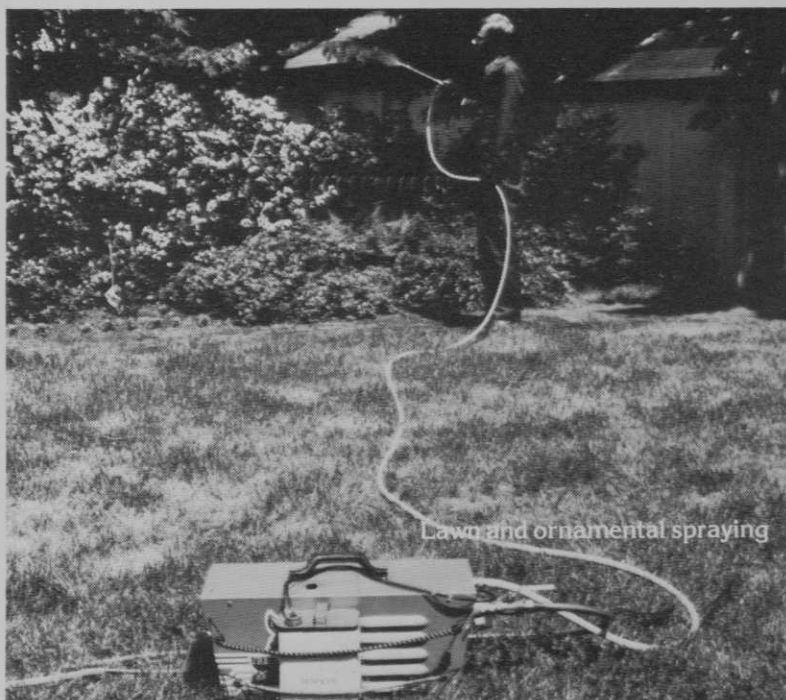


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underwater mower. The process must be repeated as often as necessary to achieve control. They can provide a feasible alternative to chemical control, because the harvesters do not create a phytotoxic situation in irrigation water. However, disposal of the harvested clippings can present a problem.

Biological control

Biological controls have been brought to the forefront, particularly by research into the use of the white amur. Research has shown that the fish will control aquatic plants, and its use has been legalized in some states under strict conditions. More research into the projected proliferation of the species is needed before wholesale release can be carried on.

In one research project in Florida, it was necessary to stock 2-pound fish at a rate of 160 fish per acre to achieve control of hydrilla and marginal grasses that had taken over a small pond. Control was gained, however, in 8 weeks. Research is currently underway to determine the value of us-

ing herbicides in addition to the fish.

Another fish, *Tilapia zilliei*, has begun to gain favor in warmer climates. This fish can also effectively control aquatic weeds, reportedly makes an excellent angler fish, and is being sold in California grocery stores.

Other biological controls being researched include *Arzama densa*, a moth that is a natural enemy of water hyacinth. Researchers at Mississippi State University are studying techniques of mass rearing the moth to determine its effectiveness. In California, research is underway to determine the value of plant competitors to force out undesirable aquatic weeds. Texas scientists are studying the use of a fungus as a possible biological control of water hyacinth.

Conclusion

There are some precautions one can take to avoid a stagnant, weed-infested irrigation pond. Shallow areas can be dredged. Depths of less than 3 feet are undesirable, with 8 to

10 feet more satisfactory. The lake or pond should not be surrounded by trees that shade the water. Avoid bare areas in the watershed around the pond. Erosion can significantly speed up siltation, or filling in, of the pond. Good air circulation over the surface of the pond is needed to mix upper and lower water levels and avoid stratification.

Finally, there is a computerized, 10,000-item collection of aquatic weed literature and information at the University of Florida. Collected and cataloged by Dr. George Allen, the information is in 15 categories, including biocontrol, chemical control, and plant species.

The system can be directed to print out bibliographic references for an entire category or to cross reference two categories — e.g., chemical control and a particular plant species.

To obtain category lists and further specifics, write: Information Storage and Retrieval System, IPPC Aquatic Weed Program, 3103 McCarty Hall, University of Florida, Gainesville, FL 32611. □

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Which aeration hole is better for your greens?

