

## Better turf from improved breeding methods

Advances in the art of plant breeding and associated disciplines are meeting today's need for superior turfgrass cultivars, according to Dr. C. Reed Funk of Rutgers University.

Dr. Funk, addressing the Sixth International Turfgrass Research Conference in Tokyo this summer, said researchers today continue to strive for turfgrasses that exhibit increased pest resistance, improved stress tolerance and reduced maintenance requirements, and that adapt to problem areas.

Dr. Funk focused on three areas of turfgrass breeding that have received considerable attention recently: turf-type perennial ryegrass, tall fescue and *Acremonium* endophytes for improved insect resistance.

### Perennial ryegrasses

Perennial ryegrass, an important cool-season grass for turf and forage use, will be used in Europe, the U.S., Great Britain, Japan, Australia, New Zealand and Canada to the tune of 30 million kilograms of seed in 1989, said Dr. Funk. It is best adapted to fertile soils and maritime climates having mild winters and cool, moist summers.

Perennial ryegrass in Great Britain has been used for forage for centuries, figuring prominently in pastures and more recently in high traffic athletic fields. Still, its lack of tolerance to temperature extremes limited its use in this country.

"A revolution in turf-type perennial ryegrass started in the United States in the mid-1960s when Howard Kaerwer and Robert Russell

developed and promoted NK-100," said Dr. Funk. This spawned Manhattan, Pennfine, Citation, Pennant and All\*Star, he noted.

The early success of Manhattan and Pennfine led to a rapid expansion of turf-oriented ryegrass breeding programs in the U.S. and Europe, leading to turf with improved wear tolerance, stress tolerance, mowing quality, more efficient seed production and enhanced endophyte performance.

"Prospects for continued genetic improvement are great," said Dr. Funk, adding that greater cooperation among scientists around the globe and

advances in biotechnology are allowing researchers to make great strides in the development of good turf.



Advances in research are leading toward improved turf all around the world, Dr. C. Reed Funk has observed.

### Tall fescue

Tall fescue, a tall, deep-rooted, long-lived perennial grass, is used extensively for pastures, conservation and turf, noted Funk. It has above average tolerance of acidic, alkaline, saline and poorly drained soils and is drought tolerant. It was introduced into the U.S. from Europe in the 1800s and early 1900s.

"The species was not widely used until after the development and release of Alta and Kentucky-31 in 1940 and 1943, respectively," said Dr. Funk.

A tall fescue breeding program be-

prove their stress and pest tolerance.

Endophytic fungi have been known to occur in the tissues of many grasses for more than 100 years, said Dr. Funk. And recent studies have revealed an "astounding diversity of fungal species existing within the tissues of many healthy plants."

### Endophyte-enhanced turf

Many grazing animals perform poorly after consuming *Acremonium*-infected tall fescue and perennial ryegrass, prompting researchers to work toward eliminating the endophyte from those cultivars. However, improved insect resistance, persistence, and performance in many endophyte-containing plants make them ideal for turf and conservation, said Dr. Funk.

"The ability of endophytes to produce several biologically active toxins undoubtedly contributes to a broad spectrum of insect control," noted Dr. Funk. Instances of better summer survival, enhanced fall recovery and reduced weed invasion has been observed in perennial ryegrass, tall fescue, hard fescue, and chewing fescue turfs containing high percentages of endophyte-infected plants, he said.

"Enhanced resistance to harmful insects was undoubtedly responsible for some of this improved performance," notes Dr. Funk, adding, "improved stress tolerance may also have been a factor."

No adverse effects of endophytes in turf has been found, said Dr. Funk, and many types of endophytes exist in our major turfgrass species.

Further collecting, studying and using these endophytes should make them even more useful in the future. Indeed, breeding programs have been initiated to transfer useful endophytes to elite cultivars and germplasm population of perennial ryegrass, hard fescue, tall fescue, chewing fescue and blue sheep fescue, he said.

