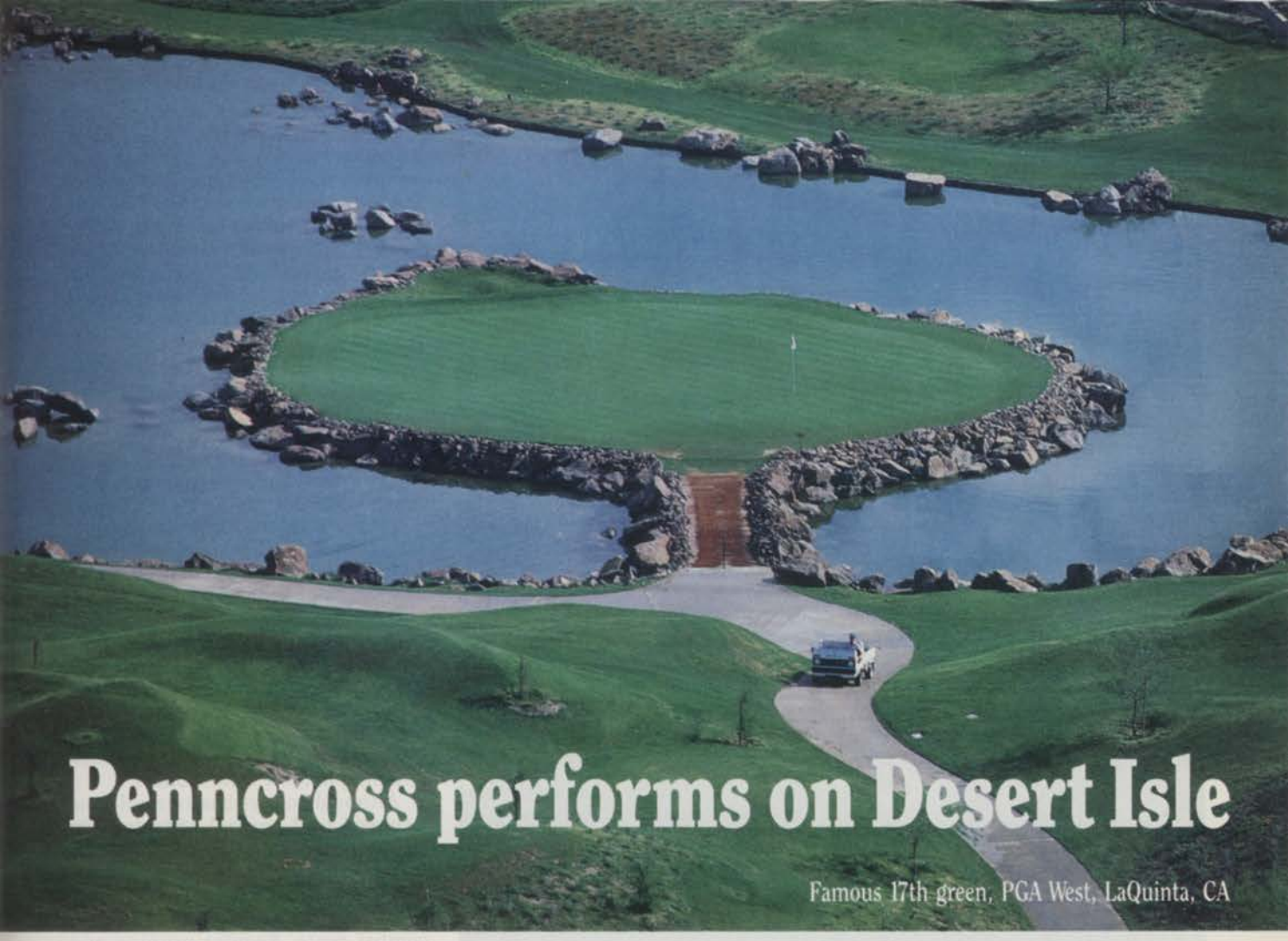

Penncross performs on Desert Isle

Famous 17th green, PGA West, LaQuinta, CA

Penncross not only survives, but thrives on all 18 greens at this innovative Pete Dye designed course.

You've seen this awesome 17th green in pictures, or maybe you've had the good fortune of playing this 147 yard challenge, but we're reasonably sure you didn't know that it's Penncross creeping bentgrass. Television announcers won't tell you and magazines don't print it, but the putting greens that have made more champions on some of the greatest courses in the world are Penncross.

