New Mulch Technology For Turfgrass Establishment

Golf Courses Can Use Weed-Free Mulch Pellets For Seedling Establishment

By GEORGE W. HAMILTON
Penn State University

Mulching is commonly the last step in the turfgrass seeding process. Mulches aid seed establishment by retaining moisture, decreasing evaporation and minimizing soil temperature change. Some materials also reduce soil erosion (5).

Because agriculture produces an abundance of organic matter such as straw, farm fields have long been a major source of mulching materials. Increasingly, however, recycled paper is being used in mulches, even on golf courses, where clean, weed-free material is required.

Crop Residues

Straw mulch offers a significant moderation of soil temperature as well as soil moisture conservation (2). Researchers have noted reductions in soil evaporation with straw mulch applications (1,4).

Oat and barley straw (the plant stems that remain after grain harvest) are popular mulching materials in areas where these grains are grown. Salt marsh hay is another commonly used mulch, but wetland protections have increased its costs and reduced its availability.

Although these types of mulches provide good mulching effects, they can contain weed seeds and have an unsightly appearance. In one study, weed and small grain seedlings in straw treatments caused a reduction in turfgrass seedling weights compared with mulches not contaminated with seed (2). For these reasons, straw mulch use on golf courses is minimal.

Hydraulic Fiber Mulches

Hydraulic fiber mulches, made from virgin wood cellulose or recycled paper, are more commonly used in golf course seeding operations.

Hydraulic mulches are combined in a specialized applicator with water, seed and sometimes fertilizer. The slurry is then sprayed onto the prepared soil. These materials have good mulching characteristics, are weed-free and aesthetically acceptable.

New mulching materials have emerged in recent years. Pelletized paper mulches have been developed to provide hydraulic mulch-like performance in an easy-to-apply form.

These mulches are compressed into small, cylindrical pellets that can be applied by hand or with spreaders or topdressers. They are typically made from recycled paper and contain a starter fertilizer. This permits mulching and fertilizing in one application.

(Continued on Page 13)

Mulches—

(Continued from Page 11)

Product Development

The first pelletized paper mulch on the market was developed and patented by Penn State University in 1995. PennMulch is a compressed pellet of recycled paper, water-absorbing polymer and starter fertilizer. Other pelletized paper mulches made from various materials have since come onto the market.

During the development of PennMulch, a field study was conducted to compare pelletized paper mulch performance with that of straw (3). For the study, a silt loam soil was fumigated with dazomet to kill existing vegetation and weed seeds in the soil. The soil was tilled to a depth of 4 inches, graded with hand rakes and seeded with Merit Kentucky bluegrass at 2.5 pounds per 1,000 square feet.

The treatments consisted of pelletized paper mulch, oat straw plus fertilzier, oat straw alone and an unmulched control. The pelletized paper mulch had a fertilizer analysis of 1-3-1 (nitrogen, phosphorus, potassium) with 100 percent of the nitrogen being quickly available. In the straw-plus-fertilizer treatments, the same fertilizer used in the production of the pelletized mulch was sprayed on the soil surface before straw application to ensure equal fertility in the mulching treatments.

Clippings were removed from the plots with a 20-inch reel mower 30 and 44 days after seeding. All broadleaf and grassy weeds were removed from the plots before the first clipping collection so that the weight of the weeds did not interfere with the weight of the turfgrass yield. Clippings were dried at 62 C for a minimum of 24 hours and weighed.

Results and Discussions

All of the mulching treatments performed very well in comparison with the unmulched control. At the 30-day mowing, all treatment results were statistically the same, except for the straw without fertilizer at 40 and 80 pounds per 1,000 square feet.

Clipping yield at 44 days after seeding showed all of the treatments had significantly higher yields than the unmulched control. The pelletized paper at 90 pounds per 1,000 square feet provided significantly higher yields than the other mulch treatments.

Conclusions

The effects of mulching on the establishment of Kentucky bluegrass were very similar for pelletized paper and oat straw. Pelletized paper mulch appears to be a good alternative to straw mulches.

Pelletized paper mulches are also attractive for golf course applications because of the ease of use and application. In addition, these mulches are weed-free, provide a neat appearance after application and do not have to be removed after germination.

