



Low Chemical Landscape Management On a Golf Course

PART I: Getting Plants Off to a Good Start

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“Low Chemical Landscaping” and “Integrated Pest Management” are the landscape phrases of the 1990’s. But these concepts are hardly new! The practice of using biological control (using one organism to control another) is at least 100 years old: ladybird beetles were released into California citrus groves in 1888 to control harmful insects. And IPM programs—integrating physical, cultural, environmental, mechanical, biological and chemical pest management techniques—dates back at least to the early part of this century. Since that time, IPM has gained more and more momentum. We are now at a point where much of the basic research about insect and pathogen biology, crop tolerance and damage levels, and environmental parameters has been done. IPM programs are now an integral part of many agriculture production programs.

IPM programs have been developed less in the landscape industry than in vegetable, fruit and field crop production for various reasons. First, those crops are generally grown in large plant numbers, where pests concentrate and can be monitored easily. In landscapes, on the other hand, we are likely to have a few each of many plants, each with its own pest problems. This makes scouting and non-chemical control a real challenge. Second, the necessary research on ornamental crops was not conducted to any great extent for lack of funds, because landscapes were not “big business” until fairly recently—but we all know that has changed. And third, some serious issues have surfaced in recent years that demand a rethinking of the use of pesticides in all of agriculture, including the landscape sector. These issues include the following:

- Overuse of chemicals has led to pest resistance, pest resurgence and some harmful effects on humans and other nontarget organisms. It doesn’t matter which sectors of agriculture may

have contributed to this situation; all sectors are being scrutinized.

- Overuse or improper use of some chemicals has caused groundwater contamination in many parts of the country.

- FIFRA has required that pre-EPA-approved pesticides be reregistered within 10 years, a process which may cause the loss of some materials that the landscape industry relies on.

- Instances of pesticide contamination of food have produced a social climate in which the general public is increasingly unsympathetic to agricultural use.

The landscape industry has had some difficulty adopting IPM practices because of the lack of needed scientific data and the diversity of ornamental plantings, but the research base is growing, and there are enough success stories to show that it can be done. A company in North Carolina, for example, offers landscape IPM services commercially to homeowners (Grossman, 1989). Another company in Maryland offers commercial scouting services to nurseries (Daar, 1988). And, as Michael Semler pointed out in the last issue of *The Grass Roots* (Semler, 1991), golf course superintendents have used the principles of IPM, if not the terminology, for a long time.

The prospect of establishing a full-blown IPM program for all the plantings on your golf course is daunting, but you can break it up into logical steps by considering how to develop a healthy landscape at each of the three phases of landscape development: Design, Installation and Maintenance.

Designing a Landscape for Low Chemical Maintenance

Low chemical landscape management does not just happen—it must be planned for from the beginning. In an analysis of the design and maintenance needs of urban parking lots, Pfeiffer et. al. (1987) found a significant

relationship between design and construction practices, and future landscape management needs. The study found, for example, that soil compaction and inadequate irrigation had the greatest impact on plant survival and vigor. Early planning for those problems can improve the success of the plantings. Other problems included inappropriate plant selection, out-dated construction specifications, and conflicts between planting bed design and pedestrian traffic patterns. These factors combined to decrease the effectiveness of the landscape, and increase its maintenance needs. The study showed that careful attention to plant selection, specification review and maintenance projections during the design stage can avoid long-term maintenance problems.

The first step in designing any landscape is to determine its functions. Ornamental landscape plantings on the golf course may serve the functions of separating the holes and guiding golfers around the course, beautifying the course, controlling wind, minimizing soil erosion, and providing sound and visual barriers. Once the functions are determined, the remaining four steps of designing are just “filling in the details.”

First, do a thorough site analysis to determine what the location will provide for plants. Determine slope, exposure, soil characteristics, water availability, and weather and climate factors. Determine what the site offers and, perhaps more importantly, what it does not offer.

Then, select plants that will adapt to the site. This is far easier than selecting a favorite plant and then trying to locate a place where it will survive! Many references provide extensive plant lists to help you make the best selections (Dirr, 1990; Gerhold, 1989; Hasselkus, 1991; Sabuco, 1987; Wandell, 1989). Within many species

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of ornamentals, cultivars have been developed with environmental, insect and disease problems in mind. For example, many disease-resistant crabapples are available, and columnar forms of many trees are available for sites where limited spread is desired. Many publications provide information to help you sort out which specific cultivars will perform best in your geographic region. For example, Epping and Hasselkus (1991) provided an excellent list of rugose roses in the last issue of *The Grass Roots*.

