

FEATURE

USDA Forest Service, Northeastern Area State and Private Forestry

271 Mast Road, Durham, N.H. 03824

Phone: 603-868-7600; Fax: 603-868-1066; Web Site: <http://na.fs.fed.us>

Date: 06/18/08

phone:

Feature No. DFO-05-08

Contact: Glenn Rosenholm

603-880-6325

E-mail: grosenholm@fs.fed.us

From observation to forest health application

By Glenn Rosenholm, USFS Northeastern Area S&PF

Wasp EAB Biosurveillance Lead Researcher Philip Careless said it took direct observation, field research and real-world problem solving to bring about this latest groundbreaking forest health protection effort.

His professor Dr. Stephen Marshall earlier made a huge leap forward in this field of research, he said. Marshall's son noticed about four years ago that a wasp was carrying beetles into a hole in the ground. The elder Marshall became curious and did more research.

By observing what beetles *C. fumipennis* took into the colony, they later found two new species of beetle previously unknown to Canada. They published their Ontario findings about three years ago.

"That was the phenomenal leap that he made, using one insect to search for other insects," said Careless in Ontario.

He said his own research, based on Marshall's and other researchers' earlier works, was to study what insects the *C. fumipennis* wasps brought back to their colonies.

"One of the reasons I enjoyed this project was it allowed me to study insect diversity by simply looking at what kinds of insects the *C. fumipennis* brought back to its site. I would observe how big of an insect they could carry, what things influenced the nesting, what parasites attacked the wasps, etc," he said.

Careless later attended entomological conferences in the United States. There he learned about the problems state forest health managers experienced trying to monitor for newly-established EAB infestations. Marshall and Careless thought using the *C. fumipennis* to search for the EAB might help solve the problem, he said.

"We knew going into it that they would take EAB. We didn't know if it was a practical tool. We needed to make sure the wasp was bringing in a good number of EAB. Watching the wasps would quickly tell you if the surrounding forest were infested."

Careless added that the wasp also had to be human tolerant. "We needed a wasp that would ignore humans and stay focused on their beetle collecting work," he said. He studied how the wasps reacted to human proximity and being handled. What he

found out was surprising: While the *C. fumipennis* was physically equipped to paralyze its prey with its stinger, it apparently did not sting humans.

"The convenient thing is it seems that the wasp doesn't realize it can sting in defense. We picked up wasps, handled them, but they never attempted to sting us. They tried to bite us, pull away, everything except sting us," he said. "They are just not smart enough yet to know the power they have, and that is to our benefit."

Like many non-social, solitary wasp species, it has not evolved to a point where it realizes it can use its stinger for defense, added Careless. "In wasps and bees the stinger has actually developed from an egg-laying device. Over time some wasps' egg-laying devices evolved into something that can paralyze and kill its prey. The final step in this evolution was its use as a tool for defense, like the hornet or honey bee," he said.

Another important discovery he made was that the wasp colonies did not need to remain in a single location all summer. It was possible to move them to new locations to search for EAB infestations. He began to research ways to do just that.

"We discovered that we could make the system mobile by putting wasp colonies on trailers and moving them where we needed them. Because of the species' broad distribution we can move the colonies anywhere EAB might spread to," he said.

He then shared the research results, using the *C. fumipennis* to search for the EAB, with the scientific community. Bit by bit, word got around.

Maine Forest Service Entomologist Colleen Teerling was one of the many forest health managers in the United States who saw Careless' EAB wasp biosurveillance presentation. She said she found it both fascinating and potentially a very important means of monitoring for EAB.

She and some of her colleagues became very interested in the potential of using a native wasp to search for EAB. "I put in a couple of research project proposals for *Cerceris* work in the Acadia National Park area. The other we didn't get. But then the Forest Service Northeastern Area expanded it to cover New England and New York, shuffled it around to the different states and it was picked up."

Northeastern Area Forest Health Group Leader Mike Bohne in Durham, N.H., helped to organize the proposal for the Northeastern States.

He said about a dozen or more agencies will participate this summer and fall in the project. "All of the state forestry agencies in New York and New England are taking part. New York State Ag. & Markets might be involved. WV, MD and PA folks are also involved and may submit their data to the database." The North Carolina Dept. of Agriculture is doing similar work.

The Northeastern Area is funding and coordinating the training for state forest health managers taking part the biosurveillance project. NA is also helping to identify beetles the wasps collect and it is developing an on-line database so states can submit their data.

"I'm going down for the training," said Teerling. "We've already started putting out information to hobbyists. As soon as late June and early July we'll start looking for colonies in Maine. Right now we're in an educational phase of the project."

Bohne said the biosurveillance technique has potential of being a less expensive, less destructive and more effective means of detecting EAB at low population levels than current methods. It also holds promise of speeding up detection of EAB by years.

He added "The earlier we detect an infestation, the more options we have for management and eradication."

The main goal of the project in the first year is to locate as many *Cerceris* colonies as possible, he said. In the future they expect to revisit known colonies as active biosurveillance sites and locate additional colonies.

Teerling added "I think this (project) is the best way we've got so far to monitor for emerald ash borer. I think it's one of our best bets."

Careless is overjoyed the biosurveillance project has come so far since the first observations only a few years ago, he said. "I'm absolutely delighted that a system we thought up has potential to become an accepted approach in science."

-END-