Acknowledgments

The author thanks Jeff Gregos and Art Gover for their support in this field study, Sue Eisenhauer for assistance with this paper, as well as the Pennsylvania Turfgrass Council for its continued support of turfgrass research at Penn State.

Literature Cited

1. Adams, J.E. 1966. Influence of mulches on runoff, erosion and soil moisture depletion. *Soil Science Society of America Proceedings* 30:110-114.

2. Barkley, D.G., R.E. Blaser and R.E. Schmidt. 1965. Effect of mulches on microclimate and turf establishment. *Agronomy Journal* 57:189-192.

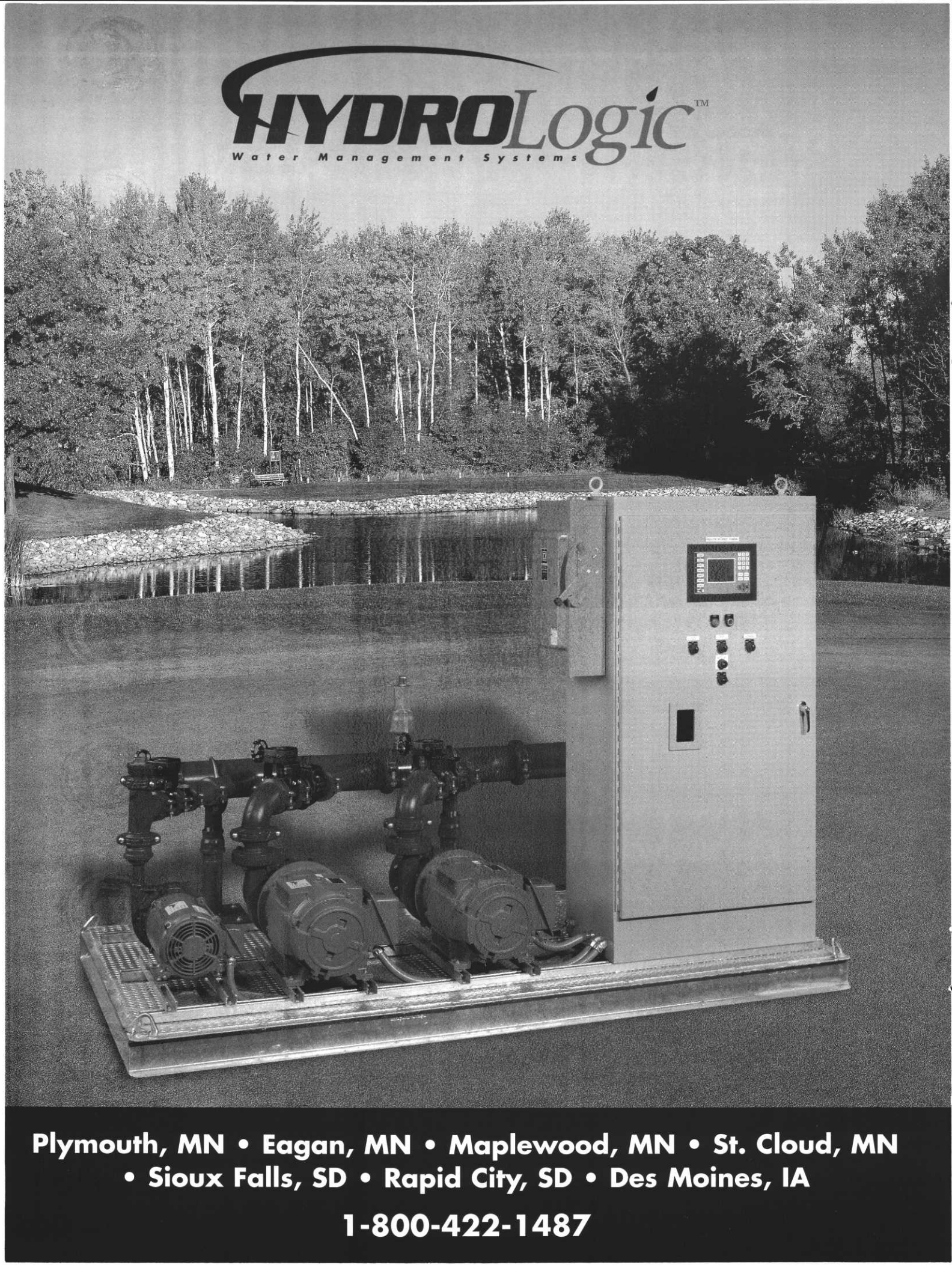
3. Hamilton, G.W., J.S. Gregos, L.P. Tredway and A.E. Gover. 1997. Pelletized paper as a mulch for turfgrass establishment. *International Turfgrass Society Research Journal* 8:101-107.

