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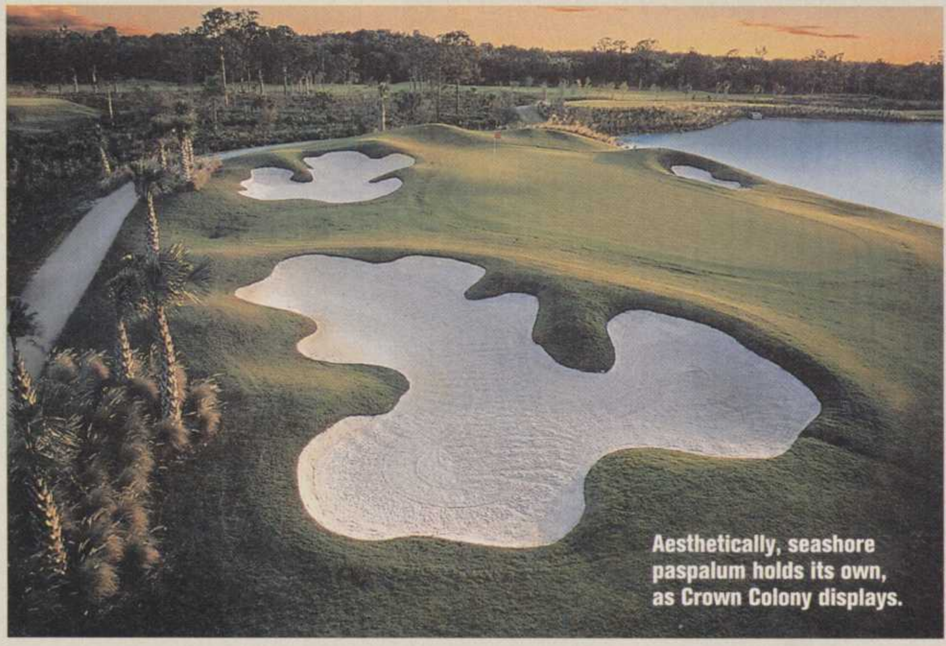
Sure About Seashore

Florida course is the first U.S. track to combine use of the SeaIsle 1 and SeaDwarf varieties of the turf. So far, so good

BY SHANE SHARP



Aesthetically, seashore paspalum holds its own, as Crown Colony displays.

PHOTOS COURTESY OF CROWN COLONY GOLF & CC

Is seashore paspalum the next "New Coke" or the answer to the Southeast's potable water shortage? That's the question the Crown Colony Golf and CC in Fort Meyers, Fla., seeks to answer. In the years to come, the course will be a living experiment for the new turf that can be irrigated with effluent, brackish and even salt water.

Seashore paspalum has raised the eyebrows of golf course owners and superintendents in South Carolina, Georgia and Florida ever since University of Georgia turf scientists Ronny Duncan and Robert Carrow penned *Seashore Paspalum: The Environmental Turfgrass* in 2000, and world-famous course designer Pete Dye used it on his Caso de Campo golf course in the Dominican Republic five years ago. Dye proclaimed paspalum to be the savior of golf in the Caribbean.

What to Do?

Steve Spaugh lost sleep over his decision to use two varieties of seashore paspalum at the Crown Colony Golf & CC in Fort Meyers, Fla.

The Right Call

Spaugh says the turfgrass has performed wonderfully. He wonders why more Florida courses haven't turned to the hearty turf.

Picking paspalum

What's good enough for the islands could turn out to be good enough for the mainland. Seashore paspalum is already in use at a select number of courses in the Southeastern United States, including the Old Collier GC in Naples, Fla. But Crown Colony is the first course in the country to combine use of the SeaIsle 1 and SeaDwarf varieties of seashore paspalum. It's also the first facility to use seashore paspalum by choice instead of necessity.

When Crown Colony was being built last year, the water available to former Crown Colony superintendent Steve Spaugh for irrigating the course contained 1,800 parts per million of salt. A hearty stand of bermudagrass would tolerate this salinity, but Spaugh considered using seashore paspalum, even though the turf is so new and untested in the industry.

"I lost sleep over the decision," Spaugh says. "They had to use [seashore paspalum] at Old Collier. We had a decision to make here, but I had enough input and support from our owners to go for it."

When he decided to use seashore paspalum after exhaustive research, Spaugh used it everywhere — on tees, fairways and greens. Spaugh also discovered seashore paspalum was superior to bermudagrass aesthetically, and could easily be mistaken for the stunning bluegrasses and ryes of the North and Midwest. He found the turf was slightly thatchier than bermuda, but needed significantly less fertilizer to survive.

"The problem wasn't that we didn't have a choice," Spaugh says. "The problem is the risks associated with using a turfgrass variety that doesn't have a long track record. We're not sure how it will fare in the long run."

Lakeland, Fla.-based architect Ron Garl, who designed Crown Colony, says the future of golf in warm climates with potable water issues lies with seashore paspalum. "Some courses

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TURFGRASS TRENDS

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INSECTS

All Grubs Are *Not* Created Equal

By Pat Vittum

Over the years, turf managers have identified white grubs as their most consistent insect pest. To be sure, other insects cause problems as well. Superintendents in the metropolitan New York area are certainly more familiar with the annual bluegrass weevil than they would like, and superintendents in the Southeast lose sleep over mole cricket infestations. But overall, white grubs are more widespread and have a wider impact in turf settings than any other insect, particularly in cool-season turf.

Until recently, white grub management was fairly straightforward. Turf managers had an arsenal of traditional insecticides, most of which were effective against grubs as long as they were applied at the right time and were watered in. But in the last two years, we have seen the elimination of registrations of several standard turf insecticides, including bendiocarb, isofenphos and chlorpyrifos.

> More than ever, turf managers must ascertain which species of grubs may be present in their turf because management strategies vary.

Some of the insecticides that remain on the market must be applied preventively, which limits the opportunity to monitor and react as grub populations develop.

Japanese beetles occur throughout much of the eastern United States, and their grubs can cause significant damage to turf roots. At the same time, several species of white grubs have become noticeably more active and more widespread over the past 10 years. European chafers are now found throughout much of southern New England, especially within 30 miles of Boston. Oriental beetles are found throughout coastal New England, Long Island and New Jersey.

Asiatic garden beetles are on the increase throughout the Northeast. Masked chafers are widely distributed throughout the Midwest and Plains states.

More than ever, turf managers must ascertain which species of grubs may be present because management strategies vary considerably from one species to another. Life cycles vary slightly, and some species are markedly less sensitive to insecticides. As always, timing of applications is critical, but now turf manages need to refine their efforts, selecting the appropriate material and applying it at the right time.

A generic grub life cycle

If we consider the Japanese beetle to be the "generic" grub species, we can describe a generalized life cycle fairly easily. Timing of events varies from one year to another, of course, and adults emerge earlier in the year in Southern locations and later in the year in Northern sites. So let's assume we are discussing Japanese beetle activity in

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Superintendents must know the difference between a Japanese beetle grub (right) and a masked chafer grub (left).

the metropolitan New York area — northern New Jersey, southeastern New York or southwestern Connecticut.

Adult beetles start flying in late June or early July, and are particularly evident on warm sunny days with light breezes or no wind. Japanese beetle adults are active in daylight and have been reported feeding on more than 300 species of ornamental plants, so they can cause significant damage to trees and shrubs.