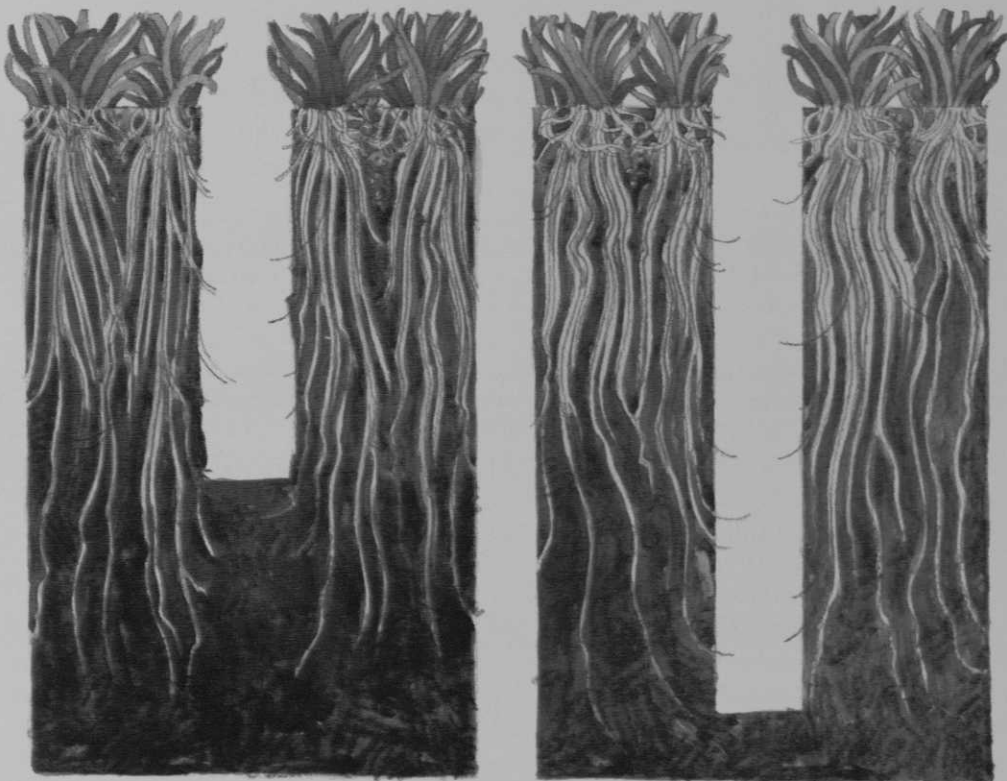
The answer, if you haven't already guessed, is the Greensaire II hole. And for good reasons.

One, it's deeper. The primary objective of aeration is to help air, water and fertilizer penetrate the soil. The Greensaire II removes cores up to 3" deep, allowing these vital nutrients to reach the root zone where they're needed.

The fact that there are 36 of these deep holes per square foot means that you also remove more soil. This not only relieves the toughest compaction problems, but it also allows you to replace more of the old, depleted soil.

The Greensaire II hole is precise. It won't affect the roll of a golf ball, so your green is back in play sooner. You can aerate most greens in 45 minutes or less.

And when you use the Greensaire II, you can also use the unique Ryan Core Processor attachment. It catches the



cores, separates good soil from debris, puts the good soil back on top, and bags the debris. You aerate, top dress and collect thatch in one operation.

If you want these same fine aerating qualities, but on a smaller scale, choose the Greensaire 16. It aerates a 16" swath instead of a 24", uses the same selection of tines

and has a convenient windrow attachment that makes core removal easy.

Of course, like all Ryan equipment, these machines are built to last. So when you aerate, don't just scratch the surface. Get the deep penetration you need with the Greensaire II, Greensaire 16 and Core Processor.

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Showcase: new mowing equipment

Higher labor costs are a fact of life on golf courses of all types today, so to hold the line on their overall cost of labor, many superintendents are trying to reduce their manpower needs. One good way to do this, many have found, is to invest in labor-saving maintenance equipment.

Good examples of such equipment: The riding triplex greensmower, which enables one man to cut as many greens in the same length of time that three or four men used to. Or hydraulically controlled gang mowers, which not only make mowing fairways and rough an easier and faster job, but save time between holes because the operator does not have to stop the tractor and get off to remove or disengage the mowers. Also, newly designed large mowers which trim close to trees and traps, again saving time and manpower.

