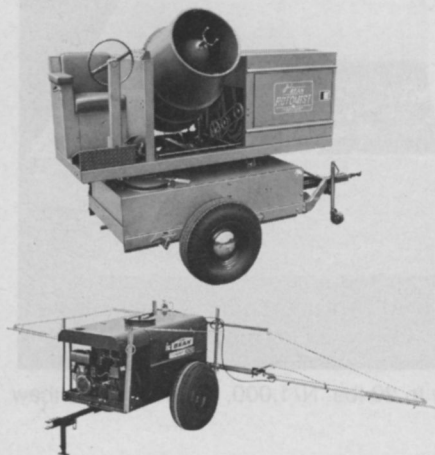


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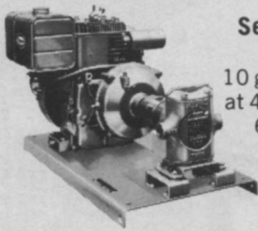
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FMC Environmental
Equipment

Hypro sprayer pumps

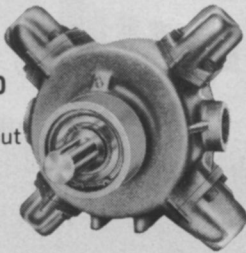
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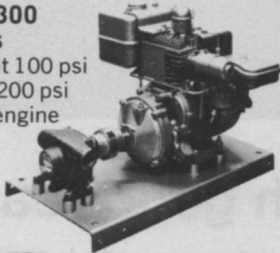
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agers have the opportunity to standardize and streamline applications when IBDU is the sole or major source of nitrogen. The initial visual grass response is about ten days after application. Then release is related to coarseness of particle and moisture supply. And the tail-off of supply is gradual. From these three basic facts, even once a year applications may well be adequate where repeat applications have been made.

For example, on an 8,000 sq. ft. front lawn of Sodco bluegrass a single yearly application of 3 lbs. N/1,000 as IBDU coarse particles (above 1 mm) gave a slow uniform growth for one year. Further, the advantage of applying the total at any time increased ease and accuracy of application.

FIG. 5 Percent increase over check (as 100% base) after IBDU application AT 18 DAYS

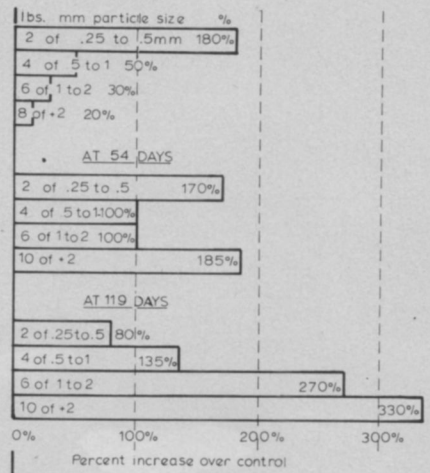


Figure 5.

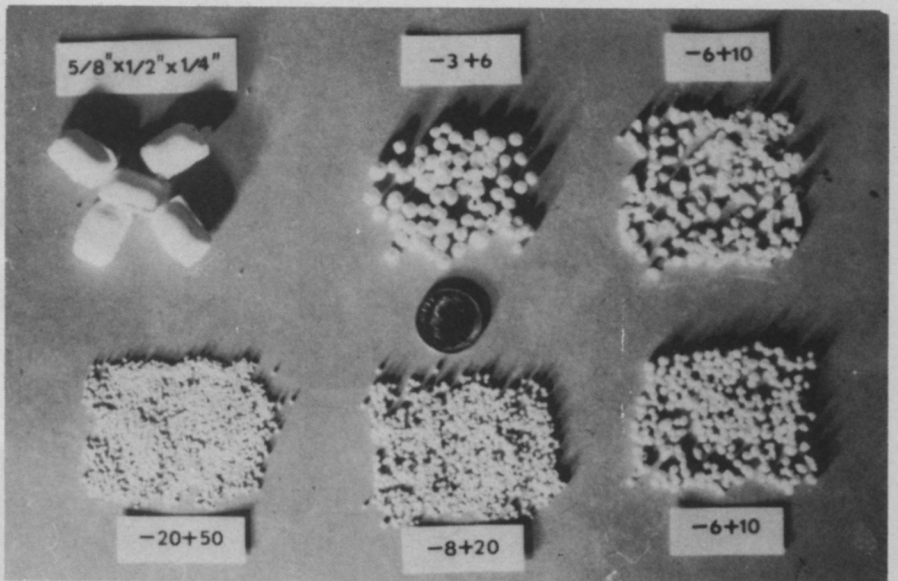


Figure 6. Sizes of IBDU used experimentally. Largest particles lasted three years in Purr-Wick greens.