4. Harris, F.S., and H.H. Yao 1923. Effectiveness of mulches in preserving soil moisture. *Journal of Agriculture Research* 23:727-742.

5. Singer, M.J., and J. Blackard. 1978. Effect of mulching on sediment in runoff from simulated rainfall. *Soil Science Society of America Proceedings* 42:481-486.

* * * *

(Editor's Note: George W. Hamilton is senior lecturer of turfgrass science at Pennsylvania State University. PennMulch is a registered trademark of Lebanon-Seaboard Corp.)


HYDROLogic™
Water Management Systems
Plymouth, MN • Eagan, MN • Maplewood, MN • St. Cloud, MN
• Sioux Falls, SD • Rapid City, SD • Des Moines, IA
1-800-422-1487

Managing Midwestern Naturalized Areas

Planning, Weed Control and Occasional Mowing Can Create Wild-Looking Spaces on the Course

By TOM VOIGT, Ph.D.
University of Illinois

Many superintendents see benefits in mowing selected areas just once or twice a year to create "naturalized" areas of tall grass. Budgetary savings, for both labor and equipment, often result. Moreover, fertilizer, insecticides and fungicides are rarely, if ever, applied to these areas.

There can also be environmental benefits. Taller plants provide food, shelter and protection for birds, mammals and assorted insects, amphibians and reptiles

Perhaps most important, unmowed areas can enhance the golfing experience as they separate fairways or present shot-making challenges. The attractiveness of the unmowed area may be improved by planting flowering forbs and grasses.

On the downside, umanaged naturalized areas can become unattractive, weedy messes, and some golfers may find even well-managed naturalized areas unappealing. Unmowed areas too close to fairways can slow play when golfers search for errant shots. Weed control may require labor and chemicals.

Increased wildlife can also be a negative. Deer and rabbits may damage plants, both on the course and on neighbors' grounds. Nuisance insects such as mosquitos or yellow jackets may also proliferate in naturalized areas. Finally, including natural areas where they don't belong may compromise the original design of some courses.

But under the right circumstances, naturalizing makes sense for many golf courses.

Observations

At many upper-Midwest golf courses, superintendents simply stop mowing out-of-play areas and allow existing vegetation to grow. Often, certain varieties of cool-season grasses are present. Orchardgrass *(Dactylis glomerata),* smooth bromegrass *(Bromus inermis),* creeping bentgrass *(Agrostis palustris)* and fine fescues *(Festuca species)* may dominate in lightly shaded areas. Creeping bentgrass, Kentucky bluegrass *(Poa pratensis),* tall fescue *(Festuca arundinacea)* and timothy *(Phleum pratense)* are often found in sunny areas.

Foxtails *Setaria* species) and other grassy weeds are often present. Dandelions *(Taraxacum officinale),* buckhorn plantain *(Plantago lanceolara),* Canada thistle *(Cirsium arvense),* chicory *(Chicorium intybus)* and wild carrot *(Daucus carota)* may also emerge, along with white and yellow sweet clovers. Woody plants such as cottonwood and willows can be troublesome.

Mowing naturalized areas once or twice a year cleans up debris, reduces weed and woody plant invasion and stimulates grass growth. Mowing in mid-to-late spring can remove cool-season grass seedheads, and late-summer or early-autumn mowing will clean up naturalized plantings and encourage regrowth of cool-season grasses.