New mowing equipment is in many cases safer to operate than the old equipment it replaces, and often does a better job. The latter is especially true in the case of multi-unit mowers with articulated cutting heads that closely follow the contours of the ground to give an even cut without scalping.

Presented here are an even 10 examples of modern mowing equipment. For further details, just circle the proper number on the free information card in the front of this magazine, fill in the requested information, and mail the card.

American Honda Motor Co.

Roto-Stop feature on the HR-21 rotary mower disengages the blade within seconds after a lever on the handle is released, although the engine keeps running. This should reduce accidents. Four HR-21 models are available: push-type, self-propelled, with and without Capacitor Discharge Ignition.

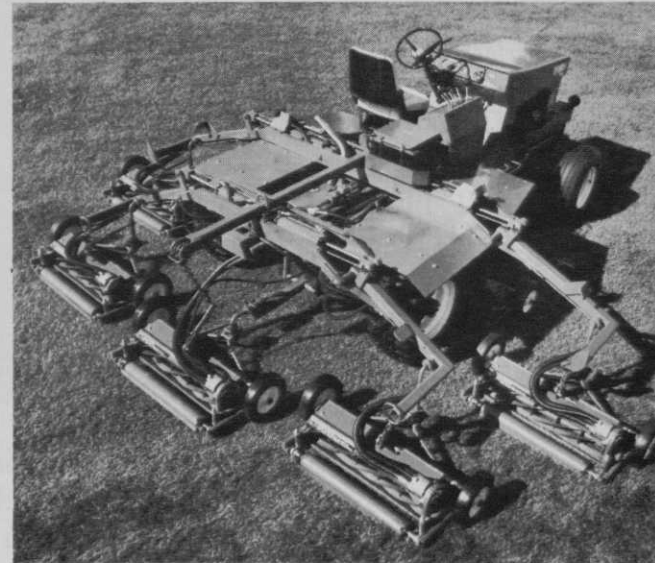
Circle 223



The Toro Co.

All-new HTM-175, a seven-gang all-hydraulic reel fairway mower, will mow swaths from 31 inches to 14 feet 7 inches with height of cut from $\frac{3}{8}$ to 2½ inches. Power comes from a 4-cylinder 236-cubic-inch diesel. Standard are 4-speed transmission, power steering, and high-flotation tires.

Circle 226



Jacobsen Manufacturing Co.

An out-front riding rotary mower, the Turfcut 50/60 comes in 50- and 60-inch widths with mowing heights from 1 to 4 inches in ¼-inch increments. Mowing decks are free to move up and down, side to side, to hug uneven turf. Air-cooled, 18-horse engine drives through a hydrostatic transmission.

Circle 225

Ford Tractor Operations

Model 1100 tractor comes in 2- and 4-wheel-drive versions. Both are powered by a 13-horsepower, two-cylinder diesel driving through a transmission with 10 speeds forward and two reverse. Three-point hitch is standard, with front PTO optional.

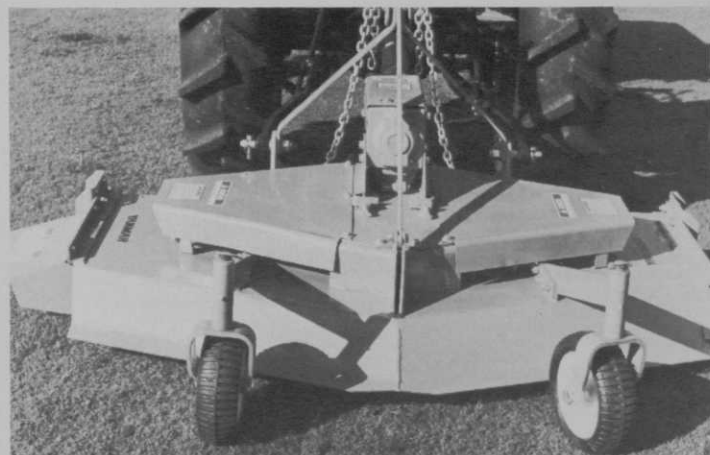
Circle 221





Mathews Co.