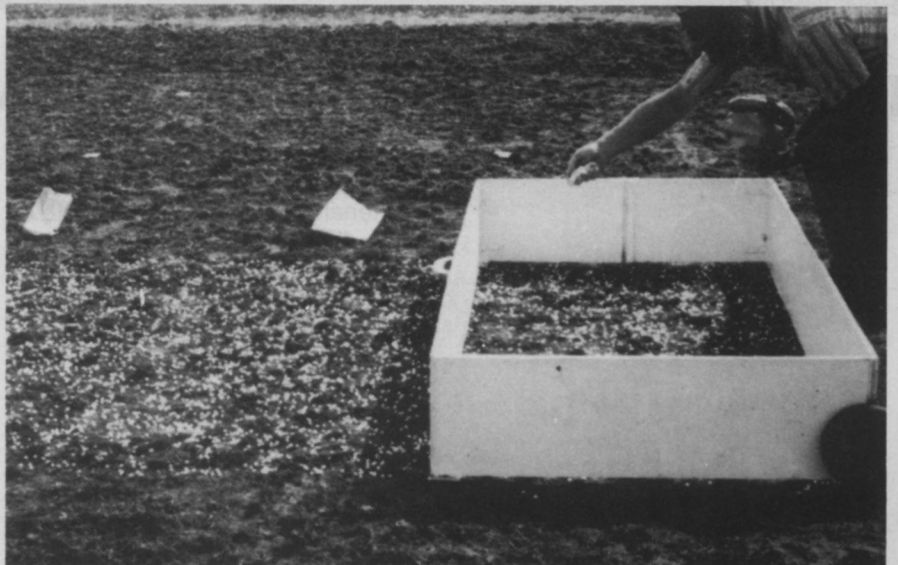


Figure 7. Experimental pellets applied up to 20 lbs. N/1,000, but freeze and thaw of two products in mix caused slump.

PROTECTION (from page 12)

The new WILT-PRUF NCF anti-desiccant acts as a conservation agent. It does not completely stop water discharge but it reduces water loss to an acceptable balance with water intake. The daily requirement of water differs with different plants and, furthermore, it is not uncommon to observe that the same variety of plant exhibits different water requirements in different climatic areas.

Adequate plant protection and insurance against adverse weather is generally obtained with a dilution of ten parts water to one part concentrate. However, this dilution can be varied within limit ranging from five to 20 parts of water to one part WILT-PRUF NCF. Because it is non-toxic to plants, the dilution rates can safely be varied to fit local conditions and needs. Assistance in determining proper dosage can be obtained from the use manual supplied upon request by the manufacturer, Nursery Specialty Products, Inc.

The new product is most economically applied to trees and shrubs with a low pressure spray. The sprayer can be of any sort ranging from a mist blower to a standard spray rig. Since the product is

easily washed from sprayers, it is no longer necessary to quickly wash them out after use. High pressure application is not recommended because of resulting waste.

Field experience has demonstrated that about 80 percent coverage is as efficient as 100 percent coverage, but care should be exercised to assure coverage of the terminal portions of plants where "soft" or new growth is usually present.

Bare root trees and seedling transplants are generally coated most economically by dipping them in diluted material. Concrete drainage tile cemented into a tube is excellent for dipping bare root trees and cut Christmas trees.

WILT-PRUF NCF is a unique arborist's tool because of its four-season utility. During spring, summer and autumn it serves as plant transplanting insurance. In winter it serves as a plant protectant against drying winds and ocean coast salt sprays. This use of WILT-PRUF may well become as important as its use in transplanting. Homeowners and estate gardeners do not like the inconvenience of spraying anything in winter. Herein lies a great business opportunity for customer spraying.

Some arborists have capitalized on this situation and set up a winter protection spray service. Its reception was excellent and served a number of worthwhile objectives. First, it provided winter work for crews which were normally discharged for the season. Second, it created a new image for the arborist company as a company interested in the year-round health of their customers' landscape plantings. Third, it provided a sense of comfort for the owners of landscape programs. Finally, this service provided an additional opportunity for contact with the customer.

The new NCF differs from its predecessor, WILT-PRUF, and other anti-desiccants in that it is easy to handle in winter, is not toxic to plants or animals, is cheaper to use, leaves no unsightly coating, resists removal by water, is easy and safe to apply, permits free exchange of carbon dioxide and oxygen and exhibits only slight reduction of photosynthesis. Basically, it is an ecologically safe protection against excessive and harmful water loss.



