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Zoysiagrass growing underneath the shade trees at The Imperial Palace in Tokyo. While zoysia does not possess the shade tolerance of cool-season grass, zoysia tolerates shade well enough to maintain a beautiful cover on this 400-year old lawn.

THE SEARCH FOR ZOYSIAGRASS

There's no limit to what researchers will do to find zoysiagrass. And there's no limit to what zoysiagrass might do for you.

by Judy and Doug Brede, Ph.D., Jacklin Seed Company

Zoysiagrass, also known as Japanese lawngrass, is a warm-season creeping perennial native to the Far East. As a turfgrass, it is adapted to the transition zone of the United States. One would hardly expect to find zoysiagrass growing at a high elevation at the exposed top of a mountain.

"Zoysiagrass has been touted to be a miracle grass that's going to solve a lot of our problems," says Milt Engelke, Ph.D. and plant breeder at Texas A&M, Dallas. "There has been an aura of mystery surrounding zoysia because it is very expensive, and thus not seen extensively."

Zoysiagrass evolved in the Orient, where until recently lawn care was unheard of. Although some species of zoysiagrass can have high seed-yielding capabilities, harvesting zoysia in the Orient is done largely by hand. Relatively little seed leaves the Orient.

Zoysia japonica is the principal species of zoysia grown for seed be-

cause of its seed-yielding abilities. It's known as Korean common in the United States. Korean common is very open growing and has a wide range of genetic variability. It has found use in interseeding into tall fescue to produce a four-season lawn mixture.

The vegetative varieties of zoysia on the market in the United States, Meyer, Midwest, Beldaire and El Toro, are also zoysia japonica or japonica hybrids. They are vegetatively propagated and can be obtained in the form of sprigs, plugs, or sod, which because of their slow growth habit are very expensive. According to Tim Bowyer, Ph.D. at Southern Turf Nurseries, zoysia sod costs can be at least 50 cents/sq. ft. installed. With little seed available and sod so expensive, why would we even want to give zoysiagrass a second look?

The benefits of zoysia

Zoysiagrass has several characteristics that give it the potential to be an ideal, low-maintenance turfgrass. "At

one time, I got gutsy enough to say that we were going to go tee to green in the southern part of the United States with zoysias," says Engelke, "and I think I can still stand on that." Engelke has tested zoysia germplasm at his Dallas research site which are adaptable to tee, green, fairway, and rough.

To elaborate on zoysia's positive characteristics, travel with us to a setting in the Orient where zoysia flourishes. The lawn surrounding the Imperial Palace in Tokyo was planted to zoysia an estimated 400 years ago. It did not have the advantage of man-made irrigation, fertilizers, modern mowers, weed control, or disease control. Part of the lawn is in full sun, and part is dotted with numerous large, very old shade trees. Yet under these conditions of ultra-low maintenance, this stand of zoysiagrass has maintained a beautiful, full cover for centuries.

This demonstrates the rugged, enduring qualities of zoysia, as well as

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its low maintenance requirements. Zoysia makes very efficient use of water. It can also tolerate salinity, both in the soil and in the water.

"Zoysiagrass is the most nutrient-efficient turfgrass we have," says Engelke. It needs very little fertilization to maintain a dark green, dense stand of turf. Zoysia becomes so dense that it crowds out invading weeds. Zoysia is also extremely wear resistant and has excellent traffic tolerance. It is very slow growing and low growing, requiring no mowing at all in certain situations.

On top of all of these attributes, for a warm-season grass, zoysia has excellent cold hardiness. The vegetatively-propagated varieties now on the market are very well adapted for the upper transition area, Tennessee through Maryland. Zoysiagrass has been successfully grown as far north as Wisconsin, Pennsylvania and upstate New York.

Nothing is perfect

After reading all these advantages to zoysia, you might say to yourself: What are the drawbacks of this grass? The problems with zoysiagrass stem largely from over-maintenance. We're so used to pouring fertilizer and

water onto bluegrass or Bermudagrass, for example, that we tend to over-maintain zoysiagrass. This causes problems. Over-maintenance of zoysiagrass can cause excess thatch, disease problems, and scalping.

Leafspot and brown patch are two diseases directly related to excessive fertility levels. However, with the proper adjustment in fertility, these problems can be overcome. Rust can also be a problem with zoysiagrass in some parts of the United States, especially in the upper Midwest; but, again, culturally it can be minimized. According to Engelke, improved varieties, such as Belaire, have excellent rust resistance.

As with all warm-season grasses, zoysiagrass goes dormant during the winter months. Some people view winter dormancy as a negative characteristic. Engelke has another view: "Not everything in the world has to be green to be good!" Zoysia has a very pleasant golden winter color. Landscape architects actually take advantage of the natural winter color of zoysiagrass in landscape design.