Lawn Genie Pick-Up mower mows, sweeps, mulches, chops, shreds, and de-thatches. The 36-, 48-, 60-, and 72-inch models collect clippings and leaves as they mow. Free-swinging flail-type blades give a smooth, even cut from 1 to 5 inches. The mowers are powered by their own gas engine and pulled by your tractor. Optional hopper empties from seat. **Circle 228**



Yanmar Diesel Division

YRR-560 rear-mounted rotary mower cuts a 60-inch swath with triple blades. Designed specifically for 19- and 24-horsepower Yanmar diesel tractors, it features anti-scalp chains and adjustable side skids. **Circle 224**

Howard Price Turf Equipment

New mower for golf course roughs, the Hydro-Power 180, can be equipped with rotary or flail mowers. Use the three floating cutting units together, individually, or in pairs. Rear wheel steering provides maneuverability. A 4-cylinder water-cooled engine drives through a 2-speed hydrostatic transmission. **Circle 229**

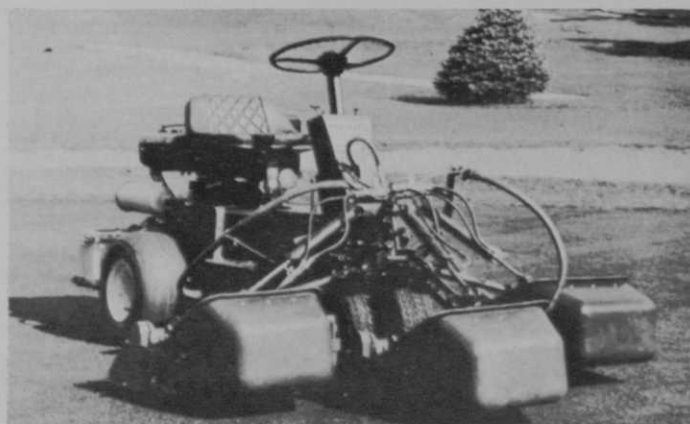


For ad on preceding page circle 132 on free information card



Pen-Gro Corp.

Ransomes Motor 5/3 mower cuts grass up to 8 inches high with any combination of its five reels. The floating action of the cutting heads maintains even height of cut and helps prevent scalping on uneven ground. Using skids and rollers, rather than wheels, on the cutting units eliminates ruts and enables trimming around traps with the fairway mower. **Circle 227**



Hahn Turf Products Division

Tournament 1202 precision greensmower features quick-adjusting, cable-driven reels that give a full 67-inch cutting swath, even in turns. And in 5 minutes, you can switch all three units to Verti-Cut, Vibra-Spiker, or tee mower. **Circle 230**

Payline Group International Harvester Co.

Model 240A mowing tractor is equipped with a diesel engine: either 46 horsepower with gear drive or 50 horse with hydrostatic. Independent PTO helps less experienced operators maintain engine speed and match ground speed to mowing conditions. **Circle 222**

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You can tell a lot about a golf car by the company it keeps. Melex rides with the best. Look around. You'll find Melex fleets floating down the fairways of some of the most prestigious country clubs in the nation...clubs that already know Melex is worth its weight in green fees.

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for everyone. And the whole crowd will heartily approve of its tight turning radius. Four speeds in forward and reverse. Automotive steering. Automatic charger. And that's not all. Standard—not optional—on every Melex is a hill brake with automatic release plus an automatic seat brake.

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low maintenance profile. (The laziest mechanics in the country love Melex.)

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Beneath the durable, high-gloss finish of its baked enamel paint, Melex boasts a very sturdy frame. Virtually indestructible, this frame is constructed from specially reinforced, formed tubular steel. And that's just one reason it's tough enough for the whole team.

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Beyond being manufactured from the highest quality materials available, Melex features a protective undercoating. Wear-and-tear resistant vinyl trim molding. Twin hydraulic shock absorbers to smooth out the lumps and bumps of the nation's toughest courses, plus

power to handle the highest hills.

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That's why we call it The Company Car. Melex has much more to offer than convenient features and classy looks. At the bottom line, this tough little golf car is more than a crowd pleaser. It will make your accountant stand up and cheer.

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Grass seed: bargain ingredient for golf course improvement

by Scott Lamb

Inflation continues to eat into the available budget for maintenance of golf courses across the country. The 10 percent or more inflation factor is applied to many of the products needed to keep the nation's golf courses in good playing condition. While this is a fact of life, there is one factor which has not been eaten up by inflation and which can produce astonishing results in course maintenance. That single factor is grass seed.