(Continued on Page 18)

A Tradition of

SPRING/SUMMER HOURS

IRRIGATION AND COMMERCIAL PARTS

7:00 am – 5:00 pm, Monday – Friday
(Plymouth, Fridley, Burnsville, and Fargo Locations)
8:00 am – 12 Noon, Saturday
(Plymouth Location ONLY)
With the exception of May 29, July 3, and September 4 when we will be closed for the long holiday weekends.
These extended hours will continue through mid-September.

GROUNDSMASTER® 3000
with Contour 82 Deck

- Out front deck with right hand trim offset
- Cutting width: 82", height-of-cut: 1–4"
- Rear discharge with partial recycling
- Mows up 4.6 acres per hour at 5.5 mph
- High efficiency blade drive

REELMASTER® 3100-D
with Sidewinder Cutting Units

- Varies tire tracking – reduces compaction and wear
- 23" of overhang – trims closer
- Shift all 3 cutting units uphill for safer, better traction – no scuffing
- Outfront operator visibility

AVAILABLE

• Product Demonstrations •
• Equipment Finance Programs •

Contact Your MTI Representative Today

EQUIPMENT SERVICE

- Trouble Shooting
- Cutting Unit Rebuilding/Sharpening
- Electrical Diagnostics & Repair
- Hydraulic Diagnostics & Repair
- Engines – Motor Repair/Rebuilding
- Field Service

Call Randy Mackeben, Ext. 229

IRRIGATION SERVICE

- Pump Station
- Trouble Shooting
- Refurbishing/Updating
- Solid State
- Electro/Mechanical
- Field Service

Call John Artus, Ext. 205

Dependability

EMERGENCY AFTER HOURS IRRIGATION SERVICE

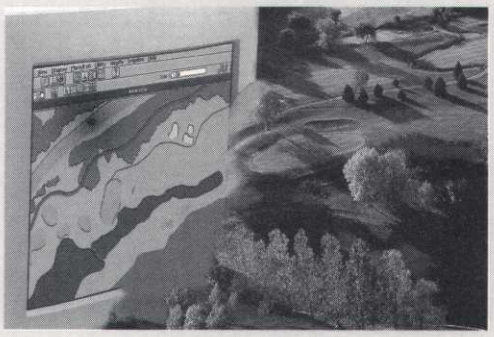
Call 612-475-2200, Ext. 302 or 1-800-362-3665, Ext. 302
(For service during regular business hours, 8:00 am – 4:30 pm, Monday – Friday, call John Artus at the above numbers, but use ext. 205)

The Complete Source for Irrigation Renovation

LARGE TURF SPRINKLERS

- Save time, water and money
- Fast retrofit conversion units
- Toro products irrigate more courses than all other brands combined

SitePro™
CENTRAL CONTROL SYSTEM



PICTURE-PERFECT IRRIGATION CONTROL

SitePro is irrigation management for the 21st century.

- Incredibly flexible
- Incredibly accurate
- Incredibly powerful

PREDICTABLY TORO
Call for a product demo

MTI DISTRIBUTING CO.

TORO®

14900 21st Avenue North • Plymouth, MN 55447
612-475-2200 • 800-362-3665

4310 Main Avenue • Fargo, ND 58103
701-281-0775 • 800-782-1031

Naturalized Areas—

(Continued from Page 15)

Be aware that mowing on an annual or semi-annual basis can produce large amounts of clippings. Rotary mowers chop up clippings somewhat, but sickle-bar mowers leave long clippings that must be removed if it appears grasses will be unable to grow through them.

Periodic burning is useful in natural areas or prairies dominated by warm-season grasses and forbs, but fires may damage or kill shallow-rooted, cool-season grasses, and such grasses may not dry out enough to burn readily.

Hand pulling, cutting or burning can be effective against some weeds. For woody plants, it is often necessary to combine mechanical methods with herbicides. timing may be critical. Yellow and white sweet clover are controlled best if cut to the ground just before flowering. Others, such as Canada thistle, should be cut during flowering.

Herbicides area also used in naturalized areas. Specific forumulation of 2, 4-D, dicamba and triclopyr are labeled for broadleaf control in naturalized settings. When dealing with any pesticides, be sure to read, understand and follow all label instructions for the safest and most effective control.