"Utilizing desirable selected endophytes to enhance the persistence, performance, pest resistance, and stress tolerance of turfgrasses has considerable potential," said Dr. Funk.

—Will Perry

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*Better cooperation and advances in biotechnology is allowing researchers to make great strides in developing good turf.*

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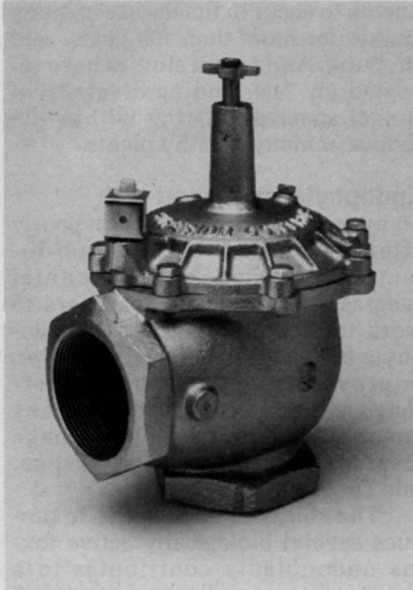
gan at Rutgers in 1961 led to the production of Rebel in 1980. That program was expanded in 1972 to incorporate cooperative programs throughout the country. "These programs led to the development and release of a number of useful turf-type cultivars, including Falcon, Olympic, Mustang, Arid, Rebel II and Houndog," said Dr. Funk.

Researchers at Pure-Seed Testing, Pickseed West, KWS and Rutgers University have developed cultivars with a significantly reduced mature plant height, called "dwarf-types." They exhibit good drought tolerance, said Dr. Funk, but work is needed to im-

# PRODUCTS

## This valve offers a different angle

The 950-A, a new, 3-inch angle valve has been added to Superior Control's 950 series of automatic brass valves. According to Superior, angle valves



have superior flow characteristics and are sought by irrigation designers, especially those outside the U.S.

A pressure-regulating version of the 3-inch angle valve, model 950-A DWPRS, is also available.

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## Improved rotary mower easy on turf, operator

Textron's Jacobsen Division has made some improvements in its Crew King mid-size rotary mowers. The Crew King now features a quick height of cut adjustment that can be done with-



out tools. New low profile caster struts give the operator a better view of the cutting path and are less likely to catch on low hanging branches and other obstructions.

The Crew King has a floating deck

design to reduce scalping. Smooth tread pneumatic casters have been added to virtually eliminate marking of soft or wet turf.

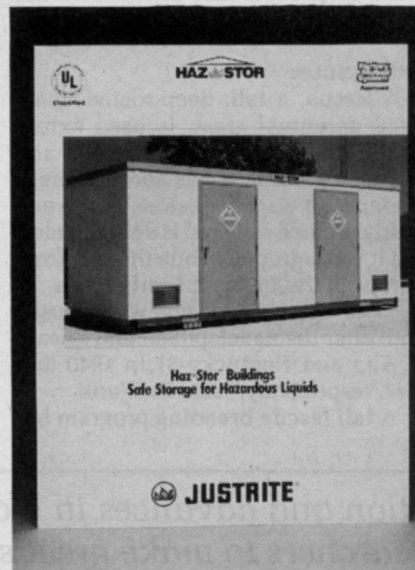
The polyethelene fuel tank is larger but lighter, for less weight and less refueling.

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## Safe liquid storage now with EPA-approved sheds

Haz-Stor hazardous liquid storage buildings comply with EPA regulations and model building codes. A new brochure is available which illustrates explosion relief panels, fire protection systems, explosion-proof lighting, secondary containment sump and other protective features.

Justrite Manufacturing says the Haz-Stor buildings are rugged and designed to provide effective and approved storage. They're delivered



pre-built to a plant site.