Grass seed prices have remained virtually stable for many years and are so remaining today. Shortages have, on a year by year basis, temporarily boosted grass seed prices, but statistics show grass seed prices have remained very stable for the past 10 years or more.

Turf seed producers in Oregon and Washington have improved their efficiency in the production of grass seeds through new, better producing varieties and by growing larger acreage. Grass seed suppliers have improved their efficiency by selling greater volume on a fairly constant margin. As a result of these factors, the golf course superintendent can still purchase grass seed at uninflated prices.

Had grass seed inflated with the devaluation of the dollar, a golf superintendent could expect to pay about 75 percent more than he paid 10 years ago. But in many cases, grass seed prices may be actually lower than they were a decade past. In most cases, prices have increased only about 10 to 20 percent in 10 years.

Grass is a living plant and, as such, is subject to the same hazards as all living things. Heat, humidity, disease,

drought, and traffic all take its toll on grass plants. As grass gets older, it loses its ability to stand up to the elements and, like people, its youthful vigor begins to slow down. There are many medicines available to prevent disease or to cure certain diseases, but weak grass plants of older generations are often susceptible to many of the grass diseases that plague golf courses. For that reason research in the development of new grass plants that resist such diseases is a constant effort.

How it is done

Grass seed research breeders select healthy plants from old stands of grass. These are moved to a greenhouse or to a plot where they are carefully identified and recorded. The plants are selected from visual observation throughout the plots where several thousand plants have been introduced for study. The seeds from the stronger plants are harvested and the weaker plants are destroyed before they can go to seed. Seed from the stronger plants are again planted in the greenhouse and again transferred to plots.

Often, rust spores and other diseases are introduced directly to the plant. Those susceptible to the disease again are discarded, and healthy plants are again saved through seed harvest. The strong plants are left in the plots for further tests, and the seed

is replanted following cross pollination with other strong plants. This process is continued for generations of plants, each building more resistance into the variety. When all tests are completed and seed yields and other positive attributes of the new plants are tested and found to be an improvement on past strains, the new grass is named and released for public use.

This is a very simplified chronology of grass breeding, but serves to explain the tedious work that goes into developing new grass varieties. Strangely, the new grass which may be resistant to a particular disease, gradually weakens or new types of the same disease eventually begin to infect the resistant plants. This may take 10 years or more before the immunity gradually declines from the new grass. But, there will be another new grass to take its place, and the process will be repeated.

How to choose your seed

Superintendents are often puzzled by the parade of magazine ads and literature proclaiming a certain variety name as the best of that species. While an abundance of advertising language is provided to make the grass variety look like a wonder grass, the claims are usually quite accurate.

There are two factors purchasers of grass seed should give top consideration. The first is required by law, and that is a purity analysis tag on each bag of seed sold. This tag will tell the consumer the purity of the seed, which means how much actual seed of the variety is being purchased. If it is 95 percent pure seed, 5 percent is made up of other crop seeds, seed hulls, straw, or any foreign material that may be in the seed bag. A test for germination, and the date of that test, must also appear on the tag. If the seed tests 85 percent germination and has been properly handled, the germination should not vary much for at least one year. Obviously, the

What is fluorescence?

The only true test to determine whether ryegrass seed is annual or perennial is to germinate the seeds and place the seedlings under black light. The roots of the annual plant will fluoresce (radiate light), while the roots of a perennial plant will not. This unique test makes it possible to establish quality control in the production of both perennial and annual ryegrasses. — Dr. William Meyer, Pure-Seed Testing, Inc., Hubbard, Ore.

Scott Lamb is president of Agricultural Commodity Promotions and represents Turf-Seed, Inc., the Manhattan Ryegrass Growers Association, the Oregon Fine Fescue Commission, and Tee-2-Green Corp.



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3 SPIKERS

The Cushman Quick Spiker attaches to a Turf-Truckster with PTO, hydraulic system and dump kit. You spike a precise 57-inch swath, even over undulating ground, and raise or lower the unit hydraulically. The Trailing Spiker gives you the same width and precise results, but its built-in lifting mechanism is controlled by a pull rope.

