the Ohio Research and Development Center shade tree evaluation plot.*

# Ohio Shade Tree Day Set for July 9

The background and status of the Ohio Shade Tree Evaluation Project will be one highlight of a combined program of the Ohio Shade Tree Symposium and the summer meeting of the Ohio Chapter of the International Shade Tree Conference, July 9, at the Ohio Agricultural Research and Development Center (OARDC), Wooster, Ohio.

The project was developed as a comparative evaluation of new tree selections in the north central states. The first phase of the study involves a planting of species in an OARDC plot. Plantings have been made annually since 1965. Currently, there are 128 species and cultivars represented in the 842 trees in the plot.

The second phase of the project involves evaluation of existing plantings of 53 different species in Toledo, Wooster, Columbus, Cincinnati and Cleveland. At each of the 99 separate sites, five replications of a tree type are being evaluated.

Dr. L. C. Chadwick, Professor emeritus of horticulture, will open the Symposium with a status report on both phases of the project. The program will also feature Richard Boers, commissioner of forestry, Toledo, Ohio, in a discussion of urban arboriculture; new plant introductions will be covered by Dr. Frank S. Santamour, Jr., supervisory research geneticist, U.S.National Arboretum; Charles L. Wilson, OARDC plant pathologist, will update Dutch Elm disease research; David Nielson, OARDC entomologist, will talk about shade tree insect control; and Dr. O. D. Diller, professor emeritus of forestry, will discuss establishment of community shade tree commissions.

Registration for the event begins at 9 a.m. in the OARDC auditorium with the program starting at 9:25.

## Toro Turf Products Extends Parts Warranty to One Year

The Toro Company has extended its warranty coverage on all of its institutional turf products to one full year, according to James R. Maloney, service manager.

The new policy covers the costs of both parts and labor for the repair or replacement of defective materials, including engines, transmissions and other components not manufactured by Toro.

The coverage, extended from 90 days, implements a new phase in Toro's program to assure after-sale satisfaction.

Toro has also adopted new procedures for equipment set-up and delivery. Distributors are supplied with a check list for each turf unit to make certain it is assembled properly and functioning well before acceptance by the purchaser.

Distributors are being urged to explain to each customer everything done to ensure top performance, and to provide instruction to turf maintenance personnel on proper operation, adjustment and maintenance procedures.

## Golf Courses Last Refuge For America's Greenbelts

Were it not for the tremendous popularity of the game of golf, many of our most critically needed green belts might have disappeared years ago.

"Golf course development has saved nearly two million acres of open space in areas where it is needed most," said Geoffrey Cornish, president of the American Society of Golf Course Architects (ASGCA). "In some overcrowded urban areas, golf courses are among the last large green belts, the final sanctuary for many species of wildlife and plant life."

A resident of Amherst, Mass., Cornish has designed more than 150 golf courses around the world. The 75-member professional association he heads is made up of the leading course designers in North America.

While golf course development on all fronts — municipal, private and real estate — has presently slowed with the economy, Cornish predicts that nearly another million acres of open space will be saved during the next 10 years by golf course developers.

"While many are waiting for a healthier economic climate, many people interested in new courses are now involved in feasibility studies and preliminary plans which indicates golf course construction may spurt later this year or early next year," he said.

Golf courses and other green belts act as big air conditioners, with trees, grass and shrubbery producing oxygen, trapping airborne pollutants, and absorbing unpleasant odors and noises.

The ASGCA president said the average 18-hole golf course can provide the oxygen requirements for a town of 7,000 people. Trees help cool and cleanse the air in summer, and reduce wind velocity and heat loss in winter. The soil absorbs moisture and replenishes water tables. The average 150-acre golf course, for example, effortlessly absorbs 12 million gallons of water during a three-inch rainfall.

Those interested in obtaining information on how to go about planning a golf course project may contact the American Society of Golf Course Architects, 221 N. La Salle St., Chicago, Ill. 60601.

**WHITE AMUR** *(from page 29)*

are too severe for white amur survival.

PUERTO RICO — Bill Rushing, Corps of Engineers, Waterways Experiment Station, Vicksburg, Miss., informed me that the Corps and the Commonwealth of Puerto Rico are planning white amur research in Puerto Rico. Amur were stocked primarily for weed control evaluations in small ponds ranging from one to 15 acres on the Del Rado Beach property. The Commonwealth is planning to stock several large freshwater reservoirs which supply water to major cities and are plagued by submerged weeds.