After nearly a week of feeding and mating, females return to the soil and begin to lay eggs — usually two to four eggs per "event," with a day or two of recovery in between. Each female can lay as many as 40 eggs in her lifetime. Note that not all beetles emerge at the same time, so the earliest ones may begin laying eggs in early to mid July, while others may not begin to oviposit until sometime in August.

Eggs take about a week to mature in the soil, absorbing moisture from the soil and undergoing cell reproduction as the tiny larva begins to develop within the egg. A young larva (first instar) emerges from the egg after about seven to 10 days, and begins to feed on small roots and rootlets. It feeds for about two weeks, and then molts to a second instar (medium-sized grub) and feeds for an additional three or four weeks. By mid-September, most grubs have molted one more time to the third and largest instar. They continue to feed well into autumn and begin to move down into the soil profile as the soil temperatures drop.

By December, most Japanese beetle grubs have moved below the root zone (and stay an inch or two below the frost line where appropriate). They spend the next several months in a semi-dormant state. As soil temperatures warm in the spring, grubs move back up to the root zone, where they resume feeding by mid-April in most years.

Adult Japanese beetles start flying in late June or early July, and are particularly evident on warm, sunny days with light breezes or no wind.

They will feed fairly actively for four to six weeks, and then spend a few days eliminating the last of the undigested food in their digestive system. Then they form a pupa, usually about an inch below the thatch-soil

interface. The pupa persists for about seven to 10 days. The insect does not move or feed during this time, but many physiological changes occur. The new young adults emerge from the soil in late June or early July, completing the cycle.

Differences between species

Japanese beetle grubs tend to prefer relatively light soils that retain some moisture throughout the growing season. They begin to migrate down in anticipation of winter as early as mid November in the Northeast, and do not return to the root zone until soil temperatures are well into the 40s (usually April).

European chafers, on the other hand, prefer drier soils than Japanese beetles. Often the damage from European chafers is most severe in non-irrigated roughs, while Japanese beetles cause more damage on irrigated fairways. In addition, European chafers are less sensitive to cold conditions, so they remain in the root zone feeding much later in autumn (as late as mid-December) and resume feeding in the spring much earlier (as early as late February) than other species. Finally, the life cycle of the European chafer is about two weeks ahead of the Japanese beetle in most locations. For example, adults emerge and lay eggs earlier and grubs begin feeding about two weeks earlier than Japanese beetle grubs.

Oriental beetles lay eggs 1 to 8 inches deep in the soil (deeper than the Japanese beetle). They lay eggs slightly earlier than the Japanese beetles, but it takes the eggs longer to hatch. Therefore, the timing of grub development is similar. There is some evidence that oriental beetle grubs are quicker to migrate downward through the soil profile when conditions are too hot or dry near the surface. This means it can be more difficult to achieve good contact of a soil insecticide with the grubs because they have taken refuge deeper in the soil profile.

The Asiatic garden beetle appears to be increasing in numbers throughout the Northeast. Adults are attracted to lights at night and can be a nuisance at amusement parks or lighted athletic fields. Grubs feed on a variety of vegetation, including less intensively maintained turf and weed patches. The timing of the life cycle generally is within a week of Japanese beetles in most locations.

Northern and Southern masked chafers spend two or three weeks in the egg stage (slightly longer than Japanese beetles)and less than a month as adults (slightly less than Japanese beetles). The life cycle of Northern and Southern chafers tends to be a week or so earlier in many locations, but this difference probably is not significant when considering control strategies. They feed on roots of a variety of grasses, but also can survive by feeding on dead or decaying organic matter in the thatch.

Green June beetle grubs feed primarily at or near the surface, eating dead or decaying organic matter in the thatch and occasionally on succulent turf roots.

Green June beetle grubs feed primarily at or near the surface, eating dead or decaying organic matter in the thatch and occasionally eating succulent turf roots. These grubs are much larger than most other species and cause considerable mechanical damage as they burrow through the soil and thatch. They also leave small mounds of soil at the entrances of their burrows, which extend 6 inches to 10 inches into the soil. The burrows can accelerate the rate of desiccation.

When insecticides are used to reduce populations, grubs frequently die on the surface, resulting in a disposal problem. If you don't, the adults feed on ripening fruits — peaches, plums, prunes, apples or pears. Since management strategies are different for adult Green June beetles, and are not discussed in this article.

Pat Vittum is a professor of entomology at the University of Massachusetts. She is primarily an extension entomologist and teaches turf entomology every spring, as well as a course in "Pesticides in the Environment" every fall. She studies the ecology and management of a variety of turfgrass insects, including white grubs and annual bluegrass weevil. She is the senior author of Turfgrass Insects of the United States.


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Soil Organic Matter Reaches Equilibrium

By Yaling Qian and Tony Koski

Soil organic matter (SOM) is recognized as having profound influences on soil fertility, especially in sand-based root zones. SOM is interesting to turf managers because changes in it influence air-filled porosity, water retention and percolation in sand-based root zones. SOM also serves as a major reserve of plant nutrients, especially nitrogen, phosphorus, sulfur and potassium. In addition, appropriate levels of SOM in sand-based root zones may increase surface stability for putting greens.

Excessive SOM accumulation (especially when an organic matter layer is formed), however, will result in slow oxygen diffusion into the root zone and slow water movement. As a result, disease, black layer and poor rooting may follow.

Major obstacle to SOM study

One major obstacle that has prevented researchers from addressing questions of SOM change in turf systems is that SOM change is a slow process, and annual changes are generally small. Long-term experiments (over years and decades) are often necessary to document these changes.

To overcome this obstacle, we designed a study to take advantage of the historic soil-testing results from golf courses with ages ranging from about 1 year old to about 45 years old. Many golf courses analyze soils (including SOM measurement) on a regular basis and possess long-term soil testing results. Documented management activities, and other site-specific data such as weather and soil texture, are also available for many well-managed golf courses. Such information is invaluable in revealing the dynamics of SOM, and interpreting SOM changes in golf courses.

The goals of this study were to conduct a survey to compile data on soil-testing results (including SOM) from different golf courses and generate regression models to predict the rate of SOM changes and to help identify factors important to SOM changes.

Compilation of soil-test data

During 2000, 12 golf courses around the Denver area; three courses around the Fort Collins and Loveland, Colo. areas; and one course in Saratoga, Wyo., were surveyed. All soil testing results were compiled (Table 1).

The oldest golf course was 45 years old in 2000; the newest golf course was 1.5 years old. We compiled the existing soil testing results, including mineral content, cation exchange capacity (CEC), SOM and pH.

Concurrent with our compilation of the soil data, we also collected information on prior land use, grass species and type, irrigation, mowing height and frequency, fertilization and other cultivation practices. Ten courses with ages ranging from 4 to 45 years were established on native prairie, five courses with age ranging from 1.5 to 35 years were established on agricultural land, and one 5-year old course was built on a mixture of native and agricultural lands.

Turfgrasses grown in putting greens were creeping bentgrass or a mixture of creeping bentgrass and annual bluegrass. Turfgrasses grown on fairways and tees were perennial ryegrass, Kentucky bluegrass or a mixture of both. At all survey sites, irrigation was provided at approximately 75 percent to 100 percent of evapotranspiration (ET) since turf establishment.