PGA West is a revolutionary new course with target greens, stadium spectator mounds and punishing hazards. Why would such an innovative designer use a strain of bentgrass that's been around for so many years?* We maintain that there is no better all-around bentgrass anywhere!

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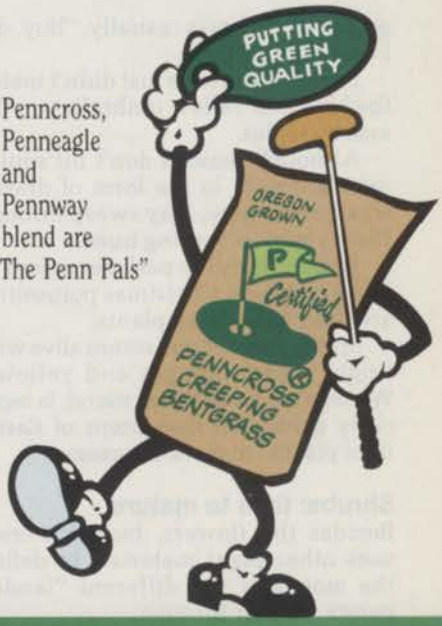
Pete Dye specified Penncross for *this* desert isle, as he did for his famous Sawgrass island green in Ponte Vedra, Florida. Penncross is no ordinary putting green grass . . . and Pete Dye is no ordinary designer.

Watch Penncross perform in the *Skins Game* at PGA West, Nov. 29 and 30, 1986.



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*Penncross is a tried and true cultivar developed by Professor Burt Musser at Penn State University and released in 1955.

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Disneyland's landscape superintendent Ken Inouye shows off a topiary hippo near the "It's A Small World" ride in Fantasyland.

got bored," he says casually. "Boy, did I hear about it!"

Seems the orange just didn't match the blue and yellow umbrellas on the nearby tables.

Although seasons don't hit southern California in the form of drastic weather changes, they sweep through Disneyland in varying hues.

Winter finds the park decorated in blues and reds. Christmas poinsettias are used as bedding plants.

Spring and summer comes alive with bright pinks, oranges and yellows. White, a color used year round, is especially evident in the dozens of Easter lilies planted to mark the season.

Shrubs: time to mature

Besides the flowers, Inouye's crew uses other plant materials to define the moods of the different "lands" guests wander through.

Tomorrowland's shrubs are pruned in futuristic geometric shapes.

Frontierland, sporting a rugged look, could pass as the backdrop of an old John Wayne flick. The drought-tolerant ornamental grass, pennisetum, at the entrance to Frontierland adds to the wild West look.

Few aren't charmed by the topiary animals found near the "It's A Small World" ride in Fantasyland. The shrubs, shaped into elephants, hippos and the like, take five to 15 years to develop.

The animals are made from a variety of shrubs such as junipers, including Armstrong and Sea Spray.

All in all, Disneyland has nine acres of shrub areas.

Fantasyland also boasts one of the two areas of the park which Inouye considers his biggest challenge. Storybook Land could be a horticulturist's nightmare, but to Inouye it's a dream.

Spectators take a boat ride through the mouth of a whale into the miniaturized land. The landscaping is designed on a one-tenth scale.

A three-inch weed on such a scale is magnified to look like a 10-foot giant against a three-inch house. "It's one of the higher maintenance areas," he says.

The dwarf albeta spruces in Storybook Land developed when their roots were confined by a glacier. Tree roots are kept confined in metal containers to slow foliar growth. The trees live about five years.

"Turf" in Storybook Land ranges from Irish moss to Korean grass. Patchwork gardens display about 25 plant varieties of different colors and textures. At a distance the gardens look like someone spread Grandma's homemade quilt on the river's bank.

Inouye's crew is also responsible for maintaining the river and the 17 million gallons of circulating water used on rides in the park.

"We use chemicals in the waterways, but nothing stronger than pool chlorine," Inouye explains. "We dye it to make it look dirty."

Inouye tries to avoid using any toxic plant materials or chemicals in the park. After all, children will stick anything in their little mouths.

Although Inouye has four full-time licensed pest control operators on staff, he tries to use cultural methods for controlling insects.

One way of doing this is by using plant varieties with a natural ability to combat pests. Regular pruning and keeping dead foliage off trees also helps prevent infestations.