TENNESSEE — Tennessee recently initiated investigation of the white amur in small ponds at the Oak Ridge Laboratory under the direction of Dr. Larry Wilson. Wilson will investigate plant preference and effectiveness of the white amur as a weed control agent and he will evaluate the impact of the white amur on native farm pond fishes and the sporting potential of the white amur.

Bill Campbell, Tennessee Game and Fish Commission, said white amur have been taken from Real Foot Lake and are probably from Arkansas stockings. Real Foot is in the northwestern part of the state and connects via canal to the Mississippi River. He feels the amur definitely is now in the Tennessee River watershed.

Leon Bates, biologist with the Tennessee Valley Authority (TVA), said the TVA stocked a small farm pond in Alabama to evaluate the aquatic weed control potential of the white amur. The pond was approximately an acre and was stocked with five three-pound amur. The fish did an excellent job in controlling weeds, and grew to approximately 26 pounds in two and one-half years. The amur did such an effective job that the farmer was very hesitant to allow TVA to recover the fish and insisted that the recovered fish be replaced.

Bates also said several Alabama ponds which occur along the Tennessee River are stocked with the white amur. Since these ponds were flooded by the Tennessee River this year, white amur now must be widespread in the Tennessee River watershed.

MISSOURI — Dr. Jim Whitley, Missouri Conservation, Division of the Game and Fish Department, is very concerned about white amur movement from Arkansas to Missouri. Since Missouri borders Arkansas, he feels the introduction of white amur in Arkansas leaves Missouri little choice concerning the amur. This has resulted in a heated contention between states over the potential use of the white amur. Whitley is concerned that the white amur may meander into some of the Ozark streams which contain native aquatic plants upon which he feels the associated fish production is dependent.

Whitley has investigated the feeding habits of small amur to determine if and under what conditions white amur will feed on organisms other than plants. He has reported that small amur will feed on *Gammarus* spp,. a small crustacean commonly known as scud, and that one-tenth pound white amur consumed fry of bluegills and guppies in aquaria void of vegetation.

Dr. William Pfliger, an associate of Whitley's, is working with commercial fishermen to establish the distribution of the white amur in the U.S., especially in the Mississippi watershed. He is also trying to determine if the amur has reproduced naturally in the Mississippi drainage.

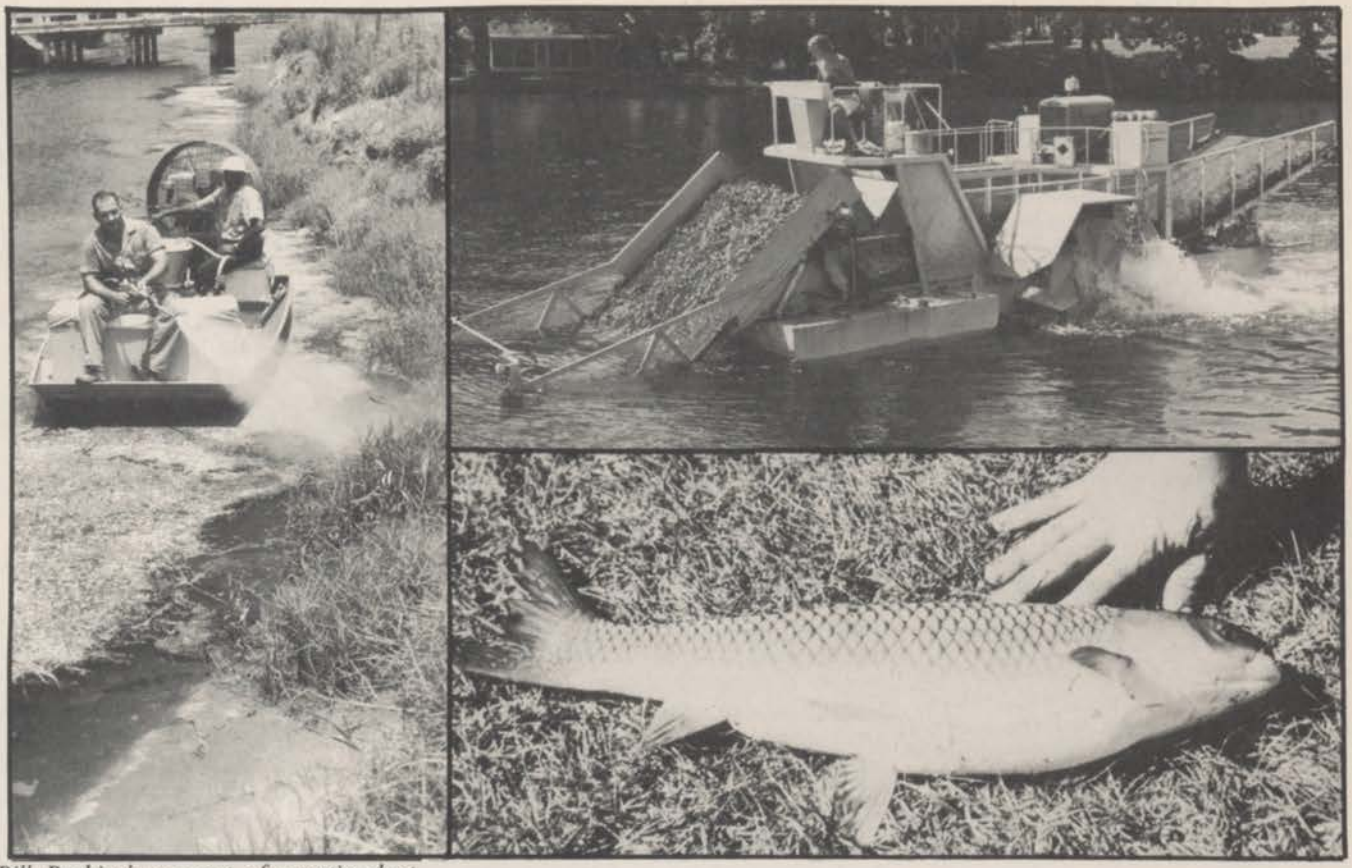
According to Whitley, several nine- to 15-pound amur have been taken in the Missouri River. Whitley said Dr. Richard Anderson, Cooperative Fishery Unit, is conducting water quality and algae production studies on the white amur in aquaria.