Next, consider long-term plant growth. Choose plants whose mature size will physically fit the site. Choosing plants that will grow too large will mean costly pruning at some point, and stress that may promote insect/disease pressure. Designing overcrowded plantings may cause general stress from competition among plants, and may create a situation that requires frequent disease control.

The last step of designing is to review the maintenance requirements of plants and plantings. If you check a reference and find that a particular plant is susceptible to serious problems, look for another plant. Consider native plants, and preserve natural plantings wherever appropriate. Project maintenance tasks so that you can anticipate problems and solve them before they develop.

Proper Planting and Early Care Promote Good Tree and Shrub Health

Installing the landscape may at first seem like the "little step" between

design and maintenance, but the treatment which a landscape plant receives at planting time and in its first few years can promote either long-term landscape effectiveness, or decline and the need for high maintenance and early replacement. Healthy, vigorous plants that are given a good start are far more able to fend off insects, diseases and environmental stress than plants showing poor growth and vigor.

Always start with healthy plants. Whenever possible, go to a nursery and tag the plants you plan to purchase. If that is not possible, develop a good working relationship with a nursery or a landscape contractor and let them know that your company places a high value on quality.

Once the location is determined and a healthy plant has been selected, it's time to schedule the planting process. The best time for planting bare root materials is spring, as soon as possible after plants are on site. Spring is a good season for planting containerized and balled-and-burlapped plants, too, but some of these materials may also be planted in fall. Spring-planted materials are ready to begin a new season of growth, and they undergo little desiccation because there is usually an abundance of water at that season. However, spring planting offers the challenges of leaf burn in an early spring, and possible setback from the shock of digging and moving. Fall planting has become popular in recent years because the soil is often drier than in spring, allowing it to be worked, and because late fall-planted materials are entering dormancy and will resume ac-

tive root growth in the spring in their permanent location.

Dig a hole three to five times the diameter of the root ball, and the same depth as the root ball. Older recommendations often suggested digging a deep hole, but it is important to rest the root ball on native soil in order to ensure that the plant will not settle deeper over time. Many tree and shrub problems develop later if the plants are not placed at the proper depth, due to root stress from lack of oxygen. There are two exceptions to this rule of planting depth. If the soil on site is heavy clay or compacted soil, set the root ball so that the root collar is one or two inches above ground level, and build the soil up to the root collar. If the soil is very light sand, set the tree or shrub an inch deeper than the standard recommendation, to protect the roots from drying out. For recommendations on planting in tree pits or containers, see Moll et. al. (1991).

If the tree or shrub is in a container, remove it, set the plant in its hole and position it. Check for girdling roots, and separate and spread any such roots (cut them away if necessary). If the plant is balled-and-burlapped, set it in its hole, cut wires and ropes, and pull back the burlap to the bottom of the hole (remove synthetic burlap!). Backfill the hole halfway, tamp lightly but do not compact, then water to settle the soil. Fill the rest of the hole and water. New plantings can be fertilized with a slow-release fertilizer, but if you plan to use a soluble material, wait until the following spring, and apply the fertilizer when the new season's first leaves have fully expanded.

Apply two to four inches of mulch (bark or wood chips) around newly planted trees and shrubs, but keep it six to eight inches away from the plants. How wide should the mulched area be? That is a question of both esthetics and plant health. About 90% of a tree's roots are in the top twelve inches of soil, so if a tree is surrounded by turf, competition with grass roots is inevitable. In fact, a study done at the Morton Arboretum (Watson, 1989) found that up to 90% fewer tree roots grew in the top few inches of soil where trees and grass were grown together, as compared with trees grown without competition from grass. A tree's roots extend two or three times as wide as its branches, and it is not practical on a golf course to provide such a wide mulched area. However, grouping

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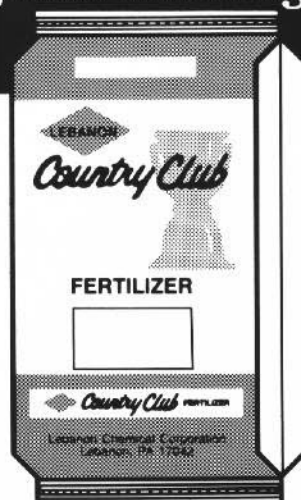
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BETTER TURF CARE FROM THE GROUND UP

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ornamentals and mulching as wide a zone as possible around the group will encourage good root activity.

