ORGANIC INSECT MANAGEMENT AT THE VINEYARD GOLF CLUB

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The Vineyard Golf Club, a private 18-hole Donald Steel designed course, opened for play during May 2002. The golf course's construction on Martha's Vineyard was subject to agreements and conditions required primarily by The Martha's Vineyard Commission, an authority established by the state to protect the land and waters on the island. The course's developers also worked with the Sheriff's Meadow Foundation to obtain additional approvals for the golf club focusing on the agreements to protect the environment.

One of the conditions of approval for the course was that it be managed organically, which was defined as "… derived from plant materials or biological organisms or mined from natural deposits". While it is important to keep in mind that the course was required to use organic maintenance practices, the club's members have enthusiastically embraced the organic mandate even through times when playing conditions are not visually perfect.

Communication between the golf course superintendent and the membership is critical at an organic golf course, because golfers' expectations seem to include a preference for "Augusta-like" or visually appealing playing conditions; regardless of the course's budget, location or environmental restrictions. Communications with members at the Vineyard Golf Club include:

- publishing an article from the maintenance department within every club newsletter that includes project updates and conditions on the course
- playing golf with members throughout the season
- hosting an annual "open meeting" at the club during August
- initiating impromptu visits with members on the course
- encouraging feedback at all times
- seeking out members who may have voiced concerns about the course

These communication efforts are very important when dealing with pests, any corresponding turfgrass damage, and the specific organic maintenance practices we use on the golf course. Specifically, during the fourth and fifth years of operation, the maintenance department has dealt with grubs and predators that feed upon the grubs, including crows and skunks.

We first noticed grub damage during the fall of 2004 and we contacted the Entomology Department at the University of Massachusetts (UMASS) for assistance. We continued our only organic treatment using *bacillus popilliae* (Milky Spore) and repaired the damaged areas every morning before play.

This organic treatment was a time consuming task that started in late August, occurred weekly until the middle of October, and accounted for more than 120 man-hours per week. This work made a difference to our players and minimized their concerns. A smooth, tamped out and seeded portion of a tee, collar or fairway does not affect play and greatly reduces the visual shock of predator damage. If damage was excessive and in a high profile area (ex. #1 white tee), we would sod the area immediately. The grubs rarely went after the new sod probably because they (the grubs) were feeding below the sod's root system.

During the peak of disease damage, grubs had attacked significant portions of tees, fairways and roughs. In an effort to quantify the extent of the damage, we measured the total areas of damage and compared that to the total unaffected areas of the tees, fairways or rough. We found that less than 1% of the managed turf areas were damaged and yet it was clear that the overall turfgrass "look" was unacceptable.

Each year during the height of grub damage, we have had little or no damage to any of our greens. In some cases the damage would occur up to the edge of the green. We think this phenomenon may be related to the construction of the greens. Each green is lined with a plastic liner that is located between the greens mix and the sub soil. During the winter of 2003, we had a severe cold spell, freezing the ground to a depth of 2-feet in the open areas. The severity of the frost was confirmed by the extensive irrigation breaks we had to repair the following spring. Since the total greens mix and stone above the liners totals 18-inches, it is conceivable that the grubs simply froze to death during this winter event. Liners might

provide interesting control in areas of the country where the frost routinely goes to 2-feet or deeper.

Keeping the members informed of these pest issues and our "organic" approach helped to establish a better understanding of the situation. Their level of understanding and support was demonstrated when the "grub" foraging predators appeared on the course. Immediately members came forward and suggested the club hire a retired "local fisherman" who specialized in skunk removal at their summer homes.

Walter, the fisherman, arrived the next day and for the past three years has removed skunks, crows and raccoons from the course. He set dozens of traps baited with white bread that had barbeque sauce slathered on, cheese crackers, or unshelled peanuts. He displayed dead crow decoys in an effort to discourage their return. The members were now participants in the management program; waving me down to call attention to trapped skunks, point out new areas for Walter set traps, or to regale me with the latest tales of their own backyard battles with skunks.