In the fairway sites, existing soils were subjected to shaping and topsoil replacement prior to establishment. Soil series, surface texture and taxonomic classification for the 14 sites used in the fairway data were obtained with the help of two people: Ron Follett, a researcher at Soil, Plant and Nutrient Research Lab of the U.S Department of Agriculture's (USDA) Agricultural Research Service; and Michael L. Petersen, an area soil scientist at the USDA's Natural Resources Conservation Service.

Most greens and tees were constructed using the USGA method or other sand-based methods. Exceptions were greens at Valley CC and the Olde Course at Loveland, where the greens were originally established on native soil. Approximately 6 inches of sand has been added to these native soil greens over time through topdressing.

A total of 690 data sets were compiled. Servi-Tech Laboratories in Dodge City, Kan., tested 26 samples; 90 samples from the Old Baldy GC in Wyoming were tested by the Soil, Water, and Plant Testing Laboratory at Colorado State University in Fort Collins, and 574 soil samples were tested by Brookside Laboratories in New Knoxville, Ohio. The soil-testing labs provided information on analytical methods. All labs used the Walkey–Black procedure to determine SOM. Soils were sampled to a depth of 4.5 inches to 6 inches. Data were reported as percent SOM by weight. Data were analyzed to evaluate the changes of SOM content over time after establishment of turf in putting greens and fairways and to relate SOM to other soil-test variables and management regimes.

The findings

A quadratic model with plateau best described the changes of SOM after turfgrass establishment. Before SOM reached equilibrium, SOM under turf increased quadratically. After reaching equilibrium, SOM did not change over time under continued turfgrass management.

Putting greens: The regression shows that SOM of putting greens was .6 percent at one year after turfgrass establishment, increased to 2.7 percent at 20 years after establishment, and to 3.4 percent at 30 years after establishment.

The increase in SOM was most rapid during 30 years after establishment, with SOM gradually reaching equilibrium thereafter. The rate of increase was about .09 percent SOM/year for the linear part of the curve that extends from one year to about 30 years.

If we assume a soil bulk density of 1.6 grams per cubic centimeter, then roughly about 160 pounds SOM is added by turf to a 5,000-square-foot putting green every year for up to 30 years.

Fairways: The average SOM of fairways was 1.76 percent at one year after turfgrass establishment, increased to 3.8 percent at 20 years after establishment and was 4.2 percent at 30 years to 45 years.

The increase in SOM appears to be most rapid during the first 24 years after fairway establishment, with SOM gradually reaching equilibrium thereafter. The rate of increase was about .1 percent SOM per year for the linear part that extends from 2 years to 24 years.

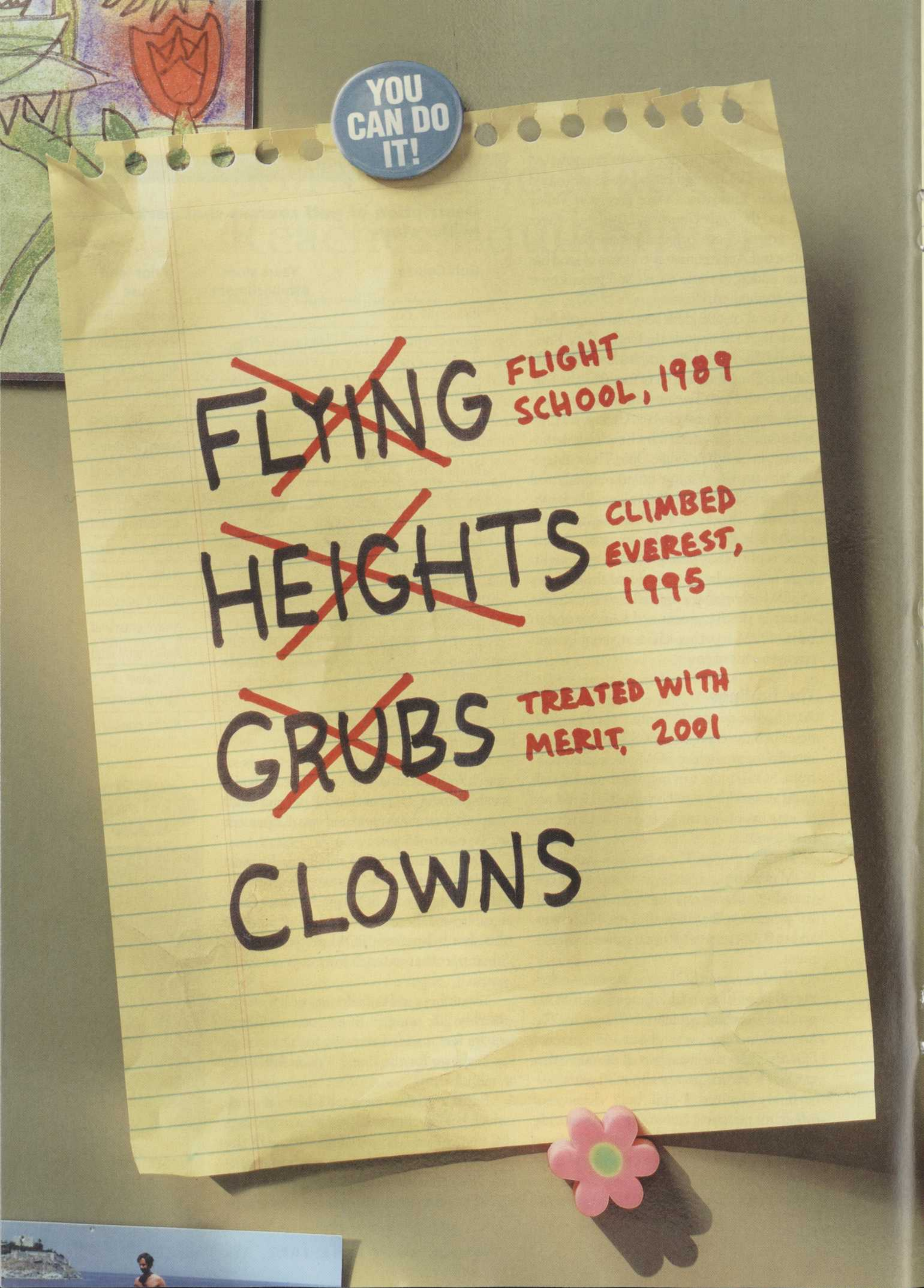
Assuming a soil bulk density of 1.5 g/cm^3, roughly 35 pounds SOM per thousand square feet is added annually to fairway soils by turfgrass for the first 24 years following establishment.

Putting greens are established on sand, which has lower initial SOM than in fairways (.6 percent vs. 1.76 percent). Although the increase in SOM continued for a shorter period, fairways accumulated a higher level of SOM at equilibrium than did putting greens

TABLE 1

Description of golf courses that participated in the study

Golf Course	Years since establishment	Prior land use
Rolling Hills CC	31	Native grassland
Ptarmigan CC	13	Native grassland
Boomerang Links	10	Agricultural land
Valley CC	45	Native grassland
Inverness GC	26	Native grassland
Hiwan CC	38	Native grassland
Murphy Creek GC	2	Agricultural land
Boulder CC	35	Native grassland
Springhill GC	22	Agricultural land
The Olde Course at Loveland	35	Agricultural land
Cattail Creek GC	9	Native grassland
Plum Creek Golf and CC	16	Native grassland
Westwoods GC	8	Native grassland
River Valley Ranch GC	5	Agricultural land
Saddle Rock GC	5	Native or agricultural land
Old Baldy GC	37	Native grassland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(4.2 percent vs. 3.9 percent). This indicates a higher capacity for carbon stabilization in the loams and finer textured soils of fairways, compared to sand used for putting green construction and topdressing.

