Intern comparing Carolina, Canadian hemlocks and adelgids

This is the 10th in a series on the biological interns here in Highlands.

By Erin Brown
ebrown@highlandsnews.com

Highlands Biological Station intern Josh Brown is working toward a prediction on the fate of the Carolina Hemlock trees and comparing them to the Canadian Hemlocks.

The intern’s project focuses on comparing the impact of the wooly adelgid on the Carolina Hemlock populations and the Canadian Hemlock.

His research so far paints a bleak picture for Carolina’s hemlocks.

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Brown’s research project consists of finding different stands or groups of hemlocks around Highlands and mapping their locations. Brown is also going to try to predict what type of species will take over after the hemlock population is wiped out.

Most of the hemlock population is in North Carolina and since the wooly adelgid infestation the hemlock is in great danger of becoming extinct before Canadian hemlock, he said.

“In my final paper I will [make predictions] but I still have to do all my data analysis,” Brown said. “Right now it looks like rhododendron will take over.”

Brown is studying at the Coweeta Hydrological Laboratory off Highway 441 near Franklin. There, he has girdled, or cut a ring around the base, of a dozen Canadian hemlocks in order to study the effects of the adelgid and what might happen to the population. By doing this he can speed up the reaction to two years instead of 10 to 15 years, because it’s important to know what’s going to happen to the population before it starts to die off, he said.

Brown said that the hemlock has a high risk of going extinct and that it is very possible that the species could be lost forever in its natural range.

“There is a big possibility of that happening because of the adelgid,” Brown said.

According to Brown the adelgid was released in Virginia and then moved north. Brown said that an adelgid infested Canadian hemlock takes 10 to 15 years to die in Massachusetts and it takes three to four years for them to die in the South.

“So they’re going to be wiped out within 10 to 15 years,” Brown said.

The adelgid dies back because of the hard winters in the north, which suppresses their population, but in the Southeast’s temperate climate they flourish.

Brown said that species have been lost before like American chestnut, white walnut, dogwood, but other trees have been able to replace them.

“For dogwood it has been sassafras, for chestnut it’s been oaks, but there’s nothing to replace the hemlock,” Brown said. “There’s nothing that fills what it does in the forest.”

The hemlock provides shade along streambeds, lowers the temperature, which creates a consistent microclimate and provides a natural habitat for animals around the streambed.

“It mediates the temperature. So it makes it cooler in the summer and warmer in winter. It cools down streams and provides a lot of shade,” Brown said.

Brown’s mentor for the project is Brian Kloeppel, who is an assistant research scientist at the hydrological laboratory.

Brown said Kloeppel has helped him become more precise in his intensive research skills.

Brown was drawn to his project because of the opportunity to work at the hydrologic laboratory. Many of the scientists who study at the lab research quality of rainwater.

The laboratory has the longest hydrological record in the world, and that is why Brown wanted to study at Coweeta.

“If you’re a scientist in the Southeast you go to Coweeta to do research in the mountains,” Brown said. “It’s like the Mecca and that is one of the main reasons that I wanted to work there.”

His major at the University of North Carolina – Chapel Hill is environmental geography, and Brown said that one of his geography teachers, Dr. Martin Doyle, has been a major inspiration to him.

“He’s the reason I’m into the environment,” Brown said. “He’s been a really big help to me. He’s my mentor, the guy I look up to. Whenever I have a problem I go to him.”

In addition to working in Highlands, Brown has studied on the Mediterranean coast in Turkey helping out with an archaeological survey.

“Basically they would take anybody and everybody out into the field and try to reconstruct what the environment looked like in Roman times,” Brown said. “The coast line was like California a hundred years ago.”

Brown said that the experience was a lot of fun and led him to become more knowledgeable about other cultural differences and other languages.

“Culture shock was around every corner,” said Brown. “It was a lot of fun and they were really, really friendly.”

Brown said that he has really enjoyed being in the mountains and studying here in Highlands.

“Just driving up the Gorge Road I was amazed at how beautiful it was here,” said Brown. “I couldn’t believe I was going to live here.”

Brown, 20, expects to graduate next year and said that he plans to take a year off after graduation before he goes to graduate school.

“I’d like to go to South or Central America and explore,” Brown said. “There are several field sites that I could work at there because I’m getting a lot of experience at Coweeta.