Zoysia breeders are working to extend the green period of zoysia. El Toro, a vegetatively-propagated

zoysia bred in southern California by Vic Younger, Ph.D., has improvements in fall and spring color.

Where and how to use it

Zoysia can be used anywhere that cool-season or other warm-season grasses are used: in home lawns, parks, cemeteries, roadsides, athletic fields, and golf courses. There are a number of advantages to using zoysiagrass on golf courses, for example. Zoysia can be used in fairway situations. The amount of traffic on the golf course will dictate whether zoysia is used alone, or overseeded with a cool-season grass variety. If a golf course has heavy traffic (300 rounds of golf per day) during the winter months when zoysia is dormant, then overseeding with a cool-season grass like tall fescue or perennial ryegrass is recommended. This is done because the dormant zoysia is not actively growing and can't recover from heavy wear.

But dormant zoysia can handle some traffic without overseeding. The contrast of zoysia's natural winter color can be quite striking on a golf course fairway. Zoysiagrass is not as aggressive as Bermudagrass and is easier to keep trimmed around sand



The slow growth and good root binding of zoysiagrass ensure enduring integrity around bunkers. Its golden winter color can be a striking sight on golf courses.

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bunkers. Its slow lateral growth habit makes zoysia easier to keep under control.

Zoysiagrass can also be used to collar bentgrass greens. The golden winter color makes zoysia a very attractive alternative. One thing must be kept in mind, however, when using zoysiagrass as a collar: avoid over-maintaining the zoysiagrass when watering and fertilizing the green. Disease and thatch problems will arise if the zoysia is given putting-green level

maintenance.

Bowyer recommends the use of a drop-type fertilizer spreader on greens with zoysia collars, to avoid over-fertilizing the zoysia. Zoysia is a good choice in the rough areas of a golf course. Because of its low growth habit, it can sometimes be left in an unmowed state on roughs. Some of the finer textured zoysia varieties, like Cashmere, a proprietary zoysia available from one sod source in Florida, can be used on both tees and greens.

Engelke has seen Cashmere successfully used on the tees of the Chi Chi Rodriguez Golf Course in Clearwater, Fla. "You are not going to stimp a 9, 10 or 11 on greens planted to zoysia, but it definitely is useful on a municipal course, or a course that doesn't have the championship putting on it that demands very high stimpmeter readings," says Engelke.

The general mowing heights for zoysiagrass are 0.3 to 0.5 inch on golf course tees; 0.5 to 1 inch on golf course fairways; and 1 to 2 inches in general

A quick look at an interesting grass



It often takes two years to produce a zoysiagrass sod crop, which is why it's an expensive commodity.

What is zoysiagrass?

Zoysiagrass, also known as Japanese lawngrass, is a warm-season, creeping perennial, native to the Far East. It has been grown in the United States since the 1940s, when it was introduced from Japan and China.

Like other warm-season grasses, zoysiagrass goes dormant every winter. But its yellow-white winter color is more pleasing than other warm-season turfgrasses. Furthermore, zoysiagrass possesses incredible cold tolerance for a southern turfgrass. It has been grown in Pennsylvania and parts of New York for many years with no winter injury. Unique strains of zoysiagrass from northern Japan are winterhardy clear into North Dakota.

How does zoysia spread?

Most strains of zoysia are slow spreaders, creeping about six inches laterally per year. Contrast that with Bermudagrass, which can creep six inches in a weekend!

The slow spreading of zoysia limits its establishment via sprigs. Sprigging is the most common method of establishing Bermudagrass, but it works poorly with zoysia because it's slow creeping. This slow spreading also makes for expensive sod prices.

What does zoysia sod cost?

Because of zoysia's slow spreading ability, it takes 1½ to 2 years to produce a sod crop. Bermudagrass, on the other hand, can sometimes yield two to four sod crops

per year. Therefore, there's quite a difference in price. Zoysia sod sells for upwards of \$1 per square foot installed—often more than the real estate it's planted on!

Tests at Southern Illinois University have shown that seeded zoysia can be established in as little as six weeks.

How delicate is zoysiagrass?

In trials at Texas A&M University by James Beard, Ph.D., zoysiagrass was the most wear-tolerant grass tested. Drs. Beard and Bob Shearman (now at the University of Nebraska) developed a wheel device that continuously rolls around in circles, wearing grass out. They timed the roller to see how many revolutions it took to wear out a certain species of grass.

Most cool-season grasses bit the dust in a few hours or days. Bermudagrass lasted a few days or weeks. With zoysiagrass, the wheel just kept turning and turning until they shut the machine off several weeks later. It never wore out.