More frequent core cultivation (with cores often removed) and addition of low SOM sand to greens will prevent higher accumulation of SOM (compared to fairway soils).

The characteristics of turf systems, including high production and high root turnover, may contribute to the high potential to build up SOM in comparison to soils in other agricultural systems.

SOM and previous use

To determine the effect of prior land use on SOM in turfgrass, comparisons were made for land converted to golf courses (during the past 10 years) from agricultural land vs. native grassland.

The previous land use of Murphy Creek GC, Boomerang Links, River Valley Ranch GC and parts of Saddle Rock GC was agricultural, whereas those of Plum Creek Golf and CC, West Woods GC and parts of Saddle Rock GC were native short-grass prairie.

The SOM of native grasslands and agricultural lands prior to golf course establishment was not measured, and SOM content in the surface was likely significantly changed due to golf course construction. However, our results indicated that fairways converted from agricultural lands exhibited 24 percent lower SOM than fairways converted from native grasslands within 10 years following establishment.

Thus, past land use imparted a strong control on the SOM baseline where fairways are built. Numerous studies have demonstrated that intensive agricultural practices result in oxidative losses of SOM.

For example, a Texas study showed SOM in the top 4 feet of agricultural soil to be 25 percent to 43 percent less than that of native prairie sites. The initial soil conditions in fairways built on previously native grasslands may be beneficial in terms of fairway management and fertility compared to fairways established on agricultural lands.

In contrast to fairways, prior land use had little influence on SOM in putting greens. This is not surprising because putting greens are built with non-native, sand-based soils.

SOM, soil mineral content and pH

Fairways. In addition to the change of SOM over time after turf establishment, our compiled data indicates that the level of SOM was influenced by soil pH, which ranged from 6.5 to 8.3.

When pH was more than 7.3, the level of SOM decreased as soil pH increased. When soil pH was less than 7.3, SOM level was not affected by pH. As SOM increased, soil potassium levels increased.

The relationships between SOM and magnesium, CEC and calcium were not significant in fairways.

Putting greens. SOM content in putting greens was influenced by soil pH, which for all soil samples in putting greens ranged from 5.9-8.0. When pH was more than 7.1, the level of SOM decreased as soil pH increased; but when soil pH was less than 7.1, SOM level was not affected by pH.

There is a strong linear relationship between CEC and SOM; the higher SOM, the higher CEC in the putting greens. Furthermore, soil SOM was also highly correlated with soil calcium, iron, sodium and potassium content in putting greens. This suggests that the higher the SOM, the greater potassium, calcium and iron levels will be available in putting greens.

Conclusions

The rate of increase in SOM was largely linear to about 20 years to 24 years in fairways and 25 to 30 years in putting greens. Soil organic matter gradually reached equilibrium thereafter.

Our study also found that past land use often controls the SOM baseline. Fairways converted from agricultural lands exhibited 24 percent lower SOM within 10 years after turfgrass establishment than fairways converted from native grasslands.

We concluded that SOM accumulation in turf soils occurs at a significant rate at first 25 years to 30 years after establishment. A rate is comparable to SOM accumulation rates reported for U.S. land that has been placed in the conservation reserve program.

Yaling Qian is an assistant professor of turfgrass science, and Tony Koski is an associate professor and extension specialist of turfgrass science at Colorado State University in Fort Collins, Colo.

Protective Seed Coating Aids Turf Establishment

By David R. Marks, Russell D. Japuntich and Robert W. Howe

Planting and establishing turf has never been easy. A variety of natural forces such as wind, rain and heat can cause poor growth rates, bare spots and need for reapplication. Seed predation by birds also can reduce the effectiveness of turf establishment and can increase costs substantially (Beard, 1973).

Studies in native prairies (Howe, 1999) imply that birds and seed-eating rodents may even modify turf composition by preferentially eating certain (perhaps desirable) seeds and avoiding others. Agricultural crop damage by blackbirds, turkeys, waterfowl, sandhill cranes, and other bird species is well-documented by the U.S. Department of Agriculture's (USDA) Wildlife Services Program, but seed losses in turf settings are seldom reported.

A potential solution to the problem of seed loss is to encase the seeds in an unpalatable material that deters animals from eating or recognizing the seeds.

Where are coatings used?

Seed coatings have been used for a variety of applications, including enrichment of pet food, deterring squirrels from backyard bird feeders and improving germination of seeds.

The National Wildlife Research Center has found that a seed coating consisting of various clays is effective in reducing blackbird predation on rice seeds in Louisiana (USDA, 1999). Seeds coated with a bird repellent are available in New Zealand, but these and other specially treated seeds have only recently been developed, and little or no information is available about their effectiveness.

On Aug. 24, 2000, the Encapsulated Seed Co. started production of an "all-in-one" grass seed product called EncapSeed at the company's manufacturing facility in Green Bay, Wis. EncapSeed uses a patented technology that individually encapsulates premium grass seeds in a blanket of mulch containing non-toxic fiber from recycled office paper. The coating also contains soil conditioners, fertilizers and a growth-enhancing agent. By combining fertilizer with seed and mulch, this product is designed to free landscapers, homeowners and superintendents from the tedious and labor-intensive task of finding, buying and applying fertilizer, seeds and straw. It also reduces the effects of wind and erosion by increasing the weight of seeds.

> Encapsulation of turf seeds clearly serves as a deterrent to seed predation by birds.

Removal, called seed predation, by birds is a major concern for people purchasing specially treated lawn seeds. Our goal in this study was to discover whether birds are truly less likely to eat treated seeds than untreated seeds. To answer this question, we created a controlled experiment on captive house sparrows, a common species of residential areas and one of the species most likely to consume seeds in turf settings. We tested the following hypothesis: Encapsulating seeds deters seed predation by birds.

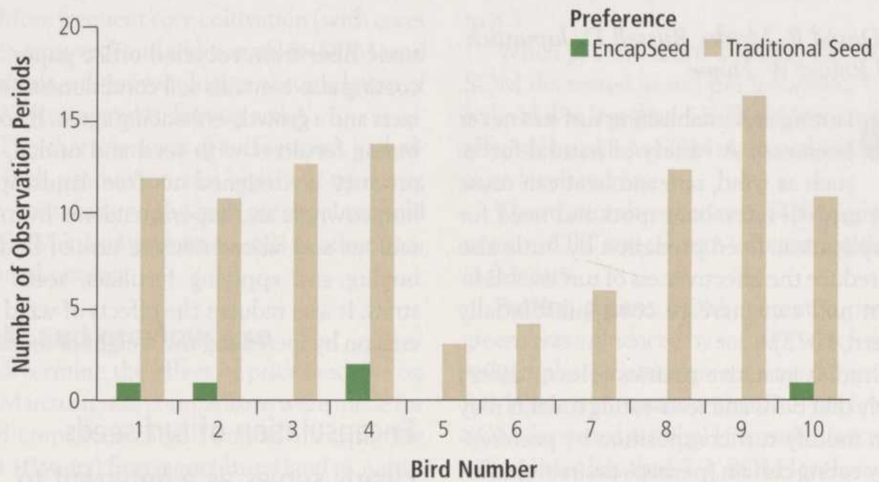
Methods

In North America, European house sparrows are an introduced species that occur in small flocks almost invariably near human habitation (Sibley, 2000, Blair, 1996).