When a problem does occur, often spraying a plant with untreated water will work just as well as chemicals.

Did you know?

Disneyland is not without its share of cocktail party trivia. Like, did you know that the Phoenix reclinata palm trees usually in front of Space Mountain (they're now awaiting a new home because of remodeling) once belonged to Cecil B. DeMille?

Or, that the wood preventing the beautiful *lepto spirma* tree from falling into the water surrounding Sleeping Beauty's Castle is from a Mexican ironwood, one of the few woods which won't deteriorate in water?

Or, that the "original" live Swiss Family Robinson tree is still growing only a few miles from Disneyland? (Rather than move the tree, they built a concrete ficus, but got the striatia going the wrong way in the process).

Well, Inouye confesses, working at Disneyland is bound to make even a landscape superintendent a great storyteller. **WT&T**

Photographs and "Disneyland" logo provided courtesy of Walt Disney Productions.

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1986 GUIDE TO:

TURF, TREE & ORNAMENTAL FERTILIZATION

by Richard Rathjens and Roger Funk, Ph.D., The Davey Co.

TURF FERTILIZATION

Frequently overlooked in determining a fertilizer program are nutrient influences on carbohydrate reserves, root growth and the plant's ability to tolerate disease and environmental stress.

Time of application

Good timing of fertilizer applications builds carbohydrate reserves and promotes root development. The response of warm-season and cool-season turfgrasses differs.

The major cool-season turfgrasses (bluegrass, perennial ryegrass, fescue, and bentgrass) initiate and develop root systems in the early spring and fall. Fall nitrogen applications will increase carbohydrate reserves and root growth. It also improves turf density by promoting greater rhizome and tiller growth.

In addition to regular fall fertilization (September-early October), a relatively new concept known as late fall or late-season fertilization is being included in many maintenance programs. Late fall fertilization is applied when shoot growth slows or around the time of the season's last regular mowing.

Nitrogen applied at this time aids the photosynthetic production of carbohydrates. These carbohydrates are stored for use the following growing season, providing earlier spring green-up and an energy source for turfgrasses to recuperate from stresses.

Another reason for late fall fertilization is to reduce the need for high amounts of spring-applied nitrogen. Too much spring fertilization can actually reduce carbohydrate reserves and root development by inciting rapid shoot growth. This is because growing shoots take priority over roots for carbohydrate use.

Both spring and summer fertilization is used to maintain the color and density produced by fall and late fall fertilization the previous year. Fertilization at these times should not produce succulent plant tissue which can increase the severity of turfgrass disease and reduce the plant's ability to withstand heat, drought, mowing or wear stress.

Potassium applications contribute to the plant's hardiness and help "temper" the stimulating effects of nitrogen applications.

In contrast, most root growth in warm season grasses—such as bermuda, zoysia, and St. Augustine—occurs in spring and summer. Fertilization during these periods stimulates root growth. However, only moderate early spring applications should be used in areas where warm-season grasses go dormant in winter.

The roots of bermudagrass and St. Augustinegrass die in the spring following green-up. Heavy fertilization in early spring may result in more stress during this critical survival period.

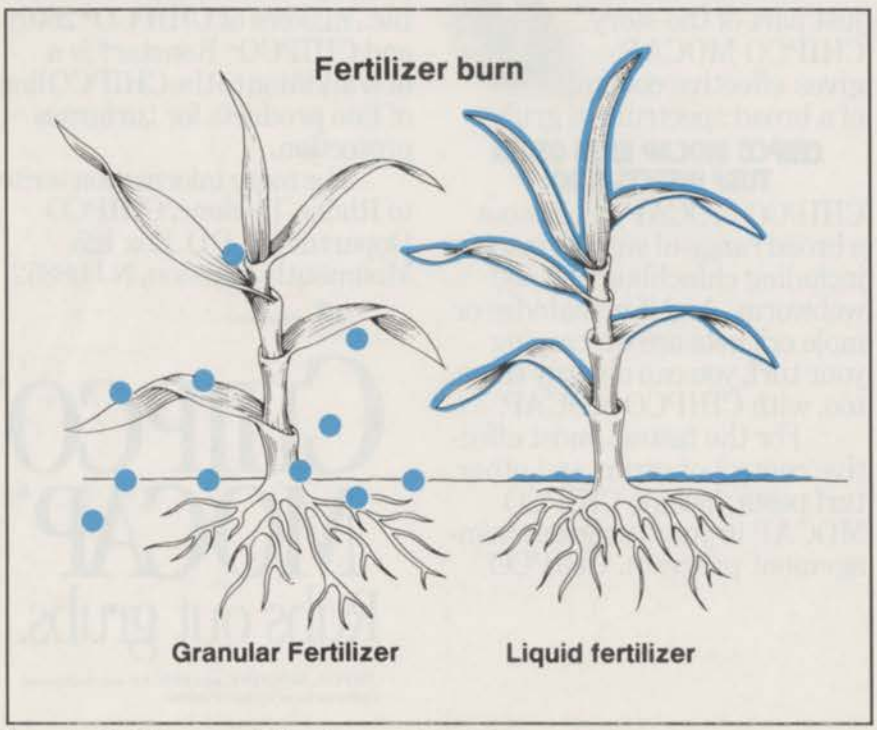
Like cool-season turfgrasses, warm-season grasses accumulate carbohydrate reserves in the fall when shoot growth slows. Care must be taken with the timing of fall fertilization since it may decrease low temperature hardiness if applied late.