What are its maintenance requirements?

Zoysiagrass is one of the lowest maintenance turfgrasses available. Natively, it grows only a few inches tall, so mowing is sometimes unnecessary. Zoysia needs little or no fertilizer after establishment and is incredibly drought-tolerant.

What about weeds?

Until a few years ago, there was no known disease of zoysiagrass. Now it is known that zoysiagrass will get many of the same turf diseases as other warm-season species. High temperature and humidity can occasionally bring on disease. Mostly, these diseases occur because the zoysia has been given too much care.

Where can I get zoysiagrass?

Jacklin Seed's JM-107 is the world's first and only proprietary, seed-propagated variety of zoysiagrass. It is moderately fine-textured and uniform, and medium dark green in color.

One source of seeded zoysia available in the United States is Korea common zoysia, which originates in South Korea. Because it is a common type, it is variable in growth habit. In 1988, the Korean government shut off supplies of this grass to America, which makes the little bit out there very expensive.

As far as vegetatively-propagated zoysias, Meyer zoysia has been a mainstay variety since it was released by the U.S. Golf Association Green Section in 1951.

Midwest zoysia was released from Purdue University in 1963, but has gained little use. Bellaire is a new variety recently released by Beltsville USDA. El Toro, a new release from University of California, has been gaining acceptance in the southern part of that state.

—Doug, Judy Brede □

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The discovery of zoysiagrass atop this arid mountain in Japan says alot for the variety's cold tolerance.

turf areas. "If properly cared for, zoysiagrass is an excellent alternative in many turfgrass situations," say Engelke.

In the past, the expense and limited availability of zoysiagrass has kept this super species from realizing its full potential in the turf industry. Turf

Zoysiagrass makes very efficient use of water. It can also tolerate salinity both in the soil and in the water. It needs very little fertilization to maintain a dark green, dense stand of turf that has excellent traffic tolerance.

breeders are working to change this with the release of seeded zoysiagrass varieties. Jacklin Seed Company will release its first seeded zoysia japonica variety, code named JM-107, in 1990-91. JM-107, in the seed increase stage presently, is a dense, uniform variety, with moderately fine texture, and a medium dark-green color. It is targeted for the same areas of use as the vegetatively propagated zoysia varieties. But a seeded variety can be established in a fraction of the time it takes for sprigs and plugs, and at a fraction of the cost.

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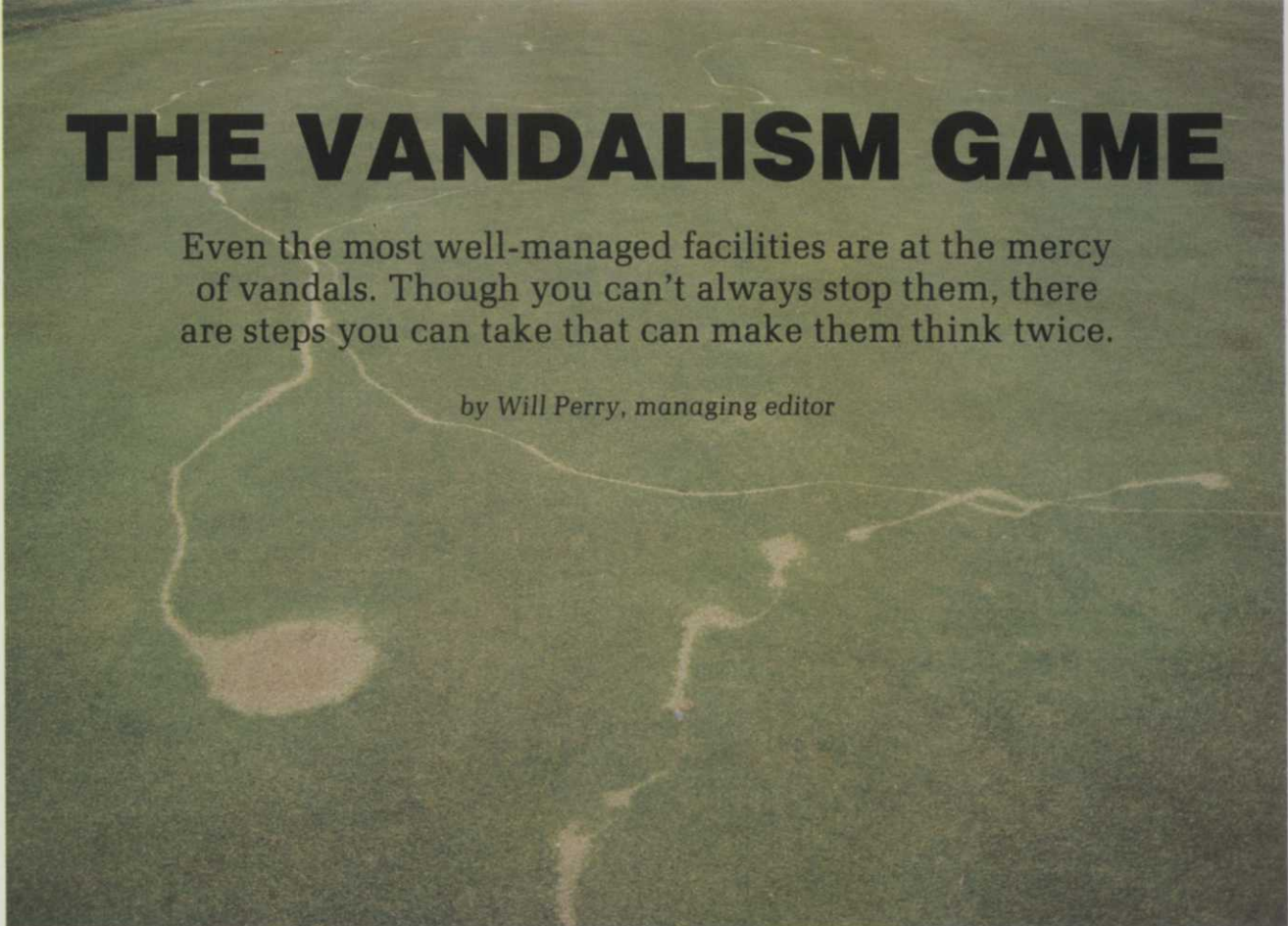
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THE VANDALISM GAME