Since their introduction in New York in 1850, populations have exploded and their distribution encompasses North America except for the northern Canadian territories (Sibley, 2000). House sparrows made ideal subjects for our study because they are common seed-eating birds (Elgar, 1987, McGillivray, 1984) and they typically are associated with human residences (Gill, 1995). Because house sparrows are exotic species, we could capture and directly

TABLE 1

Seed Preferences



Feeding preferences of 10 captive house sparrows for trays with EncapSeed vs. trays with unencapsulated traditional grass seeds. Results indicate the preferred tray during separate 10-minute observation periods. Individual birds typically made multiple visits to the trays during each observation period.

observe their feeding behaviors without violating federal or state bird protection laws (U.S. Forest and Wildlife Service, 1999).

We captured house sparrows with standard mist nets placed along a brush-line that was in close proximity to bird feeders. Netting took place on three separate days and took an average time of one hour each day.

Altogether 10 birds were caught, observed and released unharmed. This sample size is large enough to indicate a statistically significant preference by individuals if the preference is strong according to a simple binomial distribution (Zar, 1984). The birds were handled and maintained following standards outlined by Belant et al. (1997). Captive sparrows were placed in separate quarter-inch hardware-cloth, 12-square foot cages. Each cage contained a water dish, perching branches, and only one bird so that individuals would act and feed independently of one another. The cages were raised 2 inches above the ground so that any spilled seed would pass through the cage floor, and only the seeds in the feeding trays were available to the birds.

To test the seed preference of the house sparrows, we provided both the encapsulated seed and the unencapsulated or traditional grass seed in two identical feeding trays. Both seeds were comprised of the same all-purpose blend of seeds with the only difference being the encapsulation.

The blend consisted of 20 percent Cannon Kentucky Bluegrass, 20 percent Kenblue Kentucky Bluegrass, 20 percent Silverlawn Creeping Red Fescue, 20 percent Raymond Chewing Fescue and 20 percent SR4010 Perennial Ryegrass. The trays were available to the birds for the duration of 10 minutes, during which we recorded each visit to a tray.

Visits were divided into two categories: food eaten (FE) and no food eaten (NFE). A NFE visit occurred when a bird made contact with the seed but did not eat any, and a FE visit was recorded when the bill of a bird actually made contact with the seed. If a bird continued eating at the same feeding tray, we record the feeding session as only a single visit. A new visit was recorded only after the bird physically left the feeding tray and returned.

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The introduction of Merit® in the mid-90s ushered in a new era of preventative control for sub-surface insects. Merit (imidacloprid) represents a new class of systemic insecticides called chloronicotinyls, which act selectively on the insect's nervous system. The material has low active ingredient use rates, is not a cholinesterase inhibitor, provides minimal toxicity to non-target species, and poses low environmental risk.

For white grub control, applications should be made before or during the egg laying period. In most areas of the country, Merit provides season-long grub control with one application. Since Merit is not as effective as a curative treatment, a fast-acting contact insecticide like Dylox® is recommended to control large grubs.

The Andersons Fertilizer with Merit granular combination products are available in variety of analyses, slow-release nitrogen sources and fertilizer release patterns designed to cover a multitude of application needs. These formulations are highly uniform and provide superior spreadability, and the same rate of active ingredient per acre as sprayable Merit materials. Consider Andersons 14-0-14 with .2% Merit/100% Poly-S nitrogen and 18-3-18 with .2% Merit/80% Nutralene for clipping reduction, high potassium rates and extended feeding on low-cut fairways. When a higher rate of nitrogen is preferred, 22-3-8 with .2% Merit/50% Poly NS-52 is an excellent option.

Talstar®, (Bifenthrin) a third generation pyrethroid insecticide, provides rapid knockdown of surface feeding insects at application rates as low as 0.05 lbs. of active ingredient per acre. Even at extremely low use rates, Talstar provides excellent killing action with residual control of one to two months depending on the application site. On greens, Talstar provides outstanding control of cutworms, sod webworms and armyworms without damaging sensitive grass. From a safety and cosmetic standpoint, Talstar will not irritate skin, is not a threat to birds and small mammals, is not a cholinesterase inhibitor, and has much less odor than other insecticides.

The Andersons manufacture a wide range of granular Fertilizer with Talstar products targeting the golf and lawn care markets. The use of proprietary formulation methods enables the active ingredient to move quickly and efficiently from the granule to provide more effective control of the targeted insect pest. For golf course applications, 13-0-12 with 50% Nutralene is a versatile small particle formulation designed for use on greens tees and fairways. For lawn care operations 12-2-6 with 40% Poly NS-52 provides controlled release feeding, highly uniform particle sizing and dust-free spreadability. The Andersons Fertilizer with Talstar combination products allows turf managers to more efficiently utilize key labor resources by taking care of turf nutrition and insect pests in one operation.

The development of new generation insecticides such as Merit and Talstar provide turf professionals with valuable tools to effectively control insect pests while meeting today's ever-growing environmental and regulatory standards.

Merit® is a registered trademark of Bayer Corporation

Talstar® is a registered trademark of FMC Corporation

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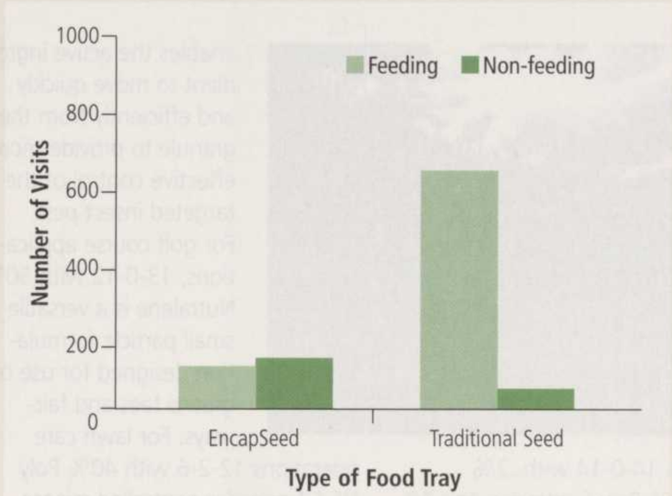
TABLE 2

Seed Preference By Visit Frequency



Summary of all visits to seed trays by captive house sparrows. Each visit represents a single decision to visit the tray. During a feeding visit, the bird ate some of the seed. During a non-feeding visit, the birds ate no seeds.

After the 10-minute observation period, we removed the feeding tray for 10 minutes, and the process was repeated. We completed a total of 290 bird observations over 12 observation days. This sample size provides significant power for detecting preferences, but we emphasize the overall preference of individuals to avoid the inflated statistical significance due to pseudoreplication (Hurlbert, 1984). Each bird was released after six days of confinement. Wild birdseed was provided after all observations were completed for the day and on days when no observations took place.

Results were analyzed by applying a simple sign test (Zar, 1984). Each observation period was labeled either positive (+) if the bird made more visits to the EncapSeed or negative (-) if the bird made more visits to the traditional grass seed. The distribution of positive vs. negative outcomes was then compared to a binomial distribution for determination of a probability (p) value. Observation periods with an equal number of visits to the treated and traditional seeds were omitted from the test, as defined by the statistical procedure.