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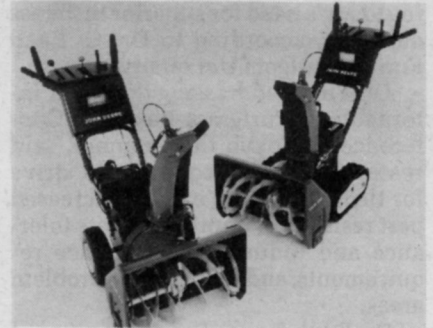
## For winter, managers count on the magnificent seven

Track-drive snow blowers lead the new line of seven machines from John Deere. The Deere-Trax system is designed for greater traction and stability on sloped, gravel or icy surfaces. In hard-packed snow or icy conditions, the machines' weight can be shifted to the cutting edge and auger height can be lowered for maximum performance by raising the handlebars, then locking the variable weight transfer system to the desired position.

This feature is available on the 5-hp TRX24 and 8-hp TRX26. Other

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## New forklift comes back from the drawing board

JCB Inc. of White Marsh, MD has introduced the improved model 930 rough terrain forklift. The body and chassis design now give operators new front fenders and steps for easier entry and exit. A new sloping hood design offers greater visibility to the rear of the unit. A new heavy duty fuel tank and hydraulic tank are easy to reach.

JCB has also made improvements in the operator compartment. Some new features include an improved instrument console, and hydraulic control levers angled toward the operator in easy reach. The door is wider, grab handles are bigger, and the Bostrum seat has been improved.

The improvements continue with the introduction of the 1000 Series Perkins, naturally aspirated engine, with key engine shut off and a new planetary drive axle. There are also two new mast features: a 37-degree hydraulic forward mast tilt for easier mast positioning from the operator's area when the mast is in the travel position; and outside mounted mast tilt cylinders for easier service access.



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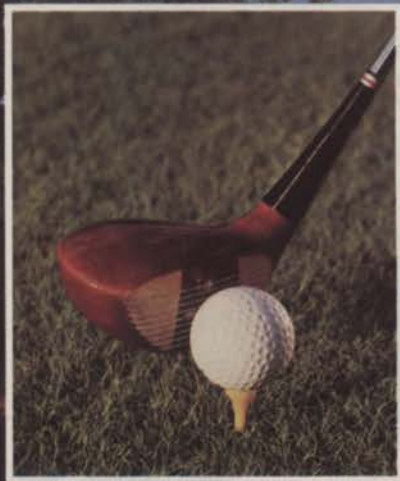
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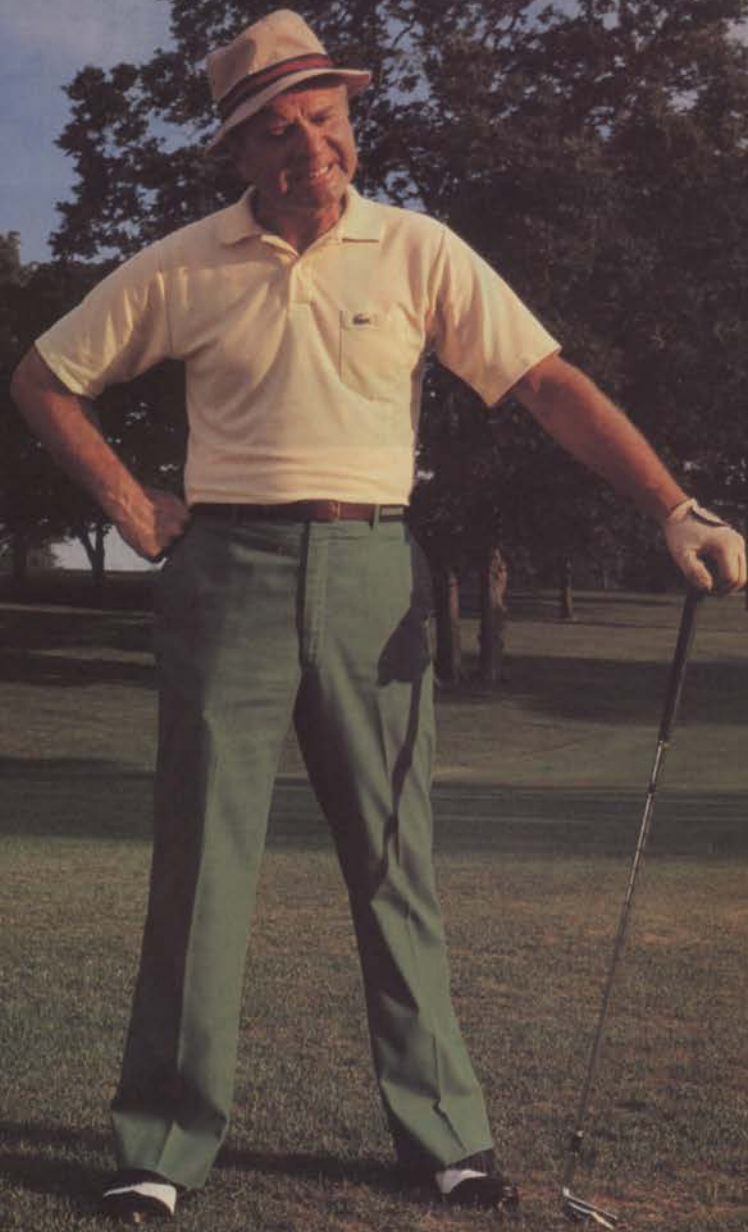
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The RedMax Models EBA430 and EBA440 feature an auto-start and recoil system for smooth, easy operation.

