Organic program mix shows results on Idaho golf course

The organic turf care program at Stoneridge Golf Club started slowly, but positive results were soon evident.

by Dan Eskelson,
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■ In an effort to achieve a high level of environmental compliance and responsibility, Stoneridge Golf Club, Priest River, Ida., began utilizing integrated pest management (IPM) strategies 1988.

The season of 1991 brought to fruition some of our endeavors at Stoneridge, when three distinct disease occurrences were successfully controlled without the use of synthetic fungicides.

The following definition of IPM, selected from several we have seen, best exemplifies our approach:

"...a decision-making process for determining *if* you need pest suppression treatments, when you need them, where you need them and what strategy and mix of tactics to use. In IPM, treatments are not made according to a predetermined calendar. They are made only when and where monitoring has indicated that the pest will cause unacceptable economic, medical or aesthetic damage. Treatments are chosen and timed to be most effective and least disruptive to natural mortality factors."

Stoneridge Golf Club:

- Lies in a Northern Idaho mountain valley at an elevation of 2500 feet;
- Native trees include red and white firs, western larch, ponderosa pine and hawthorne.
- Soils range from coarse sand and gravel to heavy silt loams.
- The greens mix is a shallow hodgepodge of different sands and silt, with plenty of fist-sized rocks.
- Penncross creeping bentgrass predominates the greens at about 95 percent.
- Symptoms of take-all patch, Ophiobulus patch, leaf spot and Fusarium bli ght are some common diseases in our area. The existence of those pathogens and possibly others resulted in the regular, preventive use of various contact and systemic fungicides until late in the 1988 season.

At this time, during my first year at Stoneridge, I began to investigate the underlying causes of seemingly endless disease problems. Soils were found to be distinctly layered at a depth of three inches. An anaerobic black layer was present on two of the greens.

A diseased section of the first green at Stoneridge was aerated with 3/8-inch solid tines, and the holes filled with screened compost. Symptoms were gone in a week.

IPM in practice— The following season a cultural program was implemented on four putting greens. This involved the use of natural organic fertilizers and a biostimulant (made by a cold temperature extraction process from 15 different sea plants.) The greens chosen varied from being traditionally healthy to highly disease prone.

The slow process of improving soil microbial activity and increasing plant vigor involved considerable faith and patience on everyone's part, but well before the end of the season, noticeably positive results were obtained:

- Disease incidence remained about the same, severity was definitely reduced;
- Recovery from disease damage after curative fungicide application was more rapid than it had been on control greens.
- Color was acceptable, but not as verdant as on those that were still on the traditional fertilizer program.
- Clipping yield was markedly reduced, with no loss of shoot density.

All greens were placed on this program in 1990 with one variation. Due to extreme cool spring soil temperatures and resultant lack of microbial activity, one application of a synthetic organic greens fertilizer at 0.5 lb. N/1000 sq. ft. was applied to initiate early growth and color.

Our natural nitrogen was supplied from a commercial natural organic, composts and fish emulsion at 3.0 lb. N/1000 sq. ft./year.

Potassium was supplied by the previous materials, sea plant extract and biannual application of sulfur-coated sulfate of potash to approximate a 1:1 NK ratio. Phosphorus was supplied by bone meal, applied at .75 lbs./1000 sq. ft., well in advance of any reseeding efforts.

Balanced top growth—with no surges—has produced reliable and predictable putting surfaces. Reduced clipping yield has saved greensmowing time. With regular foliar sprays of liquid compost and fish emulsion, color has equaled or surpassed that produced by synthetic fertilizers.

Suppressing disease naturally—Our first experiments with natural disease suppressants were promising but not totally effective. Fairly high rates of sea plant extract (7 oz./M) and a natural enzyme product were applied to control take-all patch at seven-day intervals. The disease was arrested but recovery was slow.

The addition of "compost soup" (see sidebar) increased the program's effective-

ness immensely. I had learned about it through research at the University of Bonn's Institute of Plant Diseases in Germany. A compost soup mixture was being used there to control non-turfgrass diseases such as Phytopthora, Botrytis and other fungal diseases. Apparently, active ingredients in the compost do not actually kill fungi but prevent them from colonizing plants.