Healthy balled-and-burlapped trees and shrubs that were properly handled during the digging and transportation phase generally require minimal pruning, if any, at planting time. Since early pruning directs the future growth of any plant, it is important to take the time to remove a double leader, suckers and damaged or crossed branches, but further pruning is generally not needed. Containerized plants with intact root systems generally require no pruning at planting time except removal of damaged or crossed branches.

Some trees may require trunk wrapping to protect them from drying out excessively during the establishment period, or from being damaged by bright sun in their first winter. Always remove tree wrap after the first year, to prevent girdling and damage from wetness trapped under the wrap.

Trees rarely need to be staked or guyed. The exceptions are trees planted where vandalism might be a problem, trees planted in very windy locations, and trees with large canopies that might topple. If staking or guying, pad the wire loops placed around the tree, locate the loops as low as possible on the tree, and remove them after one year to prevent damage. Where staking and guying is unnecessary, avoid the temptation! Trees grown without these supports develop stronger boles which withstand wind better in later years.

The most important aspect of early ornamental plant care is irrigation. Water plants thoroughly at planting time, and provide adequate water throughout the establishment period. Irrigation frequency and amount vary by plant, location, weather and soil type, but generally ornamental plants should receive an inch of water per week (one-and-one-half inches in sandy soils), throughout the growing season. The establishment period for woody plants is not just a week or two.

Thorough watering and periodic monitoring for signs of stress should continue through the first three years after planting. Providing this early care will pay off long into the future, because a plant that develops a good root system is able to develop the vigor needed to fend off insect and disease damage in later years.

Summary

Ornamental plants are an important part of any golf course. They serve many functions, and they give form to the landscape. Proper design, planting and early care ensure that these plants have the opportunity to develop into valuable assets.

In spite of the best-laid plans, however, problems do occur. In the second part of this two-part series, I will discuss some approaches to solving landscape plant problems following the principles of IPM.

Literature Cited

- Daar, S. 1988. Update: Nursery IPM by the Seat of the Pants. *IPM Practitioner* 10(10):1,3-5.
- Dirr, M.A. 1990. *Manual of Woody Landscape Plants*. 4th ed. Champaign IL: Stipes Pub. Co.
- Epping, J.E., and E.R. Hasselkus. 1991. Spotlight on Shrub Roses. *The Grass Roots* (18)4:10-12.
- Gerhold, H.D., W.N. Wandell, N.L. Lacasse, and R.D. Schein. 1989. *Street Tree Factsheets*. Penn State University. Factsheets 1-122.
- Grossman, J. 1989. Entomological Society of America's 1988 Annual Meeting IPM Highlights: Part Three. *IPM Practitioner* 11(5):8.
- Hasselkus, E.R. 1991. *A Guide to Selecting Landscape Plants for Wisconsin*. University of Wisconsin-Extension. Bulletin A2865.
- Moll, G., P. Rodbell, R. Skiera, J. Urban, G. Mann and R. Harris. 1991. Planting New Life in the City. *Urban Forests* 11(2):10-17.
- Pfeiffer, C.A., J.A. Wott, and J.R. Clark. 1987. Analyses of Landscape Design and Maintenance Requirements in Urban Parking Lots. *J. Environ. Hort.* 5(4):188-192.
- Sabuco, J.J. 1987. *The Best of the Hardest*. 2nd ed. Flossmoor IL: Good Earth Publishing, Ltd.
- Semler, M. 1991. IPM: We've Been Using it All Along. *The Grass Roots* (18)4:33-34.
- Wandell, W.N. 1989. *Handbook of Landscape Tree Cultivars*. Gladstone IL: East Prairie Publishing Co.
- Watson, G.W. 1989. Competition Between Trees and Turf. *Grounds Maintenance* 24(10):30,32, 59-61.



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