According to RedMax, operators are able to start the blower by pushing a button rather than pulling a cord. The unit does not have to be removed for restart.

Equipped with 41.5 cc engines, the two models generate airflows of 600 cubic feet per minute. Each unit features a self-charging, battery-type autostarter



that is conveniently located for easy access.

Other features include a patented, force-ventilated backpad to keep the operator cool, rubber mounts that insulate the operator from vibration, and a low-

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A heavy-duty air cleaner is included.  
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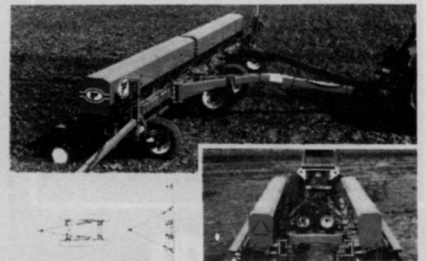
## Folding drill for state-of-the-art, exact seeding

A new folding drill from The Tye Company of Lockney, Texas features a new clear-view, "wishbone" hitch. This enables the operator to see the drill during planting, and gives him a clear view of the road behind.

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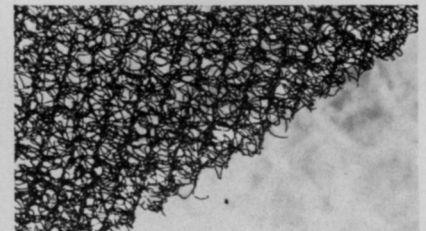
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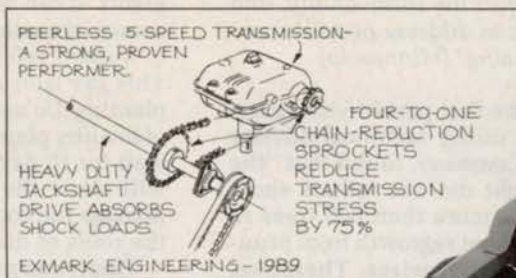
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# PROBLEM MANAGEMENT

by Balakrishna Rao, Ph.D.