> The 10,000 annuals at the course receive fish emulsion and sea plant extract in the beginning in the seedling stage.

Thatch reduction— I believe that regular use of sea plant extract and natural organics has helped us maintain the bentgrass thatch layer at one-quarter inch or less, without regular sand topdressing.

Although sand topdressing has been a time-tested, effective method of thatch control for many, we found that we could invariably count on disease stress soon after the completion of this process at Stoneridge.

We decided to try using screened compost as a topdressing. It involves just slightly more brushing and clean-up time than with sand. To counter graining, we regularly brush with a home-built tool just prior to mowing.

Costs a bit more— In terms of the cost effectiveness of our IPM program, we have had to consider several factors. First, commercial natural organics are slightly higher in cost than high-quality synthetics.

The slow, even release of the natural organics, however, has allowed us to reduce our synthetic fertilizer program by almost 50 percent.

The large savings here are only partially offset by the purchase of biostimulants. Fish emulsion costs less than $50 per year for regular foliar application to greens.

For topdressing after green aeration, cost was more than one-third greater than it would have been with local sands. This extra cost was offset by the fact that we did not use fungicides during the 1992 season.

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***Ed. note**: Ken Eskelson is now owner of Clearwater Landscapes, Inc., Priest River, Idaho.*

"Please understand I am not 'anti-chemical' (whatever that means)," wrote Eskelson to Bioturf News. *"I do believe, and have learned from experience, that a healthy soil will produce healthy plants, requiring few, if any, curative inputs. This is not always possible (i.e. putting greens stressed by mowing heights of ⅛-inch).) I feel it important to work for cultural systems with as few synthetic inputs as possible."*

Specific products used by Eskelson at Stoneridge included Ringer Greens Restore fertilizer; Emerald Isle Pana Sea and Pana Sea Plus sea plant extracts; Safer's insecticidal soap; and Dipel Bacillus thuringiensis *for webworms, cutworms, tent caterpillars, etc.*

RECIPE FOR COMPOST SOUP

■ Here's Dan Eskelson's recipe for the compost soup used for disease prevention. The base is produced in Missoula, Mont., from digested sewage sludge and wood wastes (sawdust, wood chips and finely shredded bark.).

The aerated piles must first reach temperatures of 170° F and higher, to destroy any harmful bacteria or weed seeds that may be present.

1) Fill burlap sacks and suspend them in large plastic trash barrels filled with water.
2) Brew for 10 to 14 days
3) Strain directly into spray tank. Use a nylon stocking as a strainer to prevent clogged spray nozzles.
4) A 40:60 soup-to-water ratio worked at Stoneridge. In the event of increased disease severity, experiment with a stronger mix.
5) Mix about 40 gallons of soup with 60 gallons of water in a 100-gallon spray tank.
6) Sea plant extract and fish emulsion are usually added.

Yield: 100 gallons covers 50,000 square feet of golf greens.

Cost: one man hour/week plus $45 per year for the commercial product. The compost is purchased in bulk and is relatively inexpensive. Still, it is the program's costliest IPM-related item.

Ecogen moves forward on nematode research

■ Ecogen Australia Pty. Ltd. has established a cross-licensing agreement with the Commonwealth Scientific and Industrial Research Organization of Australia (CSIRO). CSIRO's Division of Entomology is a worldwide leader insecticidal research.

Under terms of the agreement, Ecogen gets co-exclusive rights to patents which CSIRO holds in insecticidal nematode fermentation, formulation and production processes. CSIRO receives co-exclusive rights to Ecogen Australia nematode formulation patents.

Insecticidal nematodes are microscopic roundworms that seek out and attack insect larvae either in the ground or in plant stems.

Since 90 percent of all insects live in soil during some part of their lifecycle, there is a substantial opportunity in the nematode-based biopesticide market for Ecogen's products.

Ecogen has been involved in nematode research since March of 1992, when it acquired the bio-insecticide business of Bioenterprises Pty Ltd. of Australia and created Ecogen Australia.

The newly-formed company develops and commercializes biopesticides using nematodes.

In addition to the cross-licensing agreement, Ecogen and CSIRO are entering into discussions to identify areas of potential cooperation in research and development, including insecticidal nematodes and insect attractants and pheromones.