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Laval Separators, from 3-4100 gpm, will remove up to 98% of all particles as small as 200 mesh (74 microns). If you've got a problem with sand, call on Laval.

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JANUARY 1975

Penn State Chemist's Findings Contradict Current Theories

A PENN STATE chemist has found evidence that plants control mating in insects — a finding that contradicts current theory and sheds new light on evolution in insects and the sense of smell in man.

The finding also casts serious doubt on the value of pest control programs involving sex lures to disrupt mating. Funding for such programs currently runs into the billions of dollars and includes efforts against the gypsy moth, oak leaf roller moth, corn borer and boll weevil.

Such programs are based on the assumption that female insects manufacture their own lures and that there is a single attractant unique to each species to which the male will respond.

But Dr. Lawrence B. Hendry, assistant professor of chemistry, claims the attractants originate in the plants on which the insects feed.

He believes that the female insect simply stores the attractants, called pheromones, and apparently does not change them in any way.

Hendry has found the attractants in plants in concentrations that correspond to the amounts found in females and also has evidence that the males of a single species can be sensitive to as many as 20 different chemicals, depending on their diet.

According to Hendry, the females probably learn which pheromone to store and the male learns which one to seek while the insects are still in the egg or larval stage. He theorizes that the brain of the insect becomes imprinted or programmed to respond to whatever pheromone is present in its earliest food. Thus, only male and female insects which feed on the same plants as larvae would be imprinted with the same attractant and mate as adults.

The unpredictability of the field response to laboratory-prepared lures has only mystified researchers. A chemical that produced excellent results in the laboratory would sometimes produce mediocre or negative field results. The apparent contradictions, Hendry said, were the result of the different diets of the laboratory-reared and wild insects. For example, a pheromone that worked as an attractant for oak leaf roller moths reared in the laboratory on wheat germ would not work for the same insect raised in the wild on oak leaves. The attractants would even be different for one set of oak leaves and another raised on later-leaving black oak leaves.

"It could be that the receptor site is non-specific and can be taught to respond to many substances," he said.

If this guess proves true, Hendry said that pest control programs based on sex lures might still be possible, such as a program based on spraying a field with some chemical the insect larvae would eat and imprint. Later the same chemical could be used as a sex-lure to confuse the males and prevent mating.

One reason the finding is so startling, Hendry said, is the fact that insect species have been defined according to their ability to react to specific attractants. Now, he said, this definition may have to be changed. Theories of insect evolu-

tion based on the idea that insects from different species will not mate, may also have to be changed, according to Hendry.

In addition, he has found what may be a chemical link between the sense of smell in insects and in man. He has discovered that the chemical structure of the sexual excitant of the oak leaf roller moths closely resembles musk, a common constituent of many perfumes. To Hendry, this finding hints that man may also respond to some smells through imprinting rather than through a set of specialized receptors on the olfactory nerve. This could be interpreted to mean that diet affects mating selection, and, over the long haul, evolution — or, you are what you eat.

One of the first major clues to the discovery of the plants' role in insect reproduction came when Hendry saw a group of oak leaf roller moths attempting to copulate with some oak leaves that had been damaged by larvae. He decided to examine the oak leaves for evidence of pheromones and assigned one of his students, Joseph Wichmann, a senior chemistry major, to the task. Wichmann found evidence of the pheromone and Hendry, stunned by the news, accused him of accidentally contaminating the samples.

David Hindenlang, Ph.D. candidate in chemistry, was then drafted to analyze the material Wichmann had isolated from the plants. Hindenlang's verdict: it was the oak leaf roller sex attractant. Hendry's response this time was to question the accuracy of the instrument used. He bought a new instrument 100 times more sensitive and it gave the same answer.

Both students, along with junior chemistry major Mary Elizabeth Anderson, who did earlier work on the oak leaf roller's sensitivity to various suspected attractants, are included with Hendry as authors of the report.

So far, the chief insect that Hendry and his research group has studied is the oak leaf roller. But, he has also found the pheromones of 20 apple-feeding insects in apple trees, those of cabbage-feeding insects in cabbage and those of mushroom-feeding insects in mushrooms.

The research program was supported, in part, by a grant from the Research Corporation. Hendry was also aided by Ralph O. Mumma, professor of pesticides.