CALIFORNIA — Dr. Pete Frank, U.S. Department of Agriculture at the University of California, is project leader on the white amur work, the main thrust of which is to produce a sterile amur. Instead of going the route of hybrid production, various chemical means of inducing sterility are being investigated. White amur are also being evaluated for weed-control potential and effects on sport fish, particularly bluegill. These studies are being conducted in small one-tenth acre ponds.

The California Game and Fish Commission has banned importation of the amur and is not receptive to research except under highly controlled conditions. Frank feels the Commission will not allow expanded white amur studies in natural situations until sterile fish are produced.

SUMMARY — Although virtually all states have banned importation of the white amur, many states are beginning to actively investigate its potential as a biological control agent for aquatic weeds. This is particularly true of the southeastern states which experience the most severe aquatic weed problems. Above the roar of the controversy, the true facts of the white amur are beginning to surface. I feel more encouraged with each additional bit of gathered information in hopes that we soon may be able to determine the final fate of this fish and its proper place in weed control. Each state, however, seems determined to conduct its own studies on the basic considerations, namely impact and feeding.

With better cooperation and communication within and among the states, we could resolve the mysteries and myths of the notorious white amur and get to the real crux of the matter — the truth. There is nothing so tragic as one with eyes and ears who does not hear or see. □



*Bill Rushing's concept of aquatic plant management involves a whole arsenal of control methods including (above) chemical application from an airboat, (top, right) mechanical harvesting and (bottom right) biological controls such as the herbivorous white amur.*



## AQUATIC *(from page 24)*

### The Solution

This, of course, is a misnomer. Clearly, there is at this time no way of spelling out the details of an effective and economical aquatic plant management system. It is, however, possible to describe its general characteristics in qualitative terms. It is my hope that, by so doing, we will indentify gaps in the research programs that are being conducted, and at the same time provide a general framework into which existing work may be fitted. The effectiveness of too many potentially useful control methods is still too uncertain, so, at this time, we should not set priorities.

First, we need an arsenal of control methods. There are two segments to this need. Of primary importance is the need for the largest possible number of ways of affecting the plants themselves. Some obvious possibilities include:

**Controlled-release herbicides** — These look especially promising for situations in which water exchange is slow, such as in many canals and lakes.

**Growth regulators**—These offer the possibility of suppressing the formation of stolons on water hyacinths, for example.

**Mechanical plant removal** — All mechanical methods have proven to be very expensive, but there is mounting evidence that the costs could be dramatically reduced by careful engineering. And it should not be forgotten that there may be special situations in which only mechanical removal will be acceptable.