Mother Nature also got involved during the time of peak beetle activity with the arrival of a dozen or more seagulls that camped out on the fairways and devoured adult beetles by the hour. They (the seagulls) disappeared as suddenly as they appeared when the Beetles began burrowing underground.

In addition to trapping the predators and using scare tactics, a more scientific approach was required to attack the food source for these predators, the Oriental Beetle Grub. As soon as we identified the grub and isolated the infected areas, we initiated the nematode research and mating disruption programs on the course with Pat Vittum Ph.D. from UMASS to identify the best system of organic control. We kept the membership informed of our plan.

The beetle mating disruption program was implemented by Pat Vittum, Ph.D., who worked with Albrecht Koppenhofer, Ph.D. from Rutgers University on the project. In our geographic area, the beetles' mating cycle occurs during the summer beginning just after the 4th of July and continuing for two weeks through the third week in July. During year one, pheromone traps were scattered throughout the course to determine areas of intense grub activity. Our staff would empty the traps and then count, bag, date and freeze the captured beetles. After the areas of intense activity were located; a special

scent was placed in the traps and they were positioned within one acre square plots. Again beetle activity was monitored in the traps by counting the samples.

Mating disruption scents are placed throughout the course in pheromone traps to confuse the male beetles so that everything including plants, twigs, and grass appear as female beetles. The hope is that these exhausted males will not successfully mate. This research is on-going and the results will be reported through UMASS and Rutgers. Our staff was very involved in this research, taking samples from the traps and counting beetles by the hundreds.

In addition to the beetle mating disruption research, we chose a nematode (Hb2) and treated all 69 acres of managed turf during the summer 2007. It is difficult to obtain enough nematodes to treat large turf areas for two reasons:

- The law of supply and demand; because of the availability of effective insecticides there is very little demand for beneficial nematodes. Therefore, there is limited nematode production, especially in the quantities that golf courses demand.
- The second resaon is the difficulty of transporting “live” products.

It appears that the researchers are ahead of the manufacturers at this time, but hopefully that will change soon because, as well as the nematode Hb2, there is a bacteria named “buibui” that has done very well at eliminating Oriental Beetle.

Nematode applications are similar to synthetic insecticide applications in that it is important to understand the life cycle of the target and equally important to thoroughly water in at the proper time. Nematodes are live organisms that require refrigeration and have a storage limit of 30 days. We lost one shipment of nematodes that sat on a terminal in the August sun too long awaiting delivery to the Island.

Once the nematode is on site, an application should be made during a rain storm and two weeks after the beetles have pupated to larvae (early August for us). This application is made after 90% of the rain has fallen (pre-wet is key) and watered in with the remaining 10%. Imagine, for a minute, being able to predict not only when it rains but when 90% of the rain has fallen. We also have to consider the effect of soaking the turf in mid-August; our peak fungus disease time. Because we deal with live organisms that have finite life spans, organic management is often this kind of a balancing act: peak disease time coincides with optimum pesticide management application.

The organic insect management program has demonstrated four important aspects of our management program: member participation; non-traditional turf management programs; utilization of research; and measurable progress. While the initial insect damage was discouraging, it was not surprising; it just occurred a year or two earlier than expected. The members were not only supportive, but helpful in the early stages. They were the ones who encouraged us to hire Walter (the skunk man) and vouched for his effectiveness. Walter's approach to controlling insect damage was unique and "in your face", but without question mitigated damage in the early years. Our program has been the recipient of extensive research (on the golf course) with beneficial nematodes and bacterium and has provided test sites for studies in mating disruption of adult beetles. Following-up this research, we were able to acquire sufficient quantities of live nematodes to treat the entire area of managed turf this season and have observed a drop-off in damage this fall. That progress is very encouraging and has given us hope that we have a program in place to address insect damage without the benefit of traditional synthetic pesticides.