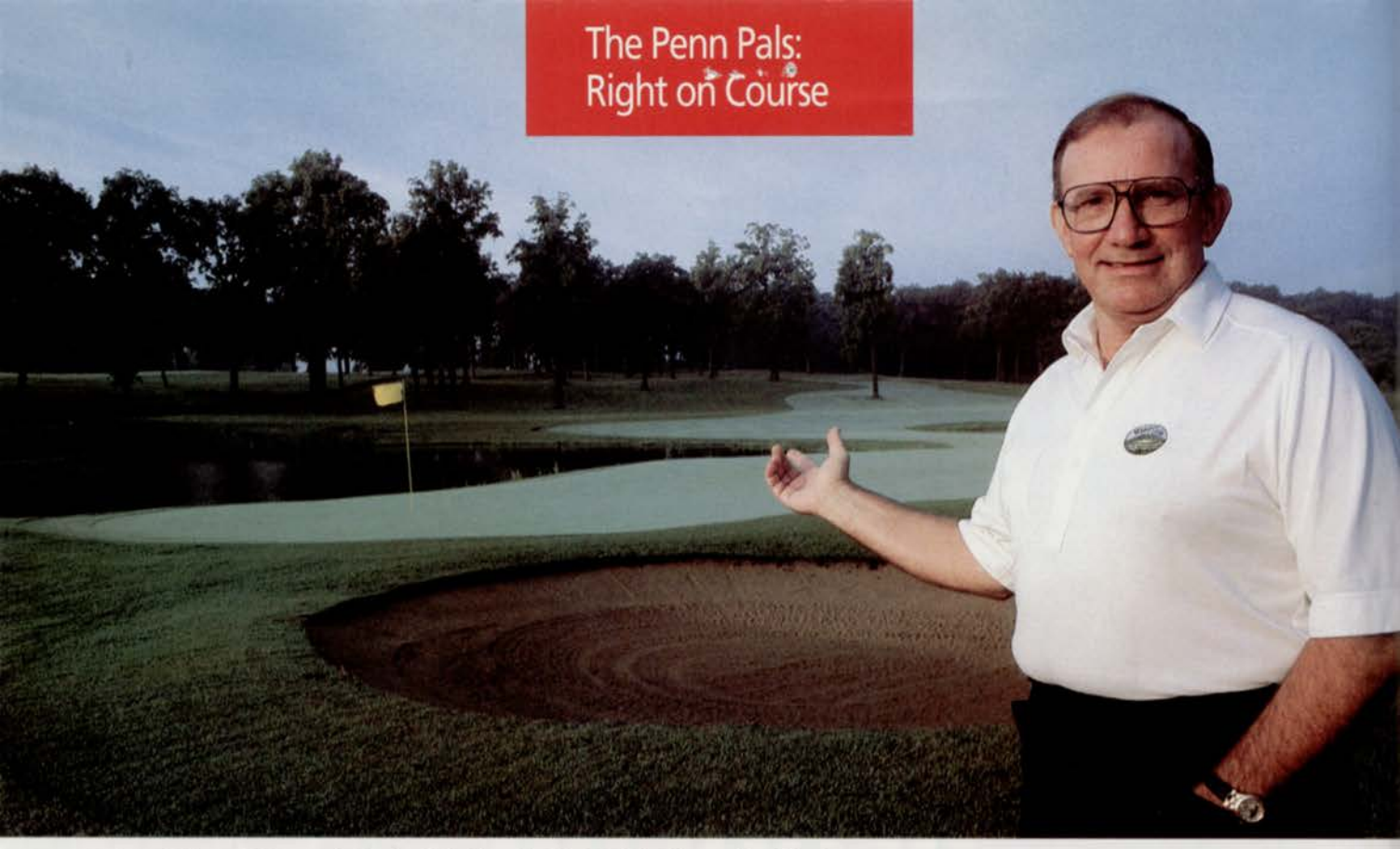
The Penn Pals:
Right on Course



Oscar Miles, CGCS, overlooks the 6th hole at the Merit Club, Libertyville, Illinois.

PennLinks Greens. Penneagle Fairways. Penncross Tees. The 'Penn Pals' Are Picture Perfect At The Merit Club.

Superintendent Oscar Miles, with Club President Ed Oldfield's affirmation, specified all the grassing of this Robert M. Lohmann designed club. With a clean canvas and open palette, Oscar began with PennLinks greens, Penneagle fairways and Penncross tees, framing them with bluegrass/fine fescue/wildflower and prairiegrass roughs. You couldn't paint a more attractive picture.

Oscar chose PennLinks greens for its rapid establishment, marvelous root system, a crown and stolons that take topdressing, upright, grainless qualities and good, consistent color ... the best putting surface available.