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Energy Saving Suggestions For Turfgrass Managers

By James A. Fischer
The Toro Company

Editor's note: The following was presented by James A. Fischer, director of marketing, Turf Products Division, Outdoor Power Equipment Group, The Toro Company, before the Ohio Turfgrass Conference, Dec. 5, 1974.

Wellhead prices in the oil-rich Arab countries have increased from \$3 to over \$12 per barrel in less than a year. Early in 1974, fuel prices almost tripled and fuel was scarce. While the situation has eased somewhat, many government and industry experts feel that winter and spring will again bring shortages and higher prices.

Turf managers can effectively save fuel by following these tips.

Equipment:

- Maintain good contact with fuel suppliers. Ask for recommendations of your storage capacity needs. Firm up contracts and prices.
- Fuel costs represent two to three percent of your total budget. Should fuel prices again increase, major savings will accrue through efficient labor force management.
- Evaluate equipment against the tasks to be done.
- Tune and maintain all equipment in accordance with owner's manuals and establish preventive maintenance procedures.
- Establish preventive maintenance procedures.

Facilities:

- Lower working temperatures in office and shop.
- Minimize interior and exterior lighting.
- Seek alternative heating methods and do not heat or cool non-essential areas.
- Consider using insulation throughout the facility.

Turfgrass:

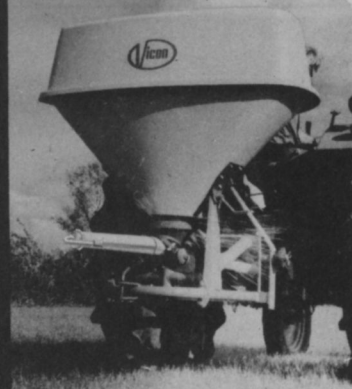
- Review all cultural practices and techniques.
- Test soils to determine pH and nutrient levels and review fertilizer programs and products.
- Evaluate watering and mowing schedules — frequency, timing and location.
- Correct all drainage problem areas.
- Evaluate adaptation and use of turfgrass varieties you now have versus "new" improved selections.
- Use fertilizer, water and chemicals efficiently.
- Use pesticides wisely for control of pests, weeds, insects and diseases.
- Evaluate height of cut in relation to type of mowing equipment.

Your People:

- Review all tasks and establish priorities.
- Schedule equipment use to attain maximum efficiency.
- Retrain operators on mowing techniques, equipment operations and adjustments.
- Combine tasks, eliminate non-essential travel.
- Stock high use parts and use United Parcel Service for emergency deliveries.
- Form car pools for transportation to and from work and professional meetings.



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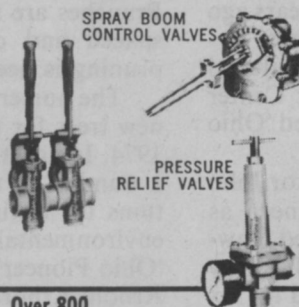
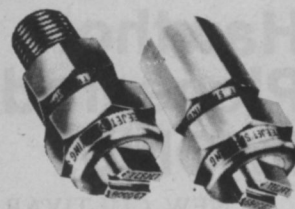
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PROMPT SHIPMENT FROM STOCK

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The 'Ohio Pioneer Dotted Hawthorn,' a thornless hawthorn which has been propagated for six years by an Ohio nursery, is now on the market. The cultivar was selected 12 years ago from the nursery of the Secrest Arboretum, Wooster, Ohio.

Thornless Hawthorn Pioneered In Ohio

A NEW CULTIVAR of a potentially valuable ornamental landscape tree selected a dozen years ago from the nursery of the Secrest Arboretum at the Ohio Agricultural Research and Development Center has been appropriately named 'Ohio Pioneer.'

Secrest Arboretum Curator John E. Ford describes 'Ohio Pioneer' as a thornless seedling of Dotted Hawthorn (*Crataegus punctata*). The new cultivar has been propagated for six years by an Ohio nursery and is now available commercially. Formal registration of the tree is being made with the Arnold Arboretum in Boston, Mass., which serves as the international registry for cultivated forms of this species.

Ford says Dotted Hawthorn is a native thornapple which grows throughout much of the northeastern U.S. northward and eastward from Iowa and Indiana. It also grows at higher elevations south-

ward along the Appalachian Mountain range.

Normally, the tree is small, seldom growing much more than 20 or 30 feet in height. It has clusters of white flowers in May, and dark red fruits are developed by September or October.

The Dotted Hawthorn, although an attractive tree, has not been widely planted because of the abundant extremely sharp thorns.

