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Larry Hanks, VP Golf Operations;
North Star Development Co., Inc.
at Deer Creek, Overland Park, KS.

“When planning our World-class, Robert Trent Jones II designed golf course in the Kansas City area, we had to seriously consider our hot, dry summers. We simply could not leave the all-important turf areas to

chance. Penncross bent was selected for the greens, zoysia for the tees and fairways, and tons and tons of Triathalawn blend was seeded into the roughs. Our tees, greens and fairways will receive adequate water, but we’re counting on Triathalawn’s deep-rooting to look good in the unirrigated areas ... especially around our stately trees.

Deer Creek is a privately owned course open for fee play. After observing how tall fescues handled the wear, shade and 1988 drought at neighboring private and public courses, we agreed that the new turf-

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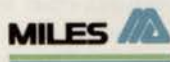


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The call is free. The tape and brochure are free. All we ask is that you lend us an ear.



Circle No. 125 on Reader Inquiry Card



Zoysia: a grass for the future — and not just on golf courses

New seeded zoysias will fit in because of lower prices and even lower management requirements.

■ Does zoysiagrass have a future in the green industry—not only on golf courses, but also on athletic fields and home lawns?

Dr. Milt Engelke of Texas A&M University says it does.

"The future is real bright," says Engelke. "This grass is greatly under-used. It, along with buffalograss, will be politically and environmentally 'correct' in the next few years."



Engelke: sees zoysia popularity spreading

Engelke, whose research has led to a "DALZ" series of experimental cultivars, thinks that consumer education will determine how widely the zoysias are actually accepted.

"Right now, one of the biggest problems is cost; it's extremely expensive," Engelke says.

But he further notes that zoysia's initial costs are eventually offset by low maintenance costs, including much less water.

"The new zoysias," he adds, "will be far more cost-effective as production time is reduced. We'll see more zoysia in home lawns and athletic fields as the cost comes down. Education will be the bottom line. And it'll take a decade for us to properly educate the consumer."

Zoysiagrass is native to Asia, but is well adapted to warm humid and transition areas of the U.S. It begins to go dormant at about 55° F. Engelke believes that, given time, its popularity may also spread to the southern and western U.S.

Adjectives most often used to describe zoysia are uniform, dense and low-growing. Because of its density, zoysia has superior resistance to weeds. Its stems and leaves are tough and stiff, resulting in excellent playability on golf course fairways.

Success on the course—Golf course superintendents near Kansas City and in Tennessee rave about zoysia's performance on fairways.

Members of Lawrence, Kansas's Alvarado Golf & Country Club, where Dick Stuntz is superintendent, find the zoysia to their liking. And Stuntz appreciates the fact that "if you keep nitrogen applications down and control traffic, you can turn the water off."

He cuts his fairways at 1/2 inch, three times a week, and applies pesticides only when necessary.

"The vast majority of our areas have tolerated the low height of cut very well," he observes. "I'm headed for 3/8ths of an inch—not for playability, but for thatch control."

Here is the program his zoysia is on:

- **Fertilization:** 1 to 2 lbs. N per 1000 sq. ft. per season; 3 to 4 lbs. K₂O per 1000 sq. ft. per season
 - **Poa control:** Roundup at 24 oz. per acre
 - **Weed control:** pendimethalin at 1 1/2 lbs. per acre, twice per season (April 1-15 and May/June)
 - **Post-emergence crabgrass control:** Daconate at 1 to 2 oz. per 1000 sq. ft.
 - **White clover control:** Banvel 4S at 32 oz. per acre
 - **White grub control:** trichlorfon at the third instar stage (when damage is detected) with pre- and post-irrigation
- In order to avoid winterkill, Stuntz's program includes:

1. Eliminate cart traffic, if possible.
 2. Around Sept. 15, raise height of cut to 3/4 or 7/8 inch.
 3. Use adequate K₂O.
 4. Make sure drainage is adequate.
- David Stone at The Honors Course, Ooltewah, Tenn., finds the biggest problem is keeping bermudagrass out of his

zoysia fairways. He uses a variety of bermudagrass herbicides to get good results, when applied four times per year (June 1, July 1, Aug. 1, Sept. 1).



Stone: bermuda encroachment a problem

"You can never totally eliminate the bermuda in our area, but you can totally control it," he claims.

Besides the work being done at Texas A&M University, Jack Murray in Florida is also conducting research on seeded zoysias, which would make the grass more practical for a wider range of uses.