He selected Penncross for tees because they recover from divot scars more quickly.

And the Penneagle fairways? Oscar chose Penneagle for its upright growth, reduced thatch development, low nitrogen requirement and good drought and dollar spot resistance. He seeded at 80 lbs. per acre for immediate turf development and erosion control. The fairways were playable in 8 weeks. Oscar's crew usually mows fairways in the evening and leaves the clippings; recycling nutrients while reducing removal and fertilizer costs.

Oscar articulates it best: "The unique coloring of the 'Penn Pals' contrasts beautifully with the grassing around them, defining the target areas. And with the dew on the bents early in the morning, they're a marvelous work of art."

Oscar L. Miles

AS WE SEE IT

JERRY ROCHE, EDITOR-IN-CHIEF

One thing is for certain: changes are constant here

MANY OF YOU who have begun customizing your agronomic programs—by fairway or by customer—will find LANDSCAPE MANAGEMENT's latest innovation easy to understand.

You might have noticed a subtle change in last month's issue, one that's even more evident this month:

Henceforth, if you're a lawn or landscape contractor, you'll receive an expanded "Lawn & Landscape Industry" (formerly "Lawn Care Industry") section with each new issue. If you're a golf course superintendent or athletic field supervisor, you'll receive an expanded "Golf & Athletic Turf" (formerly "Golf 'Scaping") section.

Each of these sections is designed for, and written to, its specific audiences. Lawn and landscape contractors no longer have to shuffle through stories about killing *Poa annua* on fairways, and superintendents won't have to worry about reading articles on getting loans from banks.

We've "personalized" the magazine to your particular tastes. We'll be printing two editions (they're called "demographics" in the magazine business) each month, only one of which you'll receive in the mail. But your personalized edition will be more targeted to your type of operation—not only in the articles we provide, but also in the advertisements.

The largest portion of the magazine, however, will remain the same. Every month, you'll still be able to read "LM Reports," Dr. Bal Rao's popular "Ask the Expert" column, "Hot Topics" and "Product Showcase." And you'll still see the best of the university researchers writing in our "Tech Center" section each month.

It's been a little more than seven years since we changed our name from *Weeds Trees & Turf*. It's been exactly three years since we changed our format (shorter articles, more charts and graphs) to better suit your needs. Just 10 months ago, we unveiled our new-look cover with the snappy green border to separate us from all those other nameless magazines you receive in the mail every month.

With this newest, bold step toward highly-defined "demographic" editions, we feel we're continuing to fine-tune the magazine. We think you'll like the changes.

ON ANOTHER NOTE: You can watch for a series of definitive articles on the "State of the Green Industry" (last published in 1991) in upcoming months.

Last month we mailed questionnaires to 1,000 lawn care operators across the country to help us prepare for our annual **"State of the Lawn Care Industry"** report, which will appear next month.

And this year, it'll also be the kick-off to three other such reports.

Our December issue will feature a "State of the Industry" report on **athletic field maintenance**. Our January issue will deal with the **landscape maintenance** portion of the industry. And, finally, our mammoth February issue will contain a **"State of the Golf Maintenance Industry"** report.

We'll be mailing out 3,000 short questionnaires to readers in the next few months. If you receive one, we ask you to take five minutes to fill it out and promptly return it to us.

As always, your cooperation on these important projects can only help make a great magazine even better! Thanks!

Jerry Roche

LANDSCAPE MANAGEMENT
"WE KNOW YOUR TURF"

OCTOBER 1994 VOL. 33, NO. 10

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38 Electing new leaders

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Ron Hall

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BPA ABP

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ASK THE EXPERT

DR. BALAKRISHNA RAO

Azalea troubleshoot

What would cause azaleas that have been in the ground for several years to begin to look bad? *(Pennsylvania)*

Solution: In your part of the country, azaleas can develop a number of problems: mites, lacebugs, phytopthora root rot and iron deficiency chlorosis.

They are also sensitive to extremes in moisture and/or temperature. Consider the possibility of exposure to drought since 1988. Also, last year's winter sub-zero temperatures affected a number of shrubs, including azalea.

Stress will weaken the plants and make them vulnerable to a number of pest problems. If the soil pH is high (alkaline), micronutrients—particularly iron—will be tied up in soil and will be deficient in leaves, resulting in chlorosis.

Apply mite and lacebug control as needed. If you are considering using Dursban, use Dursban WP instead of the EC formulation. Azaleas are phytotoxic to the EC formulation. For root rot disease management, consider using fungicides such as Subdue or Aliette.