4 SHORT BOX & FLATBED/BOX

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attachments are mounted quickly with two pull pins. Bolt-on sides and tailgate convert the flatbed to a dump box. Both boxes can be dumped easily with either a manual or powered hydraulic dumping package. And either box is capable of hauling up to 1,000 lb. payloads.*

5 SPRAYER

Use this versatile attachment to spray greens, hard-to-reach roughs, fairways, trees, bushes. The polyethylene tank holds up to 100 gallons of chemical solution. The three-way boom provides an accurate spray for proper application and less chemical waste. The Turf-Truckster transmission and variable speed governor assure uniform ground speed. And the optional handgun lets you "fog" an area or spray up to 40' in the air.

*Rating for vehicle equipped with 9.50-8 rear tires.



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6 SPREADER/SEEDER

The Cushman Cyclone Spreader/Seeder mounts on either the Short Box or the Flatbed/Box with a hopper that holds up to 300 pounds. All controls can be operated from the driver's seat, to broadcast over areas up to 40 feet wide, depending on materials.

7 TOP DRESSER

The Cushman Top Dresser eliminates the need for self-powered units and time-consuming walking. The moving bed and rotating brush operate at a controlled speed to maintain an even spreading pattern over a 31-1/2 inch swath. The big hopper can hold up to 1,000 pounds of material, from rock salt to fine, powdered materials.

8 QUICK AERATOR

The Cushman Quick Aerator is

designed to slice greens and aerate fast. It attaches to either Turf-Truckster with just three pull pins. And is hydraulically lifted from the driver's seat for easy movement from green to green. Three tine types are available for varying soil conditions: slicing, coring (two sizes) and open spoon.

CUSHMAN RUNABOUT

The economical answer to basic transportation and light hauling requirements. The new 18-hp Runabout now carries two men, plus equipment and supplies, while the 12-hp model carries one man. Both feature a big

pick-up box, exceptional maneuverability, and 3-speed transmission. The Cushman Runabout is the way to help your men do more work, and less walking.

Ask your Cushman Turf Dealer to show you all the time- and money-saving advantages of his turf-care equipment. Unlike other companies, Cushman gives you more than transportation. We give you a total turf-care system.

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79-CUT-1



higher the purity and the germination, the more the purchaser is getting for his money. The purity tag must also show the amount of weed seeds or other crop in the lot of seed tested.

The second factor of great importance to the purchaser is the certification tag. In Oregon, this is a blue tag issued by the Oregon State University seed certification department. When certification of a field is requested by a seed grower, the field is inspected by the certification official. The seed from the field is also tested, and each step in the process is calculated to make certain the purchaser is actually receiving the genus and variety he believes he is buying. This is the only way the purchaser can be sure of getting exactly what he ordered. Each blue tag is affixed to the bag with a metal seal available only from Oregon State University.

Many sales people will try to convince the unwary that uncertified seed is every bit as good as the certified variety and much cheaper. A good many superintendents, however, have found this is not the case. Once planted, grass seed is difficult and expensive to replace.

With the advent of the new fine-leaved perennial ryegrasses, a third factor should be important to golf superintendents. This is the matter of fluorescence in the seed tests. Annual and perennial ryegrasses can cross pollinate, and the annual characteristics are dominant in such crosses. Annual ryegrass is a coarse grass, unsuitable for fine turf. If the pollen from annual ryegrass should contaminate a field of fine-leaved perennial grass, the seed from that field could have many of the annual characteristics. Since the seed of annual and perennial are about the same size, it cannot be segregated in the cleaning process. All certified perennial ryegrass grown in Oregon must be submitted to a fluorescence test at Oregon State University. The seed laws, however, do not require the fluorescence percentage to be placed on the purity tag. Most breeders of the fine-leaved perennial have set certification standards for their variety and such standards call for a maximum percentage of fluorescence in a seed lot of that particular variety. Fluorescent percentages vary by breeders' declarations and may range

up to 8 percent, with most tolerances running from 2 to 4 percent. Ideally, the seed should have no tolerance for fluorescent seedlings. At 3 percent fluorescence, a 50-pound bag of seed could reward the seed user with 150,000 annual-type plants protruding like ugly ducklings throughout his plantings.

While fluorescent seedling percentages are not listed on the purity tag, a potential user can readily receive this information from his seed source. Each lot of seed shipped is accompanied by a purity analysis certificate which does list any fluorescence seedlings in the lot tested. The lot number is stenciled on each bag of seed as required by law.