Plan The Attack

Before you decide whether to naturalize an area, answer the following questions:

- Are naturalized areas appropriate for your course? Will your course layout be negatively affected by naturalizing?
- What are your objectives? Are you just trying to reduce maintenance or do you want to enhance the appearance of an area? Are you trying to separate fairways? Think about the "look" that you want to achieve.
- Will naturalized areas slow play? Uncut areas can slow play significantly if too many errant shots end up there.
- How much plant diversity do you want in these areas? Are you recreating a meadow or prairie, or are you willing to live with only cool-season grasses in these areas? Do you want to bring in flowering plants and warm-season prairie grasses? What time of year do you want the area to be most attractive?
- How will the area be managed? How often will you mow? Can you tolerate weeds? How will you treat them? What is your overall management plan? Is burning an option, practically and legally?

Least-Management Option

If you opt for the least-management alternative, naturalization of cool-season grasses can begin as soon as normal management activities cease. Future management will include mowing in spring before plants go to seed — or in autumn before resumption of active growth — and collection of clippings. The major benefit to this naturalizing option is the overall labor and chemical savings.

This least-management option can, over time, result in serious weed invasion, particularly in summer, when cool-season grasses may be dormant. Aesthetically, this option lacks attractive plants, such as wildflowers or unique grasses, and may become more unattractive because of weeds.

Modest-Management Option

If you add selective pre- and post-emergence herbicides for controlling weeds to the least-management option, you can obtain more control over naturalization. For example, should chicory invade the area, a post-emergence broadleaf herbicide can be applied. Similarly, if green foxtail *(Setaria viridis)* becomes a problem, several selective pre-emergence herbicides are available for control. In cool-season grasses, either broadcast applications or post-emergence spot treatments can be made.

The modest-management option combines the savings resulting from infrequent mowing with improved appearance; offending weeds are reduced or eliminated. Still, this option suffers froma lack of colorful, attractive broadleaf plants.

Enhanced-Management Option

The goal of the enhanced-management option is to create a naturalized area in which attractive grasses and flowering plants are incorporated and weeds are controlled.

Mowing once or twice per year and collecting the clippings is again part of this management scheme. Attractive grasses and flowering plants can be incorporated, using

(Continued on Page 20)

Naturalized Areas—

(Continued from Page 18)

seeds or plants, into island beds rather than planting into the grass stand itself.

Concentrating mixed planting into island beds allows weeds to be easily and selectively controlled in the cool-season grass portions of the planting without damaging the plants in the island, and it lets the new plants establish with less competition.

To create island beds, identify spots where increased color and plant diversity may enhance the appearance of the hole. Outline beds using turf paint. Apply glyphosate (Roundup) to the outlined areas when the cool-season grasses are actively growing (usually spring or early summer), then mow after the grass dies. Some grasses may require a second application of glyphosate for complete kill. Scratch the surface lightly with a vertical mower or similar equipment so seed can make contact with the soil. Rotary tilling is not advised because it can turn up weed seeds.

Select plants adapted to your site and region that, together, provide season-long color. Select plants of similar height to avoid a rough, unkept appearance. Use grasses sparingly, if at all. Be aware that seeds of attractive perennial grasses or flowering broadleaf plants can take two or more years before they flower and become showy.

Many greenhouses sell perennials as "plugs." These are small, relatively inexpensive established plants and are cheaper than large, potted plants. Most plugged plants will flower during the planting year or during the first year following planting.

Plugs need to be watered repeatedly to ensure establishment. A 2-inch layer of a fine-textured organic mulch can hold soil moisture, guard against soil temperature extremes and restrict weed seed germination and establishment. A pre-emergence herbicide such as Preen (trifuralin) should reduce weed invasion.

Conclusion

Not every course is suited to naturalizing. Before starting, be sure to think through the entire process and the likely results.

The results will probably be both interesting and surprising. Wildlife may increase. Some golfers will be excited by the "new" look, but others will mourn the loss of the manicured past. You may even stretch your budget further than anticipated.

* * * *

(Editor's Note: Tom Voigt, Ph.D., is an Extension turfgrass specialist at the University of Illinois. This article was reprinted with the permission of Golf Course Management magazine.)