- For micronutrient disorder, have the leaves and soil tested to determine the deficient element. Then provide the corrective treatment as needed.
- Drought or low temperature injuries are difficult to diagnose, particularly if considerable time has elapsed since the injury occurred. However, clues such as the time the symptoms appeared, plant exposure, whether or not the damage is confined to specific plants or species, and whether or not there is a clear time of demarcation between damaged and undamaged tissues help establish the cause.

Will Epsom salts cure chlorosis?

One of our customers asked whether Epsom salts can be used to correct chlorosis in maple trees. What is your opinion? *(Michigan)*

Solution: Yes—if the chlorosis is caused by a magnesium deficiency. Epsom salts contain magnesium sulfate. They are recommended for trees having chlorosis problems caused by low magnesium levels.

Generally, if the pH needs to be increased, an application of dolomitic limestone, which contains magnesium carbonate and calcium carbonate, is recommended.

Soil in your area may have a naturally high pH. If so, an application of dolomitic limestone is *not advisable.*

Under high pH alkaline soil conditions, micronutrients such as manganese and/or iron would tie up in soil, even if they are present in sufficient amounts. Generally, in the Northeast, manganese is the primary deficient element in maple chlorosis disorder. I believe someone might have mistaken magnesium for manganese and suggested Epsom salts.

The best thing to do is to have a foliar and soil nutrient analysis. Correct the problem according to test results.

Curing dieback on Bolleana poplar

A large number of Bolleana poplar trees are showing extensive dieback and decline. We were told that these trees are supposed to be resistant to cankers. However, we see a large number of cankers. How can we treat these problems? *(Tennessee)*

Solution: The Bolleana poplar (*Populus alba* 'Pyramidalis') has often been used to replaced the less hardy Lombardy poplar. Its narrow, upright form makes it a popular screening tree.

However, it is relatively short-lived and is subject to canker diseases. It also produces a lot of suckers, especially when a live tree is cut down. It is very fast growing.

The fungal organisms which cause cankers establish on stressed, weakened trees. The past several years' drought has adversely affected a number of trees. Maturing poplar plants, when exposed to extremes in moisture and/or temperature stress, will be susceptible to canker diseases.

Poplar plants are susceptible to several fungal canker diseases such as cytospora canker *(Cytospora chyrysosperma)*; poplar canker *(Cryptodiaphorthe populea)*; imperfect stage *(Dothichiza populea)*; fusarium canker *(Fusarium solani)*; or hypoxylon canker *(Hypoxylon pruinatum)*. To further identify causal agents, a laboratory diagnosis is needed.

Canker diseases are difficult to manage. There are no fungicides registered to manage this problem. Remove and destroy severely diseased plants. Selectively prune diseased plant parts, water, mulch, fertilize and provide pest management as needed to improve plant health and vitality.

Necrotic ring spot

Problem: What fungicides can be used to manage necrotic ring spot, and when is it the best time to treat it? *(Canada)*

Solution: For necrotic ring spot disease on turfgrass, reports indicate that fungicides such as Banner, Rubigan or Tersan 1991 should be used.

Check with your Ministry of Environment about the availability of Banner and Rubigan in Canada. Also check your Tersan 1991 label to see whether the product can be used for necrotic ring spot in your area.

Follow good cultural practices such as proper mowing, watering, fertilizing and aerifying to improve turfgrass health.

Dr. Balakrishna Rao is Manager of Research and Technical Development for the Davey Tree Co., Kent, Ohio.

Mail questions to "Ask the Expert," LANDSCAPE MANAGEMENT, 7500 Old Oak Blvd., Cleveland, OH 44130. Please allow two to three months for an answer to appear in the magazine.

