

Biological Control Program Saves Hemlock Trees

Grandfather Golf And Country Club
Peter Gerdon, superintendent

Linville, N.C. 28646



Using beetles to control an insect pest saved the hemlock trees at Grandfather Golf and Country Club, preserving the course's natural environment and aesthetics.

Issue

The hemlock tree is one of the most admired and impressive trees in the mountains of North Carolina. Hemlocks are native to the eastern United States and can live for as long as 800 years. They are the primary tree species at Grandfather Golf and Country Club and a significant feature on many holes.

In 2001, the maintenance staff noticed a white substance on the hemlocks. A sample was taken to the local extension office for analysis and it was identified as the hemlock woolly adelgid. This small insect from Asia is a major pest of the hemlock tree, but it had never appeared at Grandfather Golf and Country Club. It was initially found in the United States in 1951 near Richmond, Virginia but it is now reported in more than 16 states from Maine to Georgia. After additional research, the team learned that if left unchecked this insect pest could kill the hemlocks at the golf course in three to six years.

Action

The first step in addressing this problem was learning more about the insect pest. Entomologists said that a predatory beetle called *Laricobius nigrinus* feeds on the woolly adelgid egg sacs and could provide effective control. Unfortunately, the beetles are native to the Pacific Northwest and it would take several years to get permits to release the beetles in North Carolina. Due to the permitting delays, a control program was initiated using the insecticide Imidacloprid. The insecticide was applied using Kioritz injectors, a specialized tool that delivers the insecticide into the hemlock's root zone to kill the adelgid and save the tree. However, this program was very expensive and was not sustainable due to the high number of hemlocks throughout the golf course.

Approval to release the *Laricobius nigrinus* beetle came in 2007 from the North Carolina Department of Agriculture. Superintendent Peter Gerdon traveled with local entomologist Dr. Richard McDonald to Seattle, Washington the following year to collect the beetles and send them back to Grandfather Golf and Country Club for release on the hemlock trees. According to McDonald, the approximately 150,000 beetles collected in the Pacific Northwest have multiplied into the millions in the mountains of western North Carolina.

Results

Using the *Laricobius nigrinus* beetle to control hemlock woolly adelgids has been very successful at Grandfather Golf and Country Club. Approximately 85-90 percent of the club's hemlocks have survived due to this program. Preserving the hemlock trees helped maintain the beauty of the golf course and protected the natural environment. Preserving the trees has also helped the facility avoid the significant expense of removing the massive trees if they had started dying from the pest.

The biological control program was far superior to using the insecticide. The insecticide could not be injected into the soil around rivers, creeks, lakes and any wells on the property. Many of the hemlocks were located in these restricted areas, meaning the insecticide had to be drilled directly into the trees using capsules. A special four-man department was set up to perform this work on 1,100 acres of challenging terrain. Changing over to the biological control was more effective and saved more than \$100,000 per year.