Says Engelke: "The biggest problem with zoysiagrass is management. Most people over-manage it. But I see zoysia becoming much more dominant in the next decade, and seeded zoysias will fit in because of even lower management requirements."

—Jerry Roche

—The American Zoysiagrass Association is a new organization working on raising the consciousness level of the turfgrass industry toward the zoysias. For more information, contact Frank Whitbeck at Windrock Grass Farms, Little Rock, Ark.: (800) 225-0303.

Advantages

- ✓ Heat/cold tolerant
- ✓ Slow upright growth
- ✓ High quality surface
- ✓ Disease resistant
- ✓ Drought tolerant
- ✓ Low water use
- ✓ Low nutrition requirements
- ✓ Tolerant to salt water
- ✓ Wear tolerant

Disadvantages

- x Slow recovery
- x Weak color
- x Susceptible to winterkill
- x Thatch accumulation
- x Production drawbacks (establishment, regrowth, repair)
- x Growth cycle
- x Compacts easily
- x Damaged by nematodes

Sources: Dr. Milt Engelke, Dick Stuntz

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Circle No. 149 on Reader Inquiry Card





Priming and pre-soaking for faster turf germination

Laboratory research has found that seed priming has several advantages over pre-soaking or pre-germination.

■ Dr. Doug Brede of the Jacklin Seed Co., says pre-soaking and/or priming turfgrass seed can speed germination when you want grass to establish in faster-than-normal times.

"After six weeks under optimal growing conditions, it is nearly impossible to tell a primed bluegrass field from an unprimed one," says Brede. "The benefits of priming come when temperatures are adverse, or when bluegrass is mixed with a fast-germinating species such as ryegrass that normally tends to overwhelm the slow-germinating bluegrass."

An obvious use for pre-soaking/priming is on athletic fields, where only a short period is allocated between games for re-seeding.

The difference between priming and pre-soaking? In seed *priming*, root and shoot don't break the seed coat and can be planted by traditional methods; if you *pre-soak* the seeds, however, you must plant them wet, which normally means that hydroseeding (rather than spreading) techniques must be used.

Pre-soaking—"Pre-soaking is easy with perennial ryegrass and tall fescue," Brede claims.

First step in pre-soaking is to put the

seeds in a 55-gallon drum filled with water. Then, aerate them with an aquarium pump and airstone. Wait 48 hours and plant while still wet.

This process, however, produces what Brede terms "mixed results." It is far better, he claims, to pre-soak annual ryegrass and tall fescue with a hormone solution.

Germination speed of primed grasses, fastest to slowest:

- 1- annual ryegrass
- 2- perennial ryegrass
- 3- fine fescue
- 4- tall fescue and bermudagrass
- 5- Kentucky bluegrass
- 6- zoysiagrass

Source: Dr. Brede

In this case, add 6 oz. of gibberellic acid per 10 gal. of water. Seeds will germinate

◀ Laboratory research at Jacklin Seed Co. has found that seed priming has these advantages over pre-soaking or pre-germination: (1) it can be dried back and stored for up to two months; and (2) it can be planted via conventional spreaders.

Photo courtesy Dr. Doug Brede

about three days sooner than if the gibberellic acid was not added.

"Pre-soaking is cheap and easy, but aeration is a must for both pre-germination and pre-soaking," says Brede.

Priming—As a rule of thumb, priming—at best—cuts the field germination period in half.

"Primed seed will germinate faster under cooler (60° F) conditions," Brede observes.

Though results with primed seed are usually better than with pre-soaked seed, priming does present some difficulties. Light is needed to increase the germination index of some species like bluegrass, which also needs free oxygen during priming. Some species—like bluegrass, again—also excrete toxins that inhibit the priming process.

Optimal priming times are five days for Kentucky bluegrass, two to three days for perennial ryegrass. "Stop priming when you first notice root emergence," Brede warns.

Primed seeds have a shelf life that slowly wears off until, after three months, all effects are usually lost.

"After six months, germination of primed seeds is actually poorer," Brede notes. (Pre-germinated seeds, on the other hand, must be planted right away.)

—Jerry Roche



A 10-year-old seed lot of Fylking Kentucky bluegrass springs back to life (right) after seed priming. Untreated grass from the same lot (left) has still not begun to emerge at one week after sowing. Photo courtesy Virginia Kanikeberg

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Correct identification vital to mole damage control

■ Correct identification is vital to mole damage control.