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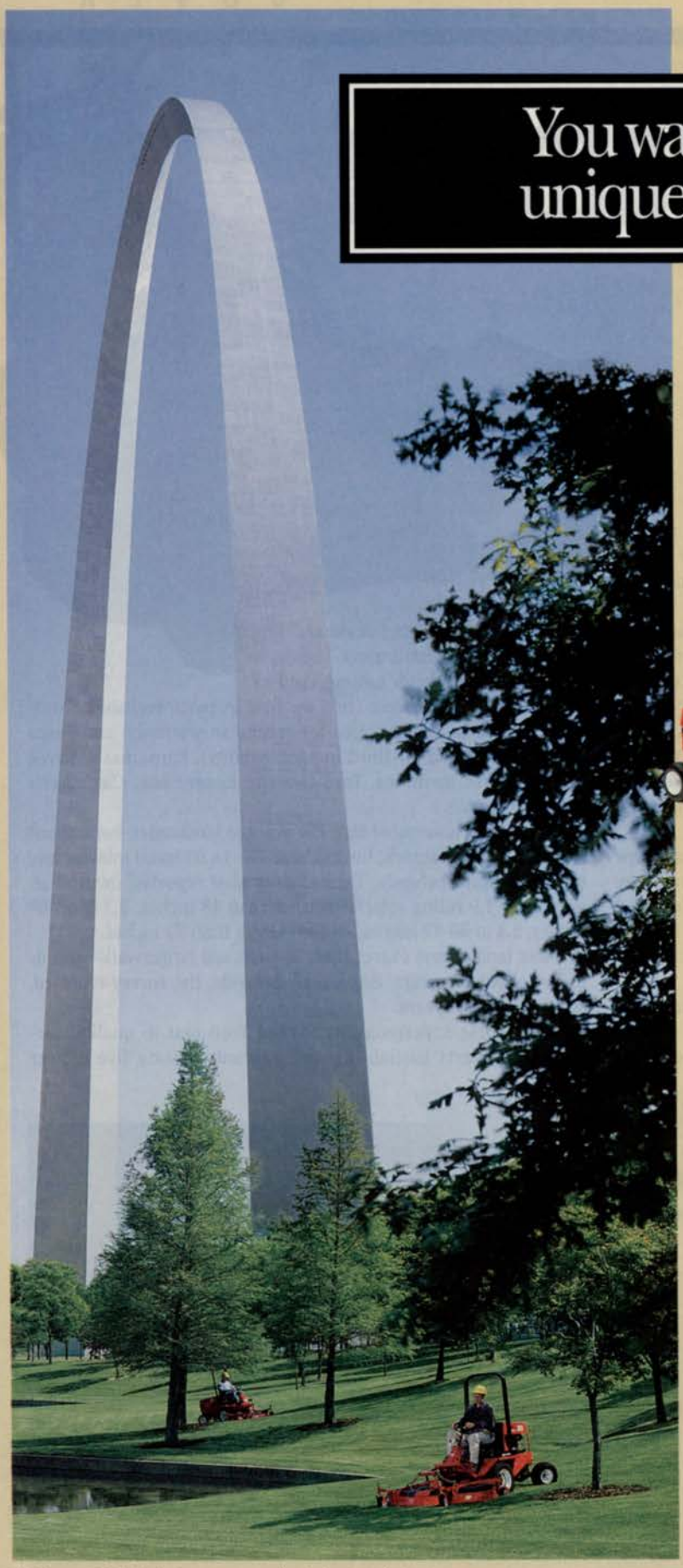

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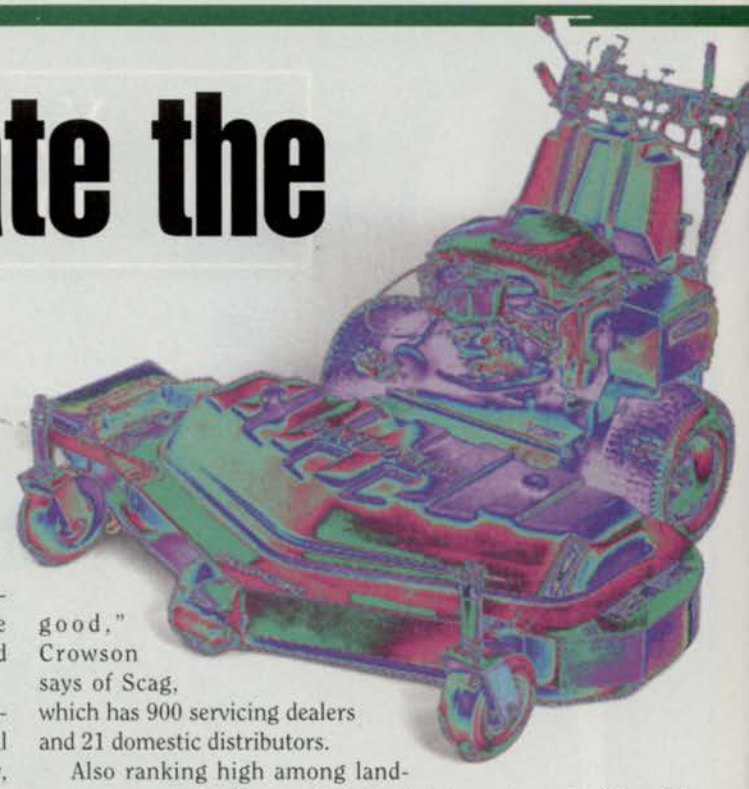

What's most important to you? Quality? Price? Serviceability? Here's what landscapers and golf superintendents think of today's mowing equipment.

■ Scag is the favorite make of mowers in the landscape maintenance market, and Toro takes top honors among golf course superintendents, according to an exclusive survey commissioned by LANDSCAPE MANAGEMENT magazine this summer.