In 1962, a thornless seedling of Dotted Hawthorn was found in the Secrest Arboretum nursery at Wooster, Ohio. It had only three small thorns on it at an age of 10 years, and when these were pruned, none reappeared. Credit for selection of the new tree goes to Dr. O. D. Diller, curator emeritus of Secrest Arboretum.

Six years ago, shortly after Ford joined the Arboretum, a horticulturist from Coles Nursery in Circleville, Ohio, saw the trees at Wooster and felt the new cultivar had the best potential of any thornless hawthorn he had seen. He envisioned a whole new market resulting from the new cultivar's introduction. The Arboretum began supplying the nursery with bud sticks from the tree and these were budded on Washington Hawthorn rootstock. Only a low percentage of the resulting budded trees developed juvenile thorns, and these were easily pruned.

Ford says from the nurseryman's standpoint, the 'Ohio Pioneer Dotted Hawthorn' is a good tree to handle because every tree is as uniform as if it had been factory made. Branches are symmetrical and well-spaced and only slight corrective pruning is needed.

The nursery began marketing the new trees for the first time in fall of 1974. In addition, Ford has shipped a number of trees to other arboreta for testing under a variety of environmental conditions. Plants of 'Ohio Pioneer' have been planted at Arnold Arboretum of Harvard University in Massachusetts; National Arboretum, Washington, D.C.; Ida Cason Callaway Gardens, Pine Mountain, Ga.; University of Minnesota Arboretum; and Dawes Arboretum, Newark, Ohio.

'Ohio Pioneer' trees have been set in the Secrest Arboretum shade tree evaluation plots to determine their best use in urban areas. Ten of the trees have been ordered by the city of Wooster for planting on selected sites along the city's streets.

Hughes Appointed Director Of Forest Research Staff

Jay M. Hughes, research specialist in forest economics, has been named director of Forest Service Economics and Marketing Research Staff, Washington, D.C., succeeding recently retired H. R. Josephson.

Hughes is a graduate of the University of Colorado with a bachelor's degree in economics and a masters degree in forestry from Colorado State University. His Ph.D. in forest economics was earned at Michigan State University. Beginning his forestry career as an assistant ranger at the Roosevelt National Forest in Colorado, Hughes soon transferred to a position in forest products marketing research at the Forest Service Rocky Mountain Forest and Range Experiment Station in Fort Collins, Colo., later moving to the Pacific Northwest Forest and Range Experiment Station in Portland, Ore., as head of multiple use and production economics research.

In 1966, he turned to academic life with appointment as associate and later full professor at the University of Minnesota College of Forestry. Three years ago, he returned to federal forestry and was appointed director of the Forest Resources Program in the USDA's Cooperative State Research Service in Washington, D.C. In 1972, he was named Chief of Forest Survey in the Forest Service.

Toro Builds Casting Plant

The Toro Company has announced acquisition of die-casting equipment of the CharLynn Division, Eaton Corporation, Cleveland, Ohio, a major source of aluminum housings used in Toro's rotary mowers.

According to David T. McLaughlin, Toro's president, the equipment will be re-located in a new \$2 million plant to be built in Shakopee, Minn. Construction is expected to begin immediately and to be completed by the summer of 1975, with full production scheduled for the fall of 1975.

The 50,000-square-foot, one-story structure will be located on a recently purchased 10-acre site. Until the new plant is complete, CharLynn will continue to operate the equipment at its facilities in suburban Eden Prairie, Minn., McLaughlin said.