Maintaining proper potassium levels in the fall will increase tolerance to low temperatures. As with cool-season turfgrasses, too much summer nitrogen fertilization can increase injury of warm-season grass subjected to stresses.

Maintaining adequate soil potassium levels will help warm-season

continued on page 28

Rathjens is senior agronomist and Funk vice president of technical and human resources for The Davey Co., Kent, Ohio.



Granular fertilizers may fall to the ground; liquids coat the plant, thus increasing burn.

"Nutriculture™ lets me fertilize all year without fear of burning"

Even in the hottest, driest weather, Dave Tooley knows he can rely on Nutriculture water-soluble fertilizer to help keep his greens and fairways in optimum condition, without fear of burning.

"Nutriculture is part of my weekly fertilizer program. We apply it in light amounts, with other chemicals. Nutriculture's tank compatibility with pesticides and herbicides makes application easier and saves me time...and because it's totally soluble, you have complete control over the release of nutrients. You know what's going to happen. My greens have the same healthy look from season start to season end."

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"Nutriculture is a high-concentrate fertilizer, so it doesn't take a lot to do the job," says Tooley. "It would take three bags of any other fertilizer to do the job of one bag of Nutriculture."

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—Dave Tooley
Superintendent
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WEEDONE® brand DPC AMINE herbicide is a fifty-fifty mix of 2,4-D and dichlorprop. It's a non-volatile amine salt formulation that stays where you spray. WEEDONE® DPC AMINE gives effective weed control but without dicamba or MCPP–which can injure sensitive ornamental and turf grass species.

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And you can tank-mix with fertilizers for 'weed and feed' treatment.

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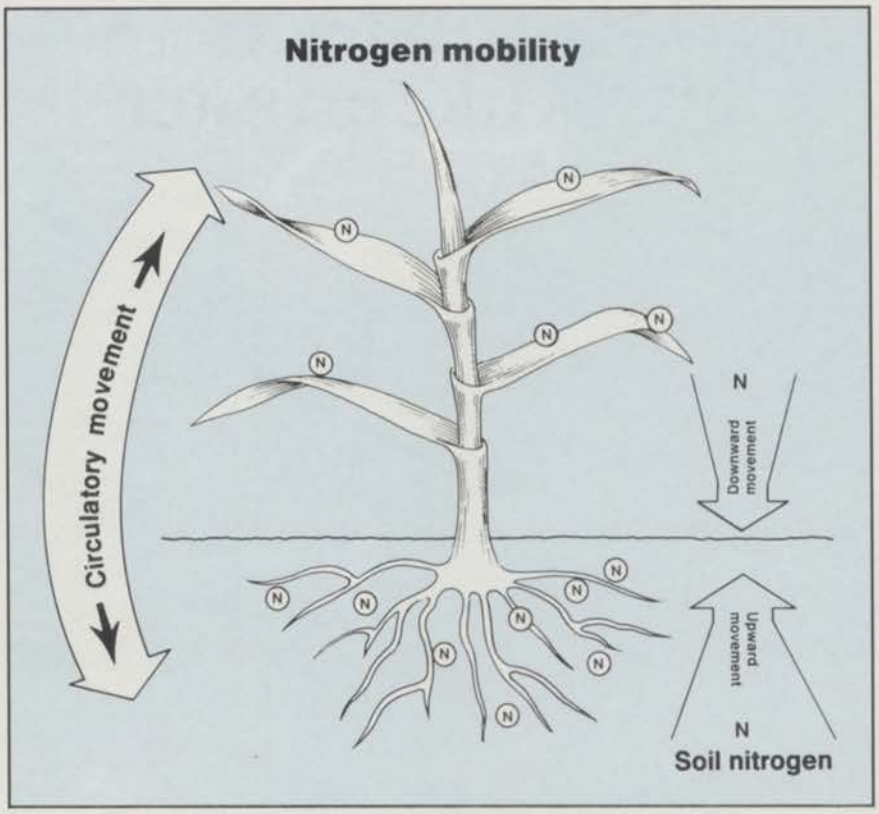
From the turf care group at Union Carbide