In four of six categories, Scag was ranked by landscape contractors as being number one among 11 brands of commercial mowing equipment. Those four categories: quality, serviceability, dealer/distributor support and warranty.

"This is very gratifying to hear," says John Crowson, Scag's national sales manager. "Durability and serviceability are two attributes that we've worked very hard toward. For the professional lawn cutter, it's so critical to keep the machines out in the field and not have to deal with downtime."

Six hundred LM readers who identify themselves as landscape contractors were polled by an independent research firm. They were asked to rate each of the manufacturers on a scale of 1.0 (very good) to 5.0 (poor) in the six categories of quality, serviceability, parts availability, dealer/distributor support, warranty and price.

Scag's scores of 1.5 in quality, 1.4 in serviceability and 1.9 in warranty far exceeded any of the other manufacturers.

"For a little company in Wisconsin, we get out there pretty good," Crowson says of Scag, which has 900 servicing dealers and 21 domestic distributors.

Also ranking high among landscapers were John Deere (tied for first in parts availability with Scag, second in support, tied for second in warranty) and Lesco (first in price, tied for third in serviceability). Ransomes received four top-three mentions, Toro two and Encore one. *(See charts below for results.)*

The survey also noted that the average landscaper owns about four small walk-behinds, five midsize (30- to 60-inch) mowers and two large walk-behinds. Landscapers also reported owning an average of 1.9 riding rotaries smaller than 48 inches, 2.3 of 48-60 inches, 2.4 of 60-72 inches, and 1.9 larger than 72 inches.

Most landscapers expect their 30-inch and larger walk-behinds to last about 5.5 years. Small walk-behinds, the survey reported, last just over 3.5 years.

Golf course superintendents voted Toro best in quality, serviceability, parts availability and warranty among five mower

LANDSCAPERS RATE...

FOR QUALITY:

1. Scag	1.5
2. Toro	1.7
3. Ransomes	1.8

FOR WARRANTY:

1. Scag	1.9
2. Encore	2.1
Deere	2.1

FOR PARTS AVAILABILITY:

1. Deere	1.8
Scag	1.8
3. Toro	1.9

FOR PRICE:

1. Lesco	2.1
2. Ransomes	2.2
3. Jacobsen	2.4
Scag	2.4

FOR SERVICEABILITY:

1. Scag	1.4
2. Toro	1.8
3. Ransomes	1.9
Lesco	1.9

FOR D/D SUPPORT:

1. Scag	2.0
2. Deere	2.1
3. Ransomes	2.3

MOWERS

brands included in the golf portion of the survey. Toro's raw score of 1.5 in quality was best by far.

"When you put the whole package together, you're talking about a commitment to the customer by Toro and its distributors," says Toro director of marketing Denny Brown. "Our theme line is 'helping you put quality into play,' but [service, parts, warranty] are all important elements of our sales and marketing philosophy."

Jacobsen and Deere also received outstanding marks from the superintendents in most categories. *(See charts at right for results.)*

According to the survey, the average golf course owns about four walking greensmowers, three riding greensmowers, two or three triplexes and about two five-gang mowers. The survey also noted that superintendents expect most mowing equipment to last 7.5 to 8 years, with walking greensmowers lasting an average of nine years.

—Jerry Roche

How important is?...

Quality: that one word that means so many different things to so many different people, is the most influential factor in selecting mowing equipment, according to LANDSCAPE MANAGEMENT's mowing equipment study.

Eighty-nine percent of all landscapers said quality is "very influential" in the buying decision; 84 percent of the golf course superintendents concurred.

Next most influential factor among landscapers is serviceability (69%) while parts availability is second-most important among superintendents (58.9%).

Interestingly, price was listed fifth of six factors influencing the buying decisions of landscapers. It was listed fifth of seven listed by superintendents.

Here are the number of respondents listing the following factors as being "very influential" in deciding which brand of mowers to purchase:

—J.R.

LANDSCAPERS	GOLF COURSE SUPERS
1. Quality (89%)	1. Quality (84%)
2. Serviceability (69%)	2. Parts availability (59%)
3. Parts availability (63%)	3. Serviceability (59%)
4. Dealer/distributor support (53%)	4. Dealer/distributor support (46%)
5. Price (31%)	5. Price (35%)
6. Warranty (27%)	6. Warranty (26%)
	7. Brand name (13%)

GOLF SUPERS RATE...