Results

Our results showed a highly significant avoidance of the EncapSeed (Table 1) by the captive house sparrows.

In nearly every observation, the birds were more likely to eat traditional turf seeds than EncapSeeds, and few birds ate the EncapSeeds at all. We recorded a total of 688 cases of birds visiting and feeding on the traditional seeds compared with 145 cases of birds visiting and feeding on the EncapSeeds (Table 2). Length of these visits varied, but the birds almost always spent a longer period of time at the tray with traditional turf seeds.

All of the 10 individual birds showed a preference for the traditional seeds (Table 1). Only one bird favored the EncapSeed tray during two separate observation periods, but this same bird favored the traditional seeds during 14 observation periods. Six birds always favored the traditional seeds, while the remaining three birds favored the EncapSeeds during only one observation period (compared with 35 total observation periods showing preference for the traditional seeds).

Analysis of the NFE visits produced some interesting results. More non-feeding birds visited the EncapSeed than visited the traditional seeds (Table 1). This could be the result of the birds' curiosities about new and strange-looking seed, which may cause them to visit the EncapSeed tray for investigation, but not for consumption.

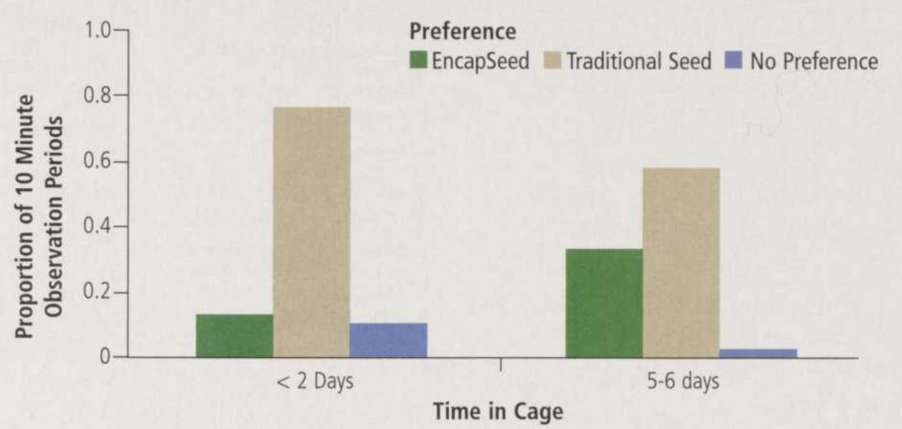
Agricultural crop damage by bird species is well documented but seed losses in turf are seldom reported.

The lower number of NFE visits to the traditional seeds is a result of the fact that visits to the plain seed usually resulted in feeding. When all visits (both FE and NFE) were evaluated together, we found significantly more visits to the traditional seeds.

To find if the birds became accustomed to

TABLE 3

Seed Preferences By Exposure Over Time



Preferences of newly captured (less than two days) vs. longer captured (five to six days) house sparrows for separated trays with two types of turf seeds. Y-axis indicates the proportion of 10-minute observation periods during which the birds favored trays with EncapSeed or unencapsulated traditional grass seeds. Results include both feeding and non-feeding visits.

the EncapSeed over time, we compared the feeding responses of experienced birds (in cage for five to six days) with responses of newly captured birds (in cage for less than one day). Using data from all visits (both FE and NFE), we found that experienced birds showed no significant difference in the number of visits to either the treated or traditional grass seed. As expected, however, these birds showed a highly significant preference for the traditional seed when just the FE visits were included (Table 3).

Inexperienced birds, on the other hand, showed a preference for the traditional turf seed even if we include the NFE visits. Apparently the birds recognized the traditional seeds as preferable without prior experience; later during the experiment they became more curious and visited the EncapSeeds more frequently.

Like the inexperienced birds, however, birds that had been in the cage for five to six days still avoided eating the EncapSeeds.

Discussion

Results from our analysis provide strong evidence that house sparrows avoid eating treated seeds. Because house sparrows are common-seed predators in urban environments, this finding supports the conclusion that seed encapsulation is an effective deterrent to bird damage in newly established turf.

Considering all individual visits made by the birds when feeding occurred, the house sparrows were 4.7 times more likely to choose traditional seeds over the treated seeds. All of the 10 birds tested showed a preference for the traditional seeds. In short, encapsulation of turf seeds by the Encapu-Layer process clearly serves as a deterrent to seed predation by birds.

Direct testing in the field would provide additional evidence for this conclusion, but the unequivocal avoidance shown by all of the experimental birds argues that our findings are robust. Use of seeds treated with the EncapSeed process should lead to a more even and effective germination of turfgrasses because fewer seeds will be removed by birds.

David Marks and Russell Japuntich are graduate students in the environmental science and *policy program at the University of Wisconsin-Green Bay in Green Bay, Wis. Robert Howe is a professor in the department of natural and applied Sciences at the university and is the director of the Cofrin Center for Biodiversity.*

REFERENCES

Beard, J.B. 1973. *Turfgrass: Science and Culture.* Prentice Hall, Englewood Cliffs, N.J.

Belant, J. L., L. A. Tyson, T. W. Seamans, S. K. Ickes. 1997. "Evaluation of lime as an avian feeding repellent." *Journal of Wildlife Management* 57:917-924.

Blair, R.B. 1996. "Land use and avian species diversity along an urban gradient." *Ecological Applications* 6, 506-519.

Elgar, M. A. 1987. "Food intake rate and resource availability, flocking decisions in house sparrows." *Animal Behavior* 35:1168-1176.

Gill, F.B. 1995. *Ornithology.* W.H. Freeman & Co. New York, N.Y.

Howe, H. F. 1999. "Dominance, diversity and grazing in tallgrass restoration." *Ecological Restoration (North America)* 17:59-66.

Hurlbert, S.H. 1984. "Pseudoreplication and the design of Ecological Field Experiments." *Ecological Monographs* 54(2): 187-211.

McGillivray, W. B. 1984. "Nestling feeding rates and body size of adult house sparrows." *Canadian Journal of Zoology* 62:381-385.

Sibley, D.A. 2000. *The Sibley Guide to Birds.* Alfred A. Knopf, Inc. New York, NY.

U.S. Census Bureau. 2000. *U.S. Census 2000.* Online. Available: *http://www.census.gov/dmd/www/2khome.htm*

U.S. Department of Agriculture. 1999. National Wildlife Research Center Highlights Report Fiscal Year 1998. Animal and Plant Health Inspection Service.

Miscellaneous Publication No. 1552. Online. Available: *http://www.aphis.usda.gov/oa/pubs/nwrchl98/nwrchi.html#birdr.*

U. S. Fish & Wildlife Service. 1999. Digest of federal laws of interest to the U.S. Fish & Wildlife Service. Online. Available: *http://laws.fws.gov*

Zar, J.H. 1984. *Biostatistical Analysis* (Second Edition). Prentice-Hall, Inc., Englewood Cliffs, N.J.

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have to take the lead when it comes to new technology," he adds.

They like it

Spaugh elected to try SeaIsle 1 on the fairways and tee boxes, and Sea Dwarf on the greens. Club agronomist Tim Daniels says the course requires 30 percent to 50 percent less fertilizer, and has proven to be drought-tolerant. SeaIsle 1 has also suppressed weed growth.