Circulatory movement: upward in the xylem, downward in the phloem.

turf's tolerance to heat, cold, mowing and wear stresses, and reduce susceptibility to turfgrass diseases.

Rate of fertilization

To determine annual nitrogen requirement (pounds per 1,000 sq. ft.), several factors should be considered: length of growing season, degree of quality desired, purpose for which the turf is used, and the species and cultivars present.

Growing season length (time between the last killing frost in the spring to the first in the fall) varies. Along the Gulf of Mexico and in certain areas of Arizona and California, it exceeds eight months. Portions of Maine and Minnesota, however, have as little as three and a half months. The longer the growing season's length, the more nitrogen is needed to maintain turfgrass quality.

The rate of fertilization can be tailored to meet different expectations in quality. A home lawn maintained for aesthetic purposes, for example, can range from a weed-free turf of acceptable color and density to a season-long turf of premium appearance.

The turf's purpose, whether for aesthetics or recreation, will also influence the nitrogen fertility level. The fertilization rate of bentgrass, for instance, can vary from four to 10 pounds of nitrogen per 1,000 sq. ft. Lower rates may be used for a pleasing appearance on a home lawn while higher rates can maximize a putting green's playability.

Research shows turf response is equal regardless of the method of (fertilizer) application with sources like urea.

Turfgrass species and cultivars can vary in amount of nitrogen needed for maximum quality. Sheeps, hard, and red fescues require a low level; Kentucky bluegrass a medium level; and bentgrass a high level of fertility. Improved cultivars of bermudagrass need more nitrogen than common bermuda.

Cultural practices like irrigation and clipping removal may require more nitrogen per year to keep the desired turfgrass quality. Supplemental watering will increase the rate at which nitrogen is leached from the root zone. Losses can be substantial when quick-release nitrogen sources are applied to sandy soils.

Clipping collection following mowing has been estimated to remove about 20 percent of the nitrogen applied to turfgrass. Using more nitrogen may be necessary to maintain quality when collecting clippings.

Phosphorus and potassium have been routinely applied along with nitrogen using fertilizer with ratios such as 3:1:2, 5:1:2 or 4:1:1. These ratios are based on the relative amounts of nitrogen, phosphorus, and potassium found in turfgrass clippings, but do not take into consideration the levels in the soil.

Their use should be based on a soil test. Many soils contain high levels of phosphorus and little, if any, response is obtained by applying more phosphorus.

Two factors to be considered in making individual nitrogen applications are source and time of year.

Quick-release nitrogen sources (for example, ammonium nitrate and urea) are commonly limited to no more than one pound of nitrogen per 1,000 sq. ft. This rule of thumb is followed in spring and fall to avoid excessive shoot growth. For this same reason, summer applications using quick-release sources are often limited to no more than one-half pound of nitrogen per 1,000 sq. ft. Lower rates of quick-release sources also minimize the possibility of fertilizer burn.

Method of application

Fertilizers can be applied in either dry or liquid forms. Research shows turf response is equal regardless of the method of application with nitrogen sources like urea. The application method then may be determined by the turf manager's perception of productivity and personal preference.

Two types of spreaders are used to apply granular (dry) fertilizers: gravity and centrifugal.

With the gravity (drop) spreader, fertilizer is held in a trough and agitated by a mixing bar connected to the wheels. The fertilizer is dropped through a series of slots to the turf below in defined swaths.

The centrifugal (broadcast) spreader is commonly used by commercial turf managers because it applies a wider swath of material and can treat large areas more quickly. It features a hopper with the fertilizer falling through a hole (or series of holes) onto a spinning disk which propels fertilizer ahead and to the

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