FOR QUALITY:

1. Toro 1.5
2. Jacobsen 1.8
3. Deere 2.1

FOR PARTS AVAILABILITY:

1. Toro 1.9
2. Jacobsen 2.1
3. Deere 2.4

FOR PRICE:

1. National 2.2
2. Lesco 2.3
3. Jacobsen 2.5

FOR WARRANTY:

1. Toro 2.0
2. Jacobsen 2.2
3. Deere 2.3

FOR SERVICEABILITY:

1. Toro 1.9
2. Jacobsen 2.1
3. Deere 2.3

FOR D/D SUPPORT:

1. Jacobsen 2.0
2. Toro 2.2
3. Deere 2.5

Turf pros respond to biostimulants

■ Biostimulants improve turfgrass vigor. Their effect is most observable on stressed turfgrass. Exactly how they do this is being researched.

A decade ago, many turfgrass professionals scoffed at the idea of spraying something like processed seaweed extract on turfgrass. They're listening now. And they're also buying so-called plant biostimulants in record amounts.

Emerald Isle says it began selling PanaSea to turf pros 16 years ago. "For the first years of our company we spent all of our time creating awareness that biostimulants could be useful," says company spokesman Doug Middleton.

Now, as many as 15 companies may be selling them to turfgrass managers. This rush started after Roots Inc., New Haven, Conn., initiated a strong marketing campaign about seven years ago. The company, using independent research, documented *real* benefits to turfgrass (trees and shrubs, too) with its product. That opened eyes. Even competitors admit that Roots helped legitimize and broaden the use of biostimulants for turfgrass.

But really, what is a biostimulant?

"For marketing purposes, the industry started describing these products as stimulators and the word 'bio' got put on it too. It stuck and it's descriptive," says Dr. R.E. "Dick" Schmidt. "We could call them stimulative growth regulators. That would probably be more accurate, but that's a mouthful."

Many people loosely describe biostimulants as products that contain plant hormones, often—but not always—along with other growth enhancement ingredients. (Some more broadly include *non*-hormone, nonnutritive growth stimulators, too.)

All plants produce hormones. Three of a plant's five hormones stimulate growth—auxin, gibberellins, and cytokinin. Cytokinin is the hormone most commonly found in manufactured biostimulants, although some contain trace amounts of the others too. The most popular natural source of cytokinin is seaweed.

Schmidt's research at Virginia Polytechnic Institute helped popularize biostimulants. Others like Drs. Michael Goatley of Mississippi State, Dr. Keith Karnok of Georgia and Dr. Tom Turner of Maryland added to Schmidt's data.

Companies claim, in varying degrees, that their respective products:

- improve turfgrass rooting
- improve drought resistance
- provide a level of salt tolerance
- improve plant density and color
- decrease nutrient requirements

How well, and under what conditions, they provide *all* of these benefits is still being sorted out.

"It's probably not the product itself that's the reason for any skepticism. It's the claims surrounding the product," says Johnny McRight, McRight Agri-Management, Greenville, Miss.

Adds William Byrnes, president of Floratine Products Group, Memphis, Tenn., "Unfortunately, a salesman's first inclination is to say that their product will solve all problems all the time and, of course, that's impossible."

The theory behind adding biostimulants to turf is simple, says Byrnes. During periods of stress, turfgrass depletes its supply of hormones and welcomes a boost from an outside source. That's when biostimulants produce visible and positive results.

"We're not trying to change what the plant does. We're simply trying to help it do what it does naturally."

End users typically spray biostimulants onto turfgrass. They can be applied alone, with fertilizer, or with iron. Schmidt favors biostimulants with iron.

"You end up with more root biomass; more root biomass tranlates into more root-to-soil contact for mineral and water uptake," says Jim Schaefer, president of Soil Technologies, Fairfield, Iowa.

Several products marketed to turfgrass managers also contain "growth-enhancing" substances in addition to hormones. Iron, nitrogen-fixing bacteria, sugars, and humic acid are not uncommon. Build healthier soil and grow healthier turfgrass, say producers of these products, adding that these products boost populations of beneficial microorganisms, make nutrients more available for uptake, create more pore

Dale Minick, superintendent at Kirtland Country Club near Cleveland, is convinced that biostimulants boost plant health.

'Why quit using it now?'

■ If traffic's not bad, you can drive due east on I-90 from downtown Cleveland to the Kirtland Country Club golf course in about 35 minutes. You trade skyscrapers and steaming manholes for a country estate with freshly mowed turfgrass on rolling hills.

From appearances, you're on a different planet.

Superintendent Dale Minick oversees this greener, quieter world, and his philosophy is: if your turfgrass ain't broke, don't fix it. That's why Minick has used a biostimulant (PanaSea) on the course for the past 12 years.

"I don't want to quit using it and find out why I was using it in the first place," says Minick, superintendent at Kirtland.