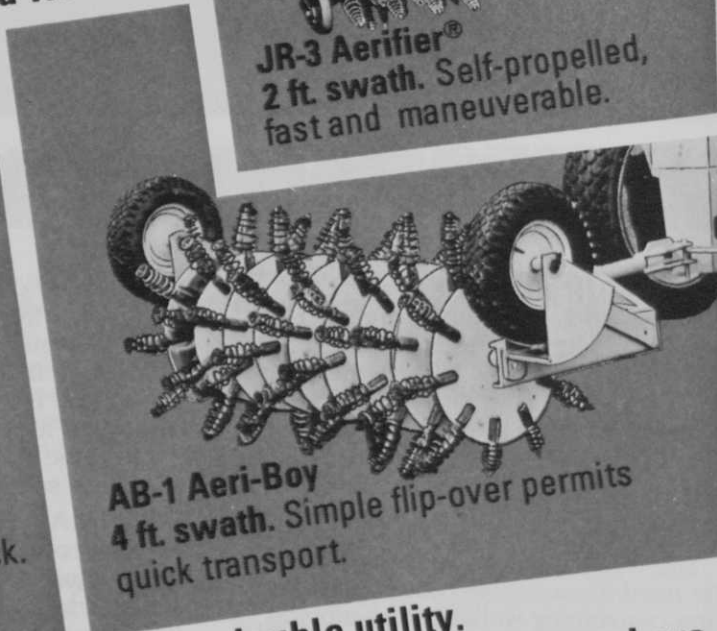
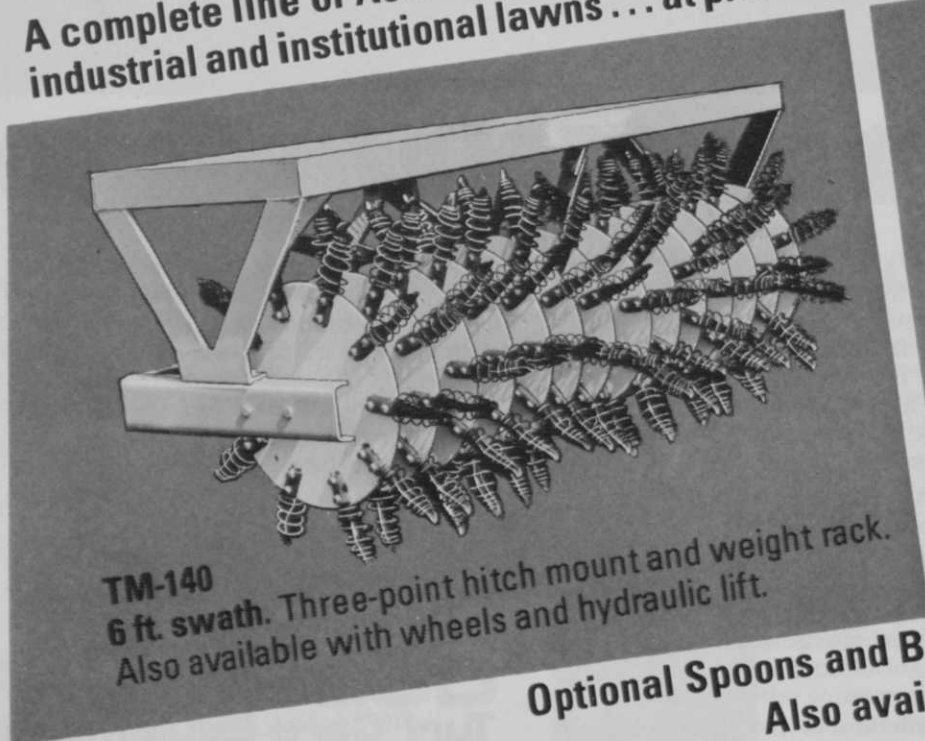
Selecting high-quality seed of the new varieties can be the best thing a golf superintendent can do for his course. Selecting high-quality seed is also good insurance against being duped by an unscrupulous salesman who insists his uncertified seed is just as good, but they didn't take time to certify it.

As the dollar buys less and less, quality grass seed can be the best buy you can make for your golf course. □

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