Even the most well-managed facilities are at the mercy of vandals. Though you can't always stop them, there are steps you can take that can make them think twice.

by Will Perry, managing editor



"A good vandal can really do a number on you," says superintendent Ed Wojtkiewicz. This green had oil spilled on it, which is especially damaging because it doesn't evaporate.

Did you hear the one about the kid, the jeep, and the golf course?

It goes like this: The kid was out partying and decided it would be fun to "turf" Princess Anne Country Club in Virginia Beach, Va. (The club, by the way, had just undergone a 16-month, \$2 million renovation.) The kid was arrested and originally sentenced to two years in jail and fined \$2,000. Eventually all but 10 days of his sentence were suspended on the condition that he put in 100 hours of community service, pay \$1,050 in fines and court costs and pay the club \$6,792.80 in damages.

The story sounds familiar to many superintendents and park managers, who know there's nothing funny about it. They also know that it's a one-in-a-thousand chance that the kid who "turfed" their course will ever have to pay for it.

It's sad but true that one individual with an attitude problem is capable of wreaking such havoc, easily ruining an entire season's work with the turn of a shovel or an opened oil can. The most frustrating aspect of this phenomenon is that there is so little you can do to stop it. The most effective deterrents to vandalism—fencing and lighting—are often too expensive for

all but the most prosperous clubs. Still, there are steps the landscape manager can take to at least reduce the problem.

Enough is enough

After four incidents of golfers being robbed by gunpoint at Chickasaw Country Club in Memphis, Tenn., superintendent Jim Harris said "enough."

He changed the color of his full time and temporary employee's shirts from blue to red to increase their visibility. Caddies were given bright orange safety vests, which are numbered and tracked to make sure they don't fall into the wrong hands for the wrong reason. He also created a stencil of the course logo and had it painted on all apparel.

"The most effective thing we've done to reduce the crime here is to have everyone stay on the lookout for people who seem to be out of place," says Harris.

On any given day as many as seven Chickasaw employees are connected via high frequency FM radios. "We're not trying to apprehend anybody," says Harris, "We're just practicing prevention."

Harris added barbed wire to the fence that surrounded the course, in-

cluding the "razor-ribbon" variety at a pregnable position beneath a railroad viaduct. Six months ago it claimed its first victim, an intruder who actually had to be cut free before going to the hospital to receive his 165 stitches.

The course had to sacrifice some of its privacy by clearing hedges from critical areas. "Many of the members complained, but we simply explained to them that it was either privacy or security. We chose security."

These efforts complement the work of full-time security guards who were put on line four years ago. For approximately \$6 an hour (\$50,000 a year), the course is privy to an unarmed guard who roves the entire course at least six times in a six-hour shift. He has a radio and a gas-powered cart equipped with flashing yellow lights.

"Since we added this additional security there has been a big drop in the number of incidents," says Harris. "If I were to recommend any measures, it would be that you get a security guard or an employee to roam the place at night. Equip a cart with flashing lights and a radio. That's usually enough to scare them off."

Many superintendents interviewed stressed that "scaring off" un-