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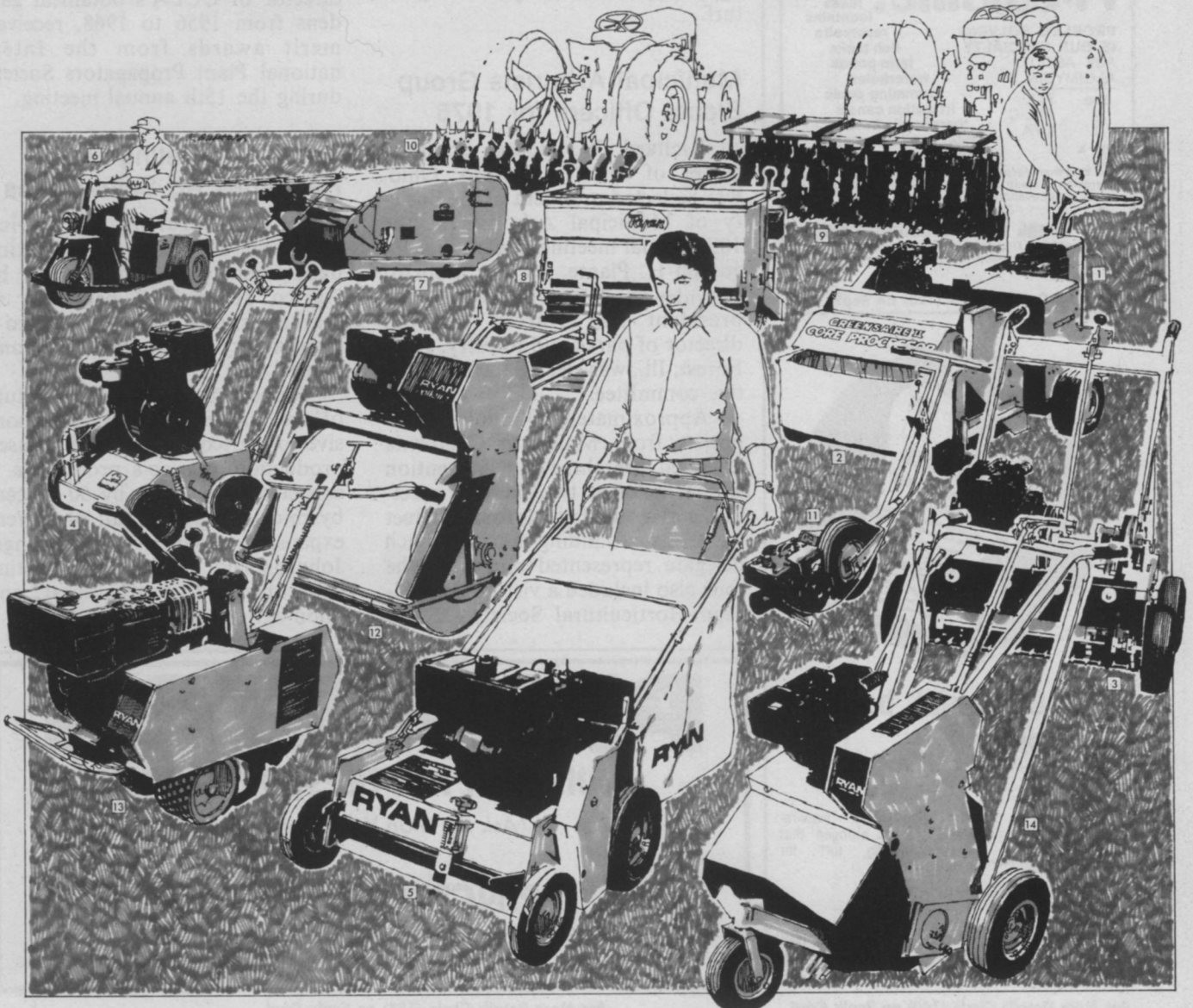
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 - 9 **Renovaire.** Turf aerator for large, contoured areas. Interchangeable tines for coring, slicing, open spoon aerating.
 - 10 **Tracaire.** Three-point hitch aerator.
 - 11 **Pro-Edge*** Professional edger.
 - 12 **Rollaire*** All-purpose roller.
 - 13 **Sod Cutters*** Self-propelled heavy-duty and junior models.
 - 14 **Lawnaire*** Home lawn aerator.
- *Self-powered and/or propelled.

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Melnor's Midwest Rep. Retires After 20 years

Melnor Industries of Moonachie, N.J., a leading manufacturer of lawn sprinklers and garden care products, has recently announced the retirement of Robert S. Black of Kansas City, Mo.

Black has represented Melnor for over 20 years in the states of Missouri, Kansas, Iowa, Nebraska and southern Illinois.

According to Eugene C. Okin, vice president of marketing for Melnor, these states will now be serviced by Byler & Associates, Kansas City, Mo., who have over 20 years experience in the hardware/houseware industry.

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San Antonio's Harold Henk Named Turfgrass President

Harold Henk, San Antonio's superintendent of parks, is the new president of the Texas Turfgrass Association.

Henk was named to the post during the 29th annual Texas Turfgrass Conference at Texas A&M University. He succeeds Herman Johnson, landscape architect in Corpus Christi.

Dwight Anderson of Dallas City Parks Department was elected vice president, and Amos Mills of Watson Distributing Company, San Antonio, was chosen as executive secretary.

A record 435 persons registered for the conference according to Richard L. Duble, program chairman. Twenty-four commercial exhibits were also featured, Duble said, and the Association presented \$2,600 in scholarships to A&M agronomy students specializing in turf.