The maintenance staff currently irrigates the turf with effluent and brackish water. The crew also flushes the course periodically with fresh water to prevent salt and mineral buildup.

Crown Colony held its official grand opening last February. Spaugh is no longer superintendent at Crown Colony — his business card now reads vice president — so he must have done something right when he chose seashore paspalum for the course. Also, player response to the grass has also been over-

Lush fairways rule at Crown Colony.

whelmingly positive, as the grass looks better than bermuda and actually provides better lies from the rough.

"It reminds me of grass you might see up North, and the ball sits up in the rough because it's so thick," says Joe Bruno, a Florida-based golf writer.

As a semiprivate facility, Crown Colony will host thousands more rounds than its exclusively private neighbor Old Collier. But with fairways as lush as you'll find in Southwest Florida, as well as nearly flawless greens cut to one-eighth inch, Spaugh is hardly worried.

"My question, after the grass came in, was: Why doesn't everyone use it?" Spaugh says. "The answer is: The industry is slow to change.

"Most people would say, 'Bermudagrass isn't broken, so why fix it?' Admittedly, there's an added initial cost because [seashore paspalum] is a new technology, but we may recoup the costs in a year because of the savings in maintenance." ■

Sharp is a free-lance writer from Charlotte, N.C.

Maintain Balance With PGRs

Keep your annual bluegrass-to-bentgrass ratios reasonable in your greens

BY TOM WATSCHKE

From the mid-Atlantic to much of the Northeast and upper Midwest, the most common distribution of turf species for putting greens is a mixture of creeping bentgrasses and various annual bluegrass ecotypes.

Over the years, these two species battle, with ebbs and flows, until the ratio stabilizes at a manageable level. Despite that stability, however, seasonal fluctuations in the ratio of these two species occur every growing season.

Early in the season, the annual bluegrass ecotypes are more aggressive, while during the summer months the balance of power shifts to the bentgrasses. During the fall of the year, the struggle shifts back to the annual bluegrasses.

The availability of plant growth regulators (PGRs) and the use of other cultural tactics can provide a means of manipulating these ratios. Opportunities now exist which enable superintendents to take advantage of these seasonal shifts to provide a competitive advantage for one of the species or the other. For example, if an increase in bentgrass population is desired during a growing season, the following scenario can provide an advantage for that species:

Keep available nitrogen to a minimum early in the season. Wait until the soil temperature warms to the upper 40s before pushing bentgrass growth, as most bentgrass cultivars do not begin aggressive growth until after the soil warms.

Allow the annual bluegrasses to flower and seed. This process causes the plant to expend considerable carbohydrate for seed production. Once the seedhead is produced and shatters, the remaining tiller is in a physiologically weakened state.

Apply a gibberelin-inhibiting PGR as soon as possible after seeds shatter. Make sure the PGR application is supplemented with an increment of available nitrogen (at least .3 pound per thousand square feet).

EARLY IN THE SEASON, ANNUAL BLUEGRASS IS MORE AGGRESSIVE THAN BENTGRASS

This PGR application will keep the annual bluegrass in a weakened condition. At the same time, the creeping bentgrass will have reduced vertical growth, but increased stolon growth.

As a result, the creeping bentgrass, which is beginning a seasonal competitive advantage thanks to environmental conditions, will have its advantage enhanced by the PGR application.

Therefore, a more significant shift toward creeping bentgrass will occur during the summer months. It's also important to maintain nitrogen availability during these months to keep the bentgrass aggressive but not too lush. Spoon feeding and foliar nitrogen fertility tactics can be employed to accomplish the desired result.

Make another PGR application in mid-September, again at label rate (the same application that was applied in the spring). This application will significantly suppress the growth of any annual bluegrass seedlings that have germinated, while keeping the specie's composition from shifting back towards annual bluegrass.

After Oct. 1, depending on particular location, keep the availability of nitrogen to a minimum. The growth of creeping bentgrass slows considerably as the soil cools, days shorten and frosts occur.

On the other hand, the growth of annual bluegrass is stimulated by these conditions. Obviously, there are other cultural practices that can be used to favor creeping bentgrass during the year, and they should also be part of the strategy.

However, the use of PGRs and the precise timing of their application can provide a significant edge as you take advantage of nature's influence on the dynamics of the mixed-species composition that exists on many putting greens.

Watschke is a professor of turfgrass science at Penn State University.

CIRCLE NO. 135

Ousting Crabgrass – After It Germinates

Postemergent herbicides are viable options for several reasons, including integrated pest management

By Fred Yelverton

Crabgrasses are some of the most problematic weeds for superintendents. Several species can be found in turfgrasses — large crabgrass, smooth crabgrass and Southern crabgrass are the most common species, although there are a few others. As a general rule, crabgrass tends to be more of a problem in temperate climates and less of a problem in tropical regions. In the United States, crabgrass is a major problem in both cool-season and warm-season turfgrasses on golf courses.

The three species mentioned above are summer annuals. That means they live less than one year, germinate as temperatures start to warm, die with frost and must come back from seed every year.

Because they must grow back from seed, the opportunity to use pre-emergent herbicides exists. As a result, these products are commonly used by turfgrass managers. Pre-emergent herbicides for crabgrass control offer advantages and disadvantages. The most obvious advantage is that timely applications of pre-emergent herbicides prevent crabgrass from becoming a problem. The primary disadvantage is that these products are "blanket-applied" and, as a result, areas not infested with crabgrass are treated as well.

Postemergent herbicides are viable options for crabgrass control for several reasons. First, postemergent control allows turfgrass managers to treat only those areas infested with crabgrass. This treat-as-needed approach is a good example of an integrated pest management (IPM) approach to weed control.

Second, postemergent herbicides are used because pre-emergent herbicides often break down, particularly after extended periods of high rainfall during the summer. In this case, postemergent herbicides are employed to remove crabgrass that escaped the pre-emergent herbicide application.

Three of the most commonly used herbicides for postemergent control of crabgrass are MSMA or DSMA, Acclaim Extra and Drive 75 DF.

MSMA and DSMA are arsenical herbicides that have been available for many years. Because the patent is expired, they are sold by many companies under a variety of trade names. These arsenical herbicides were the mainstay for crabgrass control in turfgrass until the arrival of pre-emergent herbicides several years ago.

There are several advantages of the arsenical herbicides for crabgrass control. The arsenicals are inexpensive. In addition, they can be effective for control of crabgrass in turf if plants are small at the time of application. Contrary to what many believe, the toxicity of the arsenicals is quite low. Just as with other products discussed below, MSMA and DSMA carry a "caution" on the label, which is the least hazardous category found on product labels ("warning" being next and "danger" representing the most hazardous).

The disadvantage of the arsenicals is that they can't be used on many varieties of turfgrass species. Most of the cool-season turf species and zoysiagrass can be discolored beyond acceptable limits. Centipedegrass is readily killed by application of the arsenicals. For all practical purposes, the arsenicals are viable options only on common and hybrid bermudagrasses. But even on bermudas, discoloration will occur. In addition, a repeat application is usually needed in five to seven days to ensure good control.

Acclaim Extra is a relatively new product that was originally sold as Acclaim. The current formulation, known as Acclaim Extra, was introduced a few years ago.

Acclaim Extra offers several advantages for postemergent control of weeds in turf. If applied to small crabgrass, it's highly effective in killing crabgrass. As with all postemergent herbicides, Acclaim Extra will provide better control when crabgrass is small and actively growing. Poor results can be obtained when applied to crabgrass and other sensitive weeds under growth stresses, such as drought or heat.