**Biological agents** — Much attention has been and is being devoted to these methods. But one wonders if enough imagination has been applied. Would it be possible to develop strains of fungii, bacteria, or viruses that would have useful properties, for example? Note that I did not say "find" them; I am proposing that we might be able to create them. Recent work on the development of the sterile monosex white amur hybrid is a case in point.

**Radiation** — While the experiments so far conducted suggest that the $CO_2$ laser is relatively ineffective, it should be remembered that only one wavelength has actually been tried. Perhaps among the infin-

ity of others is a combination that will unzip the DNA molecule. The Navy has recently developed a method for creating very short-duration electromagnetic pulses of the order of 10 megawatts; one wonders what the effect on the highly complex molecules included in the plant's metabolic cycle might be.

As discussed earlier, a plant control method is useless if it cannot be brought to the plants. At the moment, our arsenal of platforms consists mainly of three kinds of vehicles: conventional boats, airboats, and helicopters. Each has advantages and disadvantages, and there are places where none can reach. In view of this, there may well be a place for air-cushion vehicles and Archimedes screw vehicles.

There is certainly a place for improved spray methods that are more effective, uniform, and controllable than some of the fire-hose methods that are often used today.

This raises the flag of economics. A lot of money is spent and will be spent on aquatic plant control. This suggests that there is a market for devices specifically engineered for aquatic plant control use. So let us devote more dedicated engineering effort to such mundane things as the configuration of spray nozzles, hull designs for boats, and so on.

Further, the comprehensive management system must include an information-gathering capability, so that the deployment of control resources can be optimized. Three things seem to be worthy of consideration:

**Remote sensing** — Could we develop a capability, perhaps using earth satellites or regularly scheduled high-altitude aircraft flights, for detecting aquatic plant populations at an early state of development — perhaps using automated identification techniques to keep down costs and improve response time?

**Monitoring instruments** — Could we place sensing instruments in critical places, and telemeter their responses to an operations center?

**Growth prediction** — Could we develop mathematical prediction methods that would tell us where and when a potentially dangerous population of aquatic plants will appear? We surely could, if we spent some effort on understanding the basic physiological processes of our target plants.

Finally, the management system must include a public information capability, so that the public can be informed both as to the nature and magnitude of the problems, and also as to the specific steps being taken to counter them.

### Conclusion

I have only touched the surface of the multitude of areas we need to consider in the development of a long-range capability for operational management of aquatic plants. The crux of the whole matter is that the *entire* situation must be considered. When we consider the problem as a system, I think that we must conclude that we must develop a multifaceted arsenal of techniques and materials for aquatic plant management. □

# People on the Move

Chemagro Agricultural Div., Mobay Chemical Corp., has promoted six employees to newly created positions of area supervisors: **Kent W. Hedges** and **James M. Schell,** central region; **Edwin M. Miller** and **Richard P. Kohn,** north central region; **Allen R. Haws** and **John R. Wickenden,** southwestern region.

* * *

**Fred J. Zalokar,** appointed vice president, finance, of Agrico International, a subsidiary of The Williams Companies. **Winthrop A. Wyman,** appointed vice president, transportation, Agrico International.

* * *

**Norman W. Harris III,** named vice president-planning and control of The Toro Company. **Kendrick B. Melrose,** appointed Toro's group vice president, recreational products. **Gary Holland,** promoted to the newly-created position of group director of planning for Toro. **Mary Elliott,** promoted to the new post of corporate director-administrative services.

* * *

**G. R. (Dick) Gordon,** named district sales manager for Cushman-Ryan turf care equipment for eastern Canada and the northeastern United States.

* * *

**Ralph Deaver,** joined Thompson-Hayward Chemical Co. as an agricultural sales representative in western Tennessee and northern Mississippi. **Dennis H. Ford,** joined the company as a sales representative in northeast Arkansas. **Donald B. Emenegger,** joined Thompson-Hayward as a field research and development representative.

* * *

**Hans Bombeck,** joined the Minerals & Chemicals Div., Engelhard Minerals & Chemicals Corp., as director of international sales.