Municipal Arborists Group Elects Officers for 1975

Richard W. Boers, commissioner of forestry, Toledo, Ohio, was reelected president of the Society of Municipal Arborists at the 10th annual meeting in Chicago, Ill. Joseph H. Plante, Jr., city arborist, Providence, R.I., was elected vice president and Harold Robson, director of parks and forestry, Lake Forest, Ill., was elected to the executive committee.

Approximately 90 municipal arborists from Maine to California attended the three-day convention which included two days of meetings and a one-day bus tour of street trees in surrounding suburbs. Each delegate represented one city. The tour also included a visit to the Chicago Horticultural Society Botani-

cal Garden for lunch and equipment demonstrations.

During the business meeting, members approved a resolution to contribute \$2,100 from the society treasury to co-sponsor a film on the safe use of pesticides.

The 1975 meeting will be held at the Holiday Inn, Hartford, Conn., Oct. 1-3 with Victor J. Jarm, director of parks and recreation, as local chairman.

Plant Propagator Society Honors 3 Horticulturists

Three University of California scientists were honored for their contributions to horticultural science.

Dr. Curtis J. Alley, a specialist in viticulture at UC Davis, Dr. Hudson T. Hartmann, professor of pomology at UC Davis, and Dr. Mildred E. Mathias, professor of botany emeritus at UCLA and director of UCLA's botanical gardens from 1956 to 1968, received merit awards from the International Plant Propagators Society during the 15th annual meeting.

Agrico Marketing Group Redefines Ag Sales Areas

A restructuring of Agrico Chemical Company's marketing department was announced by Agrico group vice president of marketing, R. R. Johnson. Agrico is a subsidiary of The Williams Companies.

Johnson said the new structure of the marketing group is responsive to Agrico's plans for increased production. Agrico's production is expected to increase by 50 percent by mid-1975 as a result of current expansion programs. The change, Johnson said, divides the marketing department into "agricultural" and "non-agricultural" sales areas.

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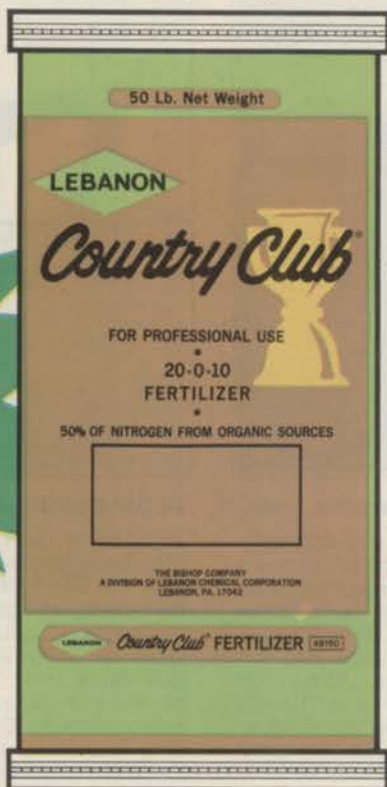
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Before any new Country Club product is introduced, it must go through extensive research and testing. It is tested on field plots under varying conditions. It is tested through plant analysis and researched under controlled conditions in greenhouses.

In its final form, nothing is sacrificed. Every element and process necessary for turf growth is utilized, enabling Country Club to give you more feeding power for your money.

The top of our line products have more WIN, higher organic content, more sulphate, magnesium, sulphur, iron and manganese. Sizing is either small for greens or regular which we call fairway sizing. These and all other Country Club products contain the applicable balance of WIN and water soluble nitrogen to allow immediate green-up and provide long-term greening — with a minimum number of applications. Based on your specific course requirements, two or more of these products will work efficiently to complete your fertilizer needs."