Another advantage of Acclaim Extra is it controls several other grassy weeds found in turf. Goosegrass, barnyardgrass, foxtail, sandbur and others are controlled by it. Acclaim Extra can be applied to Kentucky bluegrass, perennial ryegrass, tall and fine fescues, annual bluegrass and creeping bentgrass (though not putting greens). Zoysiagrass is the only warm-season turf species that is tolerant to Acclaim Extra.

While Acclaim Extra can be applied to cool-season turfgrass species plus zoysiagrass, all other warm-season species are sensitive. Although Acclaim Extra is effective on small crabgrass, it's much less effective on crabgrass once it has tillered. To obtain effective control on tillered crabgrass, rates of Acclaim Extra must be substantially increased (sometimes doubled or tripled).

Drive 75DF is the newest herbicide for postemergent crabgrass control. It offers several advantages as a postemergent herbicide. Drive is highly effective for the control of crabgrass in turfgrass species. As with previously mentioned herbicides, Drive is more effective when applied to crabgrass that is small and actively growing. Drive will also control larger crabgrass.

The key to good control with Drive is to apply the product to actively growing crabgrass. Another advantage of Drive is that it can be applied to more turfgrass species.

Common and hybrid bermudagrasses, Kentucky bluegrass, annual bluegrass, buffalograss, tall and fine fescues, annual and perennial ryegrass, zoysiagrass and creeping bentgrass (not putting greens) are all tolerant to Drive. Only bahiagrass, centipedegrass and St. Augustinegrass are sensitive to Drive.

Several other weed species are controlled by Drive, including kikuyugrass

The disadvantage of the arsenicals is that they can't be used on many varieties of turfgrass species.

and torpedograss with multiple applications. Barnyardgrass, foxtail and broadleaf signalgrass are also controlled. Drive also offers control of several troublesome broadleaf weeds such as black medic, white clover, common dandelion, dollarweed and a few of the speedwell species.

It offers exceptional seeding and overseeding flexibility — allowing turf managers to seed many varieties of turf immediately before or after application. Drive 75 DF also carries a "caution" signal word.

Although Drive controls larger crabgrass, it's more effective on small crabgrass. In addition, as with all postemergent herbicides, actively growing weeds are more easily controlled with Drive.

However, this seems to be even more important with Drive than other herbicides. Control can vary from excellent to poor when the growth state of crabgrass goes from actively growing to inactive growth. As a result, it may become necessary to apply supplemental water to turf a few days prior to Drive application. ■

Editor's note: Drive is a registered trademark of BASF AG, and Acclaim is a registered trademark of Aventis.

Yelverton is an associate professor and extension specialist at North Carolina State University

Leaders

PEOPLE ON THE MOVE

The following superintendents recently achieved certification: **Steve Fackler**, Ridge GC, Orangevale, Calif.; **Robert Stipcak**, Timber Ridge GC, East Lansing, Mich.; **Mark Hughes**, Baltusrol GC, Springfield, N.J.; **Stephen Gross**, Monroe Valley GC, Jonestown, Penn.; **Chad Clovis**, Stonewall Resort, Roanoke, W.Va.; **Scott Scamehorn**, Wild Wing Plantation, Conway, S.C.


B. York

BASF named **Bob York** as a sales specialist for the BASF Turf and Ornamental group. He is responsible for all sales-related activities in northern New Jersey, New York, Connecticut, Rhode Island, Massachussets, Vermont, Maine and New Hampshire.

Environmental Golf appointed **Glynne Taylor** as superintendent at Woodcreek GC in Modesto, Calif.

Mark Peterson was named superintendent of McCullough's Emerald Golf Links in Atlantic City, N.J.

The Dunes Golf and Beach Club in Myrtle Beach, S.C., named **Stephen Hamilton** as superintendent.

KemperSports Management named **Jeff Gerdes** as superintendent of Bolingbrook GC in Bolingbrook, Ill.

Agrisel USA hired **Jason W. Assad** as director of business development.

John Deere announced the winners of its Employer/Superintendent Recognition program: **Marc Schwarting**, superintendent at Bridges GC in Madison, Wis., and his employer, **Greg Rice**, owner; **Jeffrey Yarborough**, superintendent at Nansemond River GC in Suffolk, Va., and his employer, **Jim Adams**, owner; **Bryan Tipton**, superintendent at Suttons Bay GC in Pierre, S.D., and his employer, **Mark Amundson**, general manager; **John Monson**, superintendent at Long Prairie CC in Long Prairie, Minn., and his employer, **Michael Ray**, club manager; **Alan Andreasen**, certified superintendent at Los Lagos GC in Mission Viejo, Calif., and his employer, **Ray Davies**, certified superintendent, director of golf course maintenance and construction; **Joseph Fernau**, certified superintendent at Casper Municipal GC in Casper, Wyo., and his employer, **Alan Kieper**, special facilities superintendent for the City of Casper, Wyoming; **David Radaj II**, superintendent at Green Acres CC in Northbrook, Ill., and his employer, **Richard Welch**, green committee chairman; **Bradford Murff**, superintendent at Sienna Plantation GC, Missouri City, Texas; and his employer, **Bill Floyd**, assistant general manager; **Jeffrey Burgess**, certified superintendent at Seven Lakes GC in LaSalle, Ontario, Canada, and his employer, **Alex Marra**, general manager; **Alan Culver**, certified superintendent at Mahoney GC in Lincoln, Neb., and his employer, **Steve Hiller**, superintendent of golf operations. These winners will play in the John Deere Golf & Turf Superintendent Pro-Am tournament held in conjunction with the John Deere Classic next month

Send your leader information to Frank Andorka at 7500 Old Oak Blvd., Cleveland, 44130 or e-mail fandorka@advanstar.com.

The Company Line

PRODUCTS & SERVICES

▲ Mowers

The **Toro Co.** offers the new Toro Groundsmaster 4500-D and 4700-D. The Groundsmaster 4500-D features five Contour Plus floating decks and the Groundsmaster 4700-D has seven Contour Plus floating decks. The decks feature full rear rollers to deliver precision cut and turf striping, according to the company. Each mower is powered by a Kubota 60-horsepower turbo-charged, four cylinder, diesel engine providing an abundance of power for hill climbing and mowing. The bi-directional four-wheel drive assures dependable traction when operating on hills and wet terrain. The 4500-D delivers a 9-foot width of cut and the 4700-D provides a 12.5 foot width.
For more information, contact 952-888-8801, www.toro.com or
CIRCLE NO. 200

Points program

Syngenta Professional Products offers its GreenPartners program. Its customers earn points for their purchases of Heritage, Subdue MAXX, Primo MAXX and Barricade, which are redeemed for effective business tools. Customers can also donate points to industry organizations, such as local superintendents associations.
For more information, contact 800-334-9481, ext. 2396, www.syngentaprofessionalproducts.com or
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Improved Turf Tidy

Redexim Charterhouse offers an improved version of its Turf Tidy, a product that allows superintendents to combine the tasks of dethatching, sweeping and flail mowing into one easy-to-use machine. The Turf Tidy features a floating head that can be adapted for the three tasks.

The new Turf Tidy allows a quick switch between functions using an easy-to-reach, forward-facing access panel.
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CIRCLE NO. 147