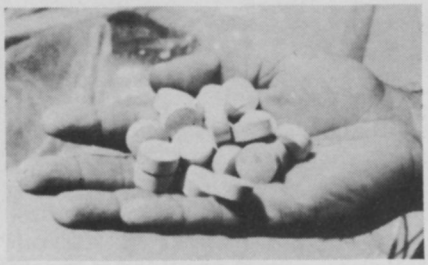
* * *

**Kenneth DeVun,** joined the production planning dept. of Ciba-Geigy's Agricultural Div. as a planning specialist.

* * *

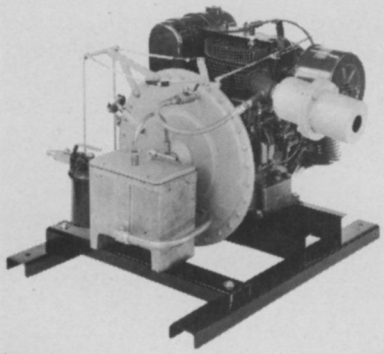
**Robert C. Tyo,** elected president and chief executive officer of Disston, Inc., a manufacturer of hand and industrial cutting tools and cordless electric lawn and garden tools.

# New Products



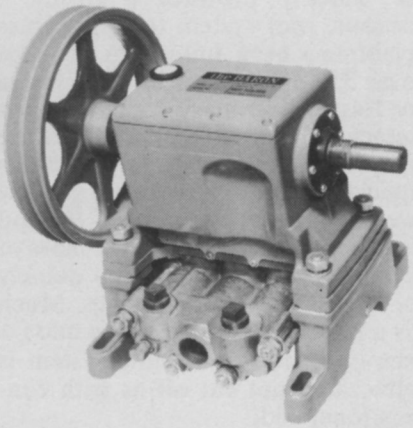
**ALGAE CONTROL:** A new approach to algae control is now available from Great Lakes Biochemical Co., Inc. Slow Release Algimycin PLL-C, a pelleted copper-based formulation, is said to save time and labor and require no mixing, special equipment or trailing bags. Application can be made with a hand scoop. PLL-C pellets will stay in place on the bottom and slowly release the algae control chemicals while water currents create natural distribution. Even when water is drawn for irrigation, pellets will remain active in treating the pond and lake water as well as water which may be added. Pellets are available in 50 lb. bags and are broadcast at a rate of 10 to 20 lbs. per acre-foot of water. This product has been registered by the EPA and various state authorities. The use of PLL-C pellets is said to take about 25 percent of the time required by the conventional methods and is particularly effective in the control of hard-to-get-at Chara and Nitella as well as most other algae.

**Circle 701 on free information card.**



**FOGGER:** London Fog Co. now manufactures heavy-duty truck-mounted foggers for fogging recreational areas, industrial property and other large areas. The foggers all have piston engine powered turbo fog system. This two-stage fog-producing system produces low temperature fog by mechanical, viscous friction-induced heat from a turbo rotor mounted directly on the engine crankcase. Second stage is produced by brief exposure to engine's hot air blast. Model 500 features 16 hp Kohler four-cycle industrial type engine with self-starter, alternator and simplified remote control. Model 100 has same features, but doubled fog output with 37 hp Wisconsin engine. Model 250 is a lighter-weight unit powered by a 12 hp manual start Kohler engine.

**Circle 702 on free information card.**

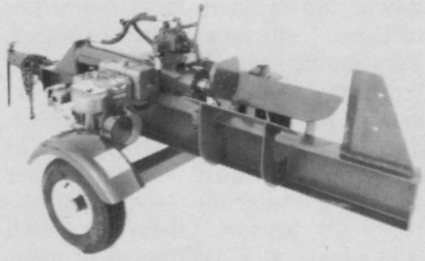


**PUMP:** Model 50 high-pressure Baron pump from Britt-Tech Corp. has a capacity range from seven gpm at 800 psi to nine gpm at 700 psi. Dimensions of Model 50 are 7¾ in. long x 12¼ in. wide x 10⅞ in. high; weight, 63 pounds. Model 50 has all the standard Baron features including corrosive-resistant components with stainless steel plungers and V-type seals that are acid and solvent resistant. Design features include the near absence of pulsations, an extremely low sound level and easy seal replacement. The pump is designed to keep pumped liquid out of oil bath crankcase.

**Circle 703 on free information card.**


**MOWER:** Excel Industries has introduced Hustler Model 272A, a 72-inch mower with 20 hp engine, dual path in-line hydro transmission and adjustable suspension seat. New model retains independent control to each wheel but eliminates transfer gear case. Power is transmitted direct to high torque hydraulic drive motors at the wheels. By reversing one wheel while moving the other forward, operator can reportedly turn machine around in its own length and trim in tight places. According to manufacturer, one man with a Hustler can replace several persons operating smaller units. Hustler is also said to conserve energy in open areas by replacing larger, more expensive tractors. Operator safety features include: a positive interlock ignition, parking brake, electric clutch and highway safety yellow paint. New 20 hp Kohler engine is protected by a heavy-duty, two-stage air cleaner, oil filter and hour meter. Available attachments include: rotary snow blower, broom, cab with heater, dozer blade and 60-inch flail cutter.