Some species of moles have large shovel-like front feet with long claws.

The *eastern* mole has a naked red nose and a short tail. It usually makes many shallow tunnels that raise the soil into long winding two-inch high ridges. The few mounds it makes are low, rounded and often have bits of turf on them. It prefers well-drained soils.

The *star-nosed* mole has a large red nose with 22 finger-like projections and a long tail. It usually makes deep tunnels not evident on the surface, but it pushes up soil from these funnels into many conical mounds of raw earth. Some mounds may be more than six inches high and 12 inches wide. It prefers moist soils.

The pattern of tunnels and hills made by both moles varies with soil conditions.

Moles frequently cause damage, but are also beneficial: they are insectivores that feed on insects, worms and other invertebrates. They also irrigate and aerate the soil by burrowing. Occasionally they eat plant seeds, roots and bulbs; but most damage is done while burrowing for insects when they uproot the plants and grass roots.

They are most active in spring or fall, on cloudy days and following rainy periods during the summer. During winter and midsummer dry conditions, they go deep into the ground. They have a very extensive underground tunnel system, including travel tunnels (which are used daily) and foraging tunnels (rarely re-used).

When moles become a problem, the following methods can be used to control damage:

1) Direct killing—Although eastern moles may burrow at any time, they are usually most active at certain times, depending on the season. Note when most new activity occurs, or when flattened ridges or mounds are repaired.

Once you have determined when the eastern moles are most active, look during those times to see the long, winding ridges being pushed up by the eastern mole tunneling just below the surface of the ground. With practice, you can quickly and quietly approach the tunneling mole and kill it by smashing the earth down

with a shovel or similar instrument just behind where the earth is being lifted up.

Repeatedly use of this method can gradually remove eastern moles from an area. But it rarely works for the star-nosed mole because it usually burrows too deep.

2) Trapping—Eastern moles are easy to trap, provided that the trap is placed on a tunnel that is actively being used every day and that problems with function of the trap are noted and resolved.

Locate active tunnels of eastern moles by gently mashing a short section of every ridge that you can find with your foot and marking it in some way. Any ridge that has been pushed back up within 12 to 24 hours is over an



The star-nosed mole prefers moist soils.

active tunnel. Traps placed on these ridges should catch the moles every 24 to 48 hours. If a trap hasn't caught a mole in three days, it is in the wrong location, or it has caught all the moles using that particular tunnel and should be moved to a new location.

Of the three types of traps, the choker type seems to be the easiest for most people to use successfully on the eastern mole. In heavy clay soils, the frame of the harpoon trap will sometimes rise up out of the ground rather than impale the moles. If this happens, use pieces of wood or metal to stake the trap to the ground.

With all types of traps, work the harpoons or jaws of the trap back and forth or up and down through the soil to ensure smooth penetration of the soil. If any trap is sprung prematurely so that the mole is not caught, remove a small piece of sod from under the trigger pan so as to delay its action. If moles burrow around a trap, then either the soil has been flattened too tightly, or part of the trap is projecting into the tunnel and alarming the mole.

To trap star-nosed moles, locate active tunnels by scattering the soil of each mound until it is flat. Mounds that are pushed back up in 24 to 48 hours are over

active tunnels. To set the trap, it is necessary to dig a hole under one of the mounds of earth. The hole should extend to the bottom of the mole's tunnel, usually four to six inches below the surface of the ground. Refill the hole with enough earth to cover the top of the mole's tunnel with approximately two inches of earth. Set the harpoon-type trap in the hole.

3) Reducing the mole's food supply—Using insecticides to reduce insects and related invertebrates may eliminate enough of the mole's food supply, especially in sandy or light soils, so that they either starve or move elsewhere.

In clay and organic soils, earthworms are usually abundant enough to make insecticide application ineffective.

4) Poison baiting—Poison baits for moles that contain 2% zinc phosphide can be used to control moles. Place teaspoon quantities every 10 to 15 feet along mole travel tunnels. To place the bait in the tunnel, punch a hole in the tunnel roof with a 1/2-inch wood or metal rod. Pour the bait through the hole into the tunnel and then repair the hole with a piece of sod or wadded newspaper.