"Every time the USGA has come out, they've always commented on the root system of the turfgrass here. I've got to believe the biostimulant is part of that," he says.

Minick's crew sprays the biostimulant, sometimes with fungicide, on 32 acres of fairways and about 6 acres of tees and greens. Tees, greens and fairways are all bentgrass. The course hosts about 17,000 rounds each season. He estimates he spends about $4,000 each year on the biostimulant.

"I don't use it to reduce using something else," says Minick. "I do know that we don't do very much syringing during summer afternoons. I think that has something to do with the biostimulant."

He uses biostimulant on the golf course's perennial gardens too. "There you can really see the root growth because you can pop the flower out and check the roots," he says.

Minick grew up in nearby Kirtland, attended The Ohio State University and has worked at Kirtland CC, in one capacity or another, nearly his entire adult life. A pretty fair golfer in his own right, he's been superintendent at Kirtland the past 15 years.

—Ron Hall

spaces in the soil. Some even contain fertilizer.

"The end users get so darned confused because everybody is calling everything a biostimulant," says Doug Middleton, Emerald Isle.

That might be, but Schaefer of Soil Technologies says there is no going back. He claims turfgrass managers now recognize that their nutrient management programs go beyond N, P, K. "There are more refined, more intelligent approaches to deal to deal with the management of quality turfgrass rather than using nitrogen, a single element, to try to solve so many damn problems." he says.

So far, the most enthusiastic turf users of biostimulants have been golf course superintendents and sod farms, say suppliers. Superintendents regularly apply them to greens, and sometimes tees. The program costs from $1,000-$2,000 a season to the budget of a northern 18-hole course. Some landscapers claim they help transplants recover faster.

Lawn care operators have been slow to incorporate these new products into their programs.

"Their big question is always—can I afford to put this on customers' lawns without charging something extra?" says one supplier.

—Ron Hall

TURF BIOSTIMULANTS

Company	Product	Description
American Colloid Co. **Circle No 311**	Enersol 15%, Enersol SC	Nutritional chemical activator, derived from humic acid; promotes beneficial soil microbes.
Aqua-Aid **Circle No 312**	Aqua-Root Liquid	Soil penetrating, plant stimulant, wetting agent (85%), humic and fulvic acids (15%).
BioPlus Manufacturing, Inc. **Circle No 313**	BioPlus Turf Mix, HV682	TurfMix: biostimulant, micronutrients, wetting agent HV682: vitamins, hormones, PGRs and root growth stimulators.
EcoSoil Systems, Inc. **Circle No 314**	BioJect	System to create healthier turf by fermenting and injecting beneficial microorganisms into the soil.
Emerald Isle Ltd. **Circle No 315**	PanaSea, PanaSea Plus	Liquified sea plant extracts, exclusive extraction processes maximize yield of nutrients, hormones, other beneficial constituents.
Floratine Product Group **Circle No 316**	Astron, Per "34" Max, Knife Renaissance	Formulations for cool, warm-season turfgrass. Unique combinations of essential secondary and micronutrients with naturally-occurring plant extracts complexed in organic acid and sugar compounds.
Growth Products **Circle No 317**	Essential	Carbon-rich organic materials in constructive, usable form for soil, plant, microorganisms.
Huma Gro Turf **Circle No 318**	Start 0-0-0	Creates prime conditions for seed germination and root development. Stimulates beneficial biological organisms to influence the rhizosphere.
Humate International Inc. **Circle No 319**	humate products	Extremely soluble; high percentage of fulvic acid, high cation-exchange capacity.
Lesco **Circle No 320**	BioChoice	EPA-registered formulation of two hormones: auxin and gibberellic acid in a chelated source of essential micronutrients.
McRight Agri-Management, Inc. **Circle No 321**	Turf Touch	Proprietary blend of activated nutrients that are designed to improve growth and activity of microorganisms.
Organic Laboratories, Inc. **Circle No 322**	Biostim	Enriches soil with proteins, carbohydrates, amino acids, humates, enzymes, plant extracts, vitamins, minerals.
Plant BioTech, Inc. **Circle No 323**	Cytogro, CytoFe	Liquid turf biostimulant derived from seaweed extracts with cytokinins and auxins. CytoFe: a formulation containing CytoGro plus 5% iron.
Plant-Wise **Circle No. 324**	3D	A concentrated biostimulant derived from pure quality, cold process seaweed, fortified with proprietary humic acid and beneficial plant growth nutrients.
Regal Chemical Co. **Circle No 325**	Regal Crown	Balanced combination of PGRs prepared in nutrient broth in which selected bacteria, yeast fungi have been grown under strict conditions.
Roots Inc. **Circle No 326**	Roots, IronRoots	Organic plant and soil conditioners with peat humic substances, cold-processed sea kelp extracts, plant co-enzymes and Vitamin B1.
Soil Technologies Corp. **Circle No 327**	Bio-Pro	Warm, cool-season formulas. N-fixing bacteria, seaweed extract, humic acids, plant growth hormones, plant foods.