**Circle 704 on free information card.**



**WOODSPLITTER:** Hy-Draulic Products has designed several new log splitters, including the MS-400 Mini-Splitter. Features of the splitter include: eight horsepower air-cooled engine; heavy-duty ram cylinder; a splitting cycle of 12 seconds; rugged tubular steel frame; a seven-gallon hydraulic oil reservoir; and a splitting length of up to 20 inches.

**Circle 705 on free information card.**

**HYDRO-WET:** After four years of field testing, Kalo Laboratories is introducing a new soil and turf wetting agent, Hydro-Wet, designed to aid water penetration in compacted hydrophobic or sloping soils. Hydro-Wet is said to release compaction layers allowing turf to better absorb water and to reduce erosion on slopes because it makes slopes wettable thus keeping water where it is needed, instead of having it flow into low areas. Hydro-Wet is designed to be used in combination with liquid fertilizers and pesticides. Hydro-Wet will reportedly help get these compounds directly to the roots where they are needed. The product is available in one and five gallon metal containers.

**Circle 706 on free information card.**

# Sewage Sod System Saves Time

By DR. HENRY F. DECKER

*The author is president of Buckeye Bluegrass Farms and the developer of the new sod producing system. Decker was a botany professor at Ohio Wesleyan University for ten years, has had practical experience in sod farm management and has served as a consultant to O. M. Scott & Sons and several lawn care companies.*

A NEW, quicker and reportedly less costly system for growing sod has been developed from experiments over the past five years at Buckeye Bluegrass Farms, Inc., Ostrander, Ohio.

Compared to the conventional method of growing and harvesting sod, which often takes a year or more, and requires large quantities of topsoil, the new system produces harvestable sod in a few weeks, reduces shipping weight by 30 percent or more and requires less labor. Sewage sludge, composted leaves or garbage, stack dust — any number of waste materials — are substituted for topsoil. Given the retail cost of sod at $2,500 per acre minimum (central Ohio), the process makes it possible for an industry with a waste problem to dispose of it economically.

The variations in the process are enormous, depending largely on the type of waste material utilized. And while its execution is slightly more exacting than growing conventional sod, the system consists simply of placing a suitably rendered growing mixture over a root impenetrable barrier, such as polyethylene sheeting, and allowing the extensive, primary rooting of the grass to knit and bind the sod. Pregerminated seed is recommended and the irrigation of the growing mixture is more critical in the initial stages.

In the conventional method of growing sod the primary roots of the grass are cut off by the sod cutting machine in which case the knitting and binding of the grasses is a function of their tillering, rhizomes, and stolons. The slowness of these growth processes account for the relatively lengthy period of time necessary to grow a conventional sod so that it will stay intact when harvested.

The new system capitalizes on the tremendous capacity for grasses to quickly produce a primary, fibrous, root system (a single grass plant has been known to produce over 350 miles of roots in 17 weeks or less). All primary rooting is kept intact, being unable to penetrate the plastic sheeting; hence the sod binds quickly and can be rolled up in a few weeks. The undersurface of the sod is a ratehr impressive, white mass of primary roots which can quickly bind the sod to its new site. Much is a rather impressive, white mass of new sod since its rooting system is intact and not cut off as with conventional sod.

Conventional sod often takes several weeks to regenerate a new root system and hence to become knitted to the new laying surface. It must be kept moist during this period often requiring great quantities of water.

A simple method of harvesting and laying the new sod is in rolls four feet wide using a slightly modified, inexpensive, three point boom apparatus off the back of a tractor with suitable hydraulic capacity. Both the harvesting or the laying of the sod requires only two men.

Various plastic or plant fiber nettings such as those used in experiments at the University of Delaware or polyureaformaldehyde foams as used in England and in experiments by the Environmental Protection Agency in Delaware, Ohio, were found either unnecessary, too costly, or only incidental to the success of the system.

Several other advantages in the new system are readily apparent: one is that since the sterility of the

*Normally, the plastic barrier is left on the soil to be used again, but here it is pulled up for demonstration purposes. The plastic can be rolled with the sod for protection during long shipments. Notice the primary rooting. This sod had been growing only about eight weeks.*