Repeat treatment weekly until mole activity ceases. *Caution: zinc phosphide is toxic to birds and mammals. Use with caution.*

5) Calcium cyanide—Locate active tunnels and use a duster to blow calcium cyanide into the tunnels in both directions every 5 to 10 yards. Seal openings. Two to three pumps on the duster are sufficient. *Note: calcium cyanide may kill the roots of plants in the tunnels.*

6) Aluminum phosphide (Phostoxin)—Locate active tunnels and place a tablet into all tunnels every 5 to 15 yards during the afternoon and evening. Use as many tablets as necessary to obtain complete coverage of the entire mole system, not just the tunnels in one area, such as the yard. If the first treatment is not successful, repeat treatments eventually are. Do not use within 15 feet of any building. Keep lid on container tightly fastened at all times.

7) Experimental materials—Several products are now being tested. Check with your county's cooperative extension agent for current status.

—This article was originally printed in "Turf Times," a publication of the Northern Michigan Turf Manager's Association

When it comes to turf grass pest control, there is a wide array of products on the market to choose from. The difficult part is actually determining which particular product to buy.

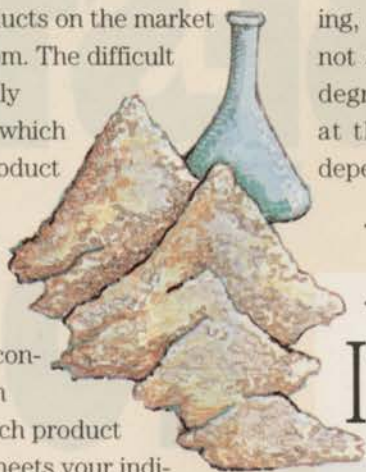
The factors that need to be consciously considered when deciding which product specifically meets your individual needs include:

- degree of control,
- residual,
- formulation,
- ease of application,
- environmental impact,
- economics, and
- availability.

Yet, once you find an insecticide that suits your needs, a new product is often introduced to the market, and you're faced with the decision-making process all over again.

The newest product available for turf pest control on golf courses is CRUSADE® 5G Granular Insecticide. Its active ingredient, fonofos, a mainstay for years in other markets, is now offered for golf course use by ICI Professional Products.

Fonofos is an organophosphorus soil insecticide that repeatedly demonstrates superior efficacy against economically-important turf grass pests, including white grubs, mole crickets, chinchbugs, sod webworms, billbugs, and cutworms. Liquid in its technical grade, fonofos is formulated as a granule in CRUSADE for the golf course, as well as for use on commercial sod farms.



Once applied and irrigated, fonofos releases from its carrier and attaches to the soil. It resists leaching, exhibits no phytotoxicity and is not affected by enhanced microbial degradation. CRUSADE is applied at the rate of 60-80 lbs. ai/acre, depending on the target pest.

NEW TURF INSECTICIDE MEETS SUPERINTENDENTS' SPECIFICATIONS

CRUSADE 5G FOR NON-RESTRICTED USE
ON GOLF COURSES

Residual Control of White Grubs

Prolonged residual in the soil gives CRUSADE the ability to control white grubs and other troublesome pests in various stages of their life cycles over an extended period of time. This particular product feature makes CRUSADE highly cost effective for the user.

At the University of Rhode Island in Kingston, entomologist Steve Alm applied CRUSADE at 4.0 lbs. ai/acre to fairway turf comprised of bentgrass, perennial ryegrass, and

Kentucky bluegrass. The result of Alm's 1991 studies indicated that CRUSADE provided 96 percent control of white grubs.

Alm credits the residual of CRUSADE as the reason for its superb control. "Fonofos at 4.0 lbs. ai/acre was outstanding in control,"

Alm says. "Other materials provided good to fair control. One factor that probably affected control levels was a prolonged hatch of eggs."

According to Alm, CRUSADE was applied late in August. He explains, "Japanese beetle eggs and first and second instar were recovered from plots on September 23rd. Shorter lived materials would not provide adequate control over the extended hatching period."

The longevity of CRUSADE in the soil enhances the product's value, according

to Bob Yarborough, vice president for control products at Lesco, Inc. in Rocky River, Ohio.

Formerly a golf course superintendent, Yarborough claims CRUSADE is unique because "it doesn't have the enhanced microbial degradation of other soil-active insecticides. That gives the product the residual necessary to provide prolonged control of the white grub at various stages of development. With CRUSADE, one well-timed application should provide adequate residual and control."