Source: LM mail and phone survey, August, 1994

Plant bulbs now, and get thanks in the spring

Your customers will love it when, with spring just peeking through the clouds, fall-planted bulbs begin to sprout colorful blooms.

Bulbs planted in pots add vivid color to a landscape site, without disturbing the turf.

■ If your customers would like to have flowers in your yard as early as next January, this is the time to plant bulbs, according to Penn State horticulture professor Dr. J. Robert Nuss.

"They're easy to plant, and they live for years," says Nuss. "Best of all, they start brightening the landscape while it's still late winter."

Spring and early summer flowering bulbs "must be planted in the fall in order to develop a good root system and satisfy the cold requirement of the specific bulb," notes Dr. A.A. De Hertogh of North Carolina State University, writing for the Netherlands FlowerBulb Institute. "In general, it is best to wait until soil temperatures are below 60° F. at the optimal planting depth."

Temperatures play an important role in bulb life, according to De Hertogh.

"When fall-planted bulbs have been purchased but are not yet planted, they should be stored between 55° and 65° F. and in a well-ventilated condition," he notes. "Do not keep them in paper or plastic bags unless specified. If bulbs are to be pre-cooled for (USDA) climatic zones 9 or 10, they should be held at 40-45° F. for 8 to 10 weeks before planting in December."

Nuss and De Hertogh offer several bulb planting suggestions:

- Spring-flowering bulbs can be planted in formal or informal beds, rock gardens and in established ground covers.
- Most prefer partial shade, so avoid planting them where they will receive direct midday sun. Direct southern exposures are also not recommended.
- Heated basement walls can damage bulbs, so plant them at least five feet away from foundations.
- Care should be taken to eliminate all perennial weeds (quackgrass, Johnsongrass, bermudagrass, etc.) before planting.
- "Keep in mind that you can fit a lot of bulbs in one space by planting large bulbs, covering them with two inches of soil and planting small bulbs on top of them," says Nuss. "You can also plant shallow-rooted annuals on top of bulbs."
- Bulbs need good drainage and a high amount of organic matter with soil pH of 6 to 7. So if the soil is mostly sand or clay, mix in peat moss or compost until the organic matter is about 25 percent of the volume.

FOR PLANNING PURPOSES, THE BASIC PLANTING PERIODS ARE:

USDA ZONE	PLANTING PERIOD
3	September
4 and 5	September to early October
6	October
7 and 8	November to early December
9	late November to early December
10	December (primarily pre-cooled bulbs)

- When planting tulips, daffodils and other large bulbs, dig out the whole bed to a depth of about eight inches. Arrange the bulbs six inches apart with the pointed ends up. Smaller bulbs such as crocuses and grape hyacinths can be planted three inches apart and five inches deep.
- De Hertogh says one of two fertilization regimes is best:

  (1) a single fall application of a sulfur-coated slow-release 9-9-6 fertilizer at planting time at a rate of one rounded tablespoon per sq.ft.;

  (2) bone meal incorporated in the rooting area at planting time with an application of 8-8-8 (one level tablespoon per sq.ft.) or 10-10-10 (one rounded teaspoon per sq.ft.) in the fall, followed by a repeat application of the same fertilizer as soon as the shoots break the ground in the spring.
- After placing the bulb, fill the hole. Replace half the soil and water the area thoroughly, add the remaining soil, and water again.
- "A three-inch layer of wood chips, peat moss or bark will retain moisture and keep mud from splashing on the flowers next spring," says Nuss.
- If you anticipate a squirrel or chipmunk problem, spread fine-mesh chicken wire over the soil and apply mulch to keep the pests from digging up the bulbs.
- In the spring or summer, as flowers fade, cut them off so they don't go to seed and rob nourishment from the bulbs.

"The foliage gathers nutrients for the next season's growth, so allow it to completely die before removing it," says Nuss. "Other than these few steps, spring-flowering bulbs don't need much attention. They'll come back year after year, just when winter seems it will never end."

EDITOR'S NOTE: To receive a free, 28-page full-color booklet "Landscaping: Flower Bulbs for Long-Term Planting," write: BULBS, Landscape Management, 7500 Old Oak Blvd., Cleveland, OH 44130. Only the first 100 requests will be honored. These booklets are being provided to LM readers courtesy of the Netherlands FlowerBulb Information Center, Brooklyn, N.Y.

Bulb chart on page 12