## Line clearance in drought

**Problem:** *Should electric utilities reduce or maintain their current line clearance pruning programs during an extended drought period? The background for this involves utilities maintaining various distances between the energized wires and the encroaching trees. When trees become stressed, will continued pruning around energized wires affect the survivability, and what is the best approach to address people's concerns with this kind of pruning? (Minnesota)*

**Solution:** The answer to the first part of your question is yes. Greg Mazur, utility technical advisor from Davey Tree Expert Company, found that "the excessive heat and drought did not reduce shoot elongation," after studying more than 600 trees in northwest Wisconsin and shoot regrowth from pruning cuts towards the energized wires. Therefore, continue to prune the trees on your regular line clearing cycle.

As for the second part of your question, as far as we know there is no documented research data available for comments. However, the following comments might be helpful in explaining the situation to your concerned people. Drought has been, and perhaps will be in the future, occurring every now and then in many parts of our world. Many utility companies are conducting line clearing work throughout the growing season, year after year. But no severe effect attributable to pruning in previous years has been documented to date.

In all likelihood, drought has occurred many times in the past to pruned street trees without significant changes in survivability.

Our experience has been that minimum sunscald and/or dieback can occur in response to pruning but not widespread decline or mortality of pruned trees. We have seen a large number of established pruned or unpruned street trees decline. The problem was associated with abiotic stress factors, insect and/or disease activity. Among these, borer, canker and wilt diseases are considered to be the most destructive disorders. Often this type of declining syndrome can be coinciding with the pruning activity and then it becomes a concern to the public.

Pruning of plants like oaks and elms which are susceptible to wilt disease should be avoided during the insect vector flight period to minimize the disease spread. However, if these trees have to be pruned, application of a wound dressing compound might be beneficial.

## Fumigant use on diseased trees

**Problem:** *How good is Vapam soil fumigant in managing the root transmission of Dutch elm disease and oak wilt disease? What is the best way to apply Vapam, and how near to the healthy tree can it be applied? (Michigan)*

**Solution:** Vapam soil fumigant can prevent root graft transmission of Dutch elm disease and oak wilt disease if it is done properly and the product performs

well. For best results, read and follow label specifications. Use only when ground temperature at 3 inches is above 60°F and less than 90°F. The soil is usually warm enough when the spring flowering shrubs such as forsythia are blooming.

Be careful when using Vapam around desirable plants. It can severely injure or kill any plants that it comes in contact with.

Vapam releases a gaseous fumigant in the soil. This gas later dissipates, leaving the soil ready for planting. Do not inject it within 10 feet of the dripline of healthy plants. After injecting Vapam, you should wait for 10 days to remove the diseased trees. This will allow the fumigant to spread effectively and manage the root graft transmission. Vapam will kill the roots of diseased trees as well as healthy trees.

Apply one part Vapam into 15 parts water (1 oz. per 1 pint water, or 8 oz. Vapam per 1 gallon water). One gallon of Vapam mixture will treat 64 ft. of line or 128 holes. Where feasible, a chemical barrier of Vapam should be placed between a newly-diseased and a healthy tree if they are growing within 40 feet of each other. With an electric drill and auger, or crowbar, make holes six inches apart and approximately 18 inches deep along a line midway between these trees. Pour in 1 pint of the Vapam mixture per hole and immediately replace the soil and tamp the opening closed. For convenience, marked ropes can be used to space the recommended number of holes in a desired line.

The turfgrass in the treated area will also be killed. These areas may require seeding only after the fumigant odor is gone. Tilling or cultivating the Vapam treated area will help speed up this process. Radish seeds can be planted to detect any residual effect of Vapam, 10 to 15 days after application. If plants are normal, the treated area is safe to plant a lawn.

Make sure to wear safety protective equipment and thoroughly clean all tools after treatment to avoid any injury from future use.



**Balakrishna Rao is Manager of Technical Resources for the Davey Tree Co., Kent, Ohio.**

Questions should be mailed to Problem Management, LANDSCAPE MANAGEMENT, 7500 Old Oak Boulevard, Cleveland, OH 44130. Please allow 2-3 months for an answer to appear in the magazine.



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