A FULL
LINE OF
QUALITY
TURF
PRODUCTS
FOR THE
PROFESSIONAL
USER



Golf Course Superintendent Show
New Orleans — Booth No. 995 - No. 1005

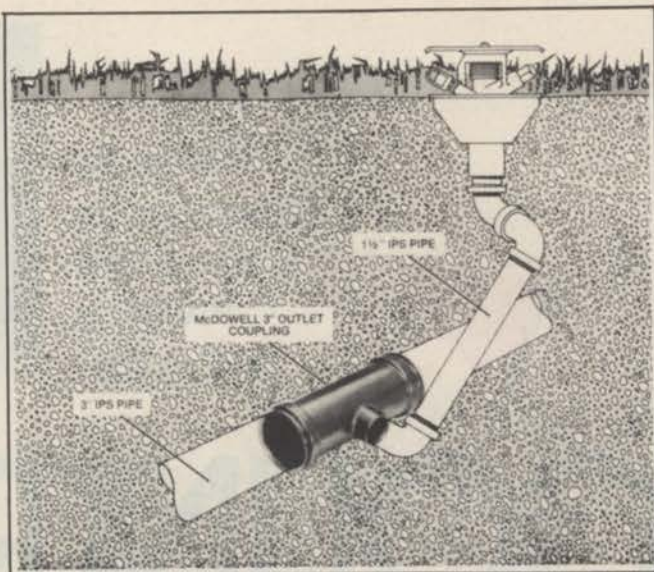


Good Names To Grow By



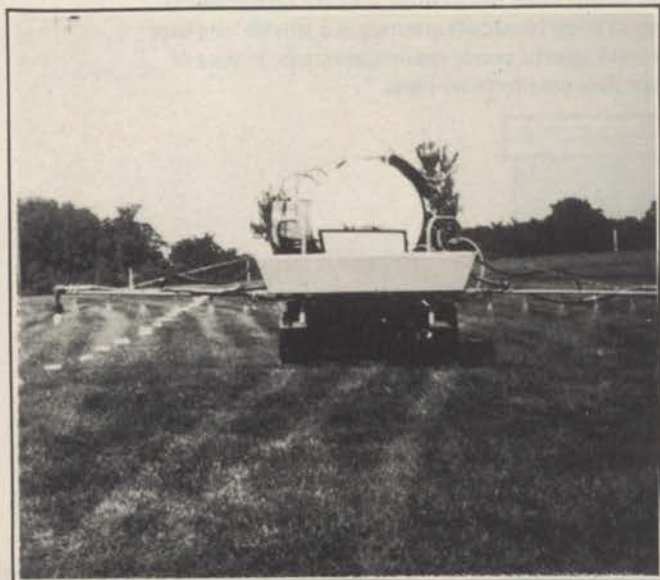
POWER BRUSH: Gravely, Clemmons, N.C.

Gravely 44-in. Power Brush attachment sweeps light snow, dirt and debris away, right down to the pavement. Sweep direction can be adjusted from operator's position. Contact pressure can be adjusted by separate adjustment controls on each side of the brush housing. Manufacturer says the most important durability feature is absence of belts to slip or break. Brush is driven with a $\frac{5}{8}$ in. sprocket chain and supported with self-aligning ball bearings. Dimensions are: L 32 x W 52 x H 19 inches. Brush dimensions: 18-in. diam. x 44-in. length. Casters: 6-in. diam. Angle adjustment to the right, left or straight ahead. For more details, circle (701) on the reply card.



EPOXI-LOKT® COUPLINGS AND FITTINGS: McDowell Manufacturing Co., DuBois, Pa.

New line of epoxy-coated steel couplings and fittings for sprinkler irrigation systems is used to connect underground PVC pipe, combining strength with ease of installation and providing expansion joints where new couplings or fittings are used, manufacturer says. New line features Outlet Coupling with $1\frac{1}{2}$ in. female thread outlet compatible with pop-up or stab-type sprinklers and connecting 3 in. IPS PVC pipe having a $3\frac{1}{2}$ in. outside diam. Weighing $1\frac{3}{4}$ pounds, coupling is applicable to systems with working pressures up to 160 psi. For more details, circle (702) on the reply card.



TURF MARKER: Richway Products, Inc., Janesville, Iowa.

New turf marker designed for golf course, park and cemetery sprayers and sod farmers is said to eliminate problem of overlap and missed strips by showing sprayer operator covered areas regardless of terrain. As sprayer moves, Turf Marker deposits dense foam balls every 4 to 6 seconds. Balls are said to be highly visible (even at night), to disappear into the ground, and life of balls may be controlled by adjustment for short or long periods. Marking system is powered by 12-volt DC source. Foam balls are said to be unaffected by wind or sprayer boom whip. For more details, circle (703) on the reply card.



PLOW BLADE: Charles Machine Works, Inc., Perry, Okla.

An optional plow blade to provide full 18-inch cover, which may be substituted for standard 12-inch blade, is now available for Ditch Witch VP12 vibratory plow. VP12 is a self-contained, self-propelled unit for making underground installations without trenching for many uses — sprinkler systems, utility lines and communications cables. VP12 is built on a one-piece frame, powered by 25 hp air-cooled engine and features separate mobile and plowing ranges and power steering. Differential drive to wheels is designed so turning causes minimum turf disturbances, manufacturer says. For more details, circle (704) on the reply card.