

Questions and answers about the EAB wasp project:

Philip Careless, Lead *C. fumipennis* researcher:

What is your current status as a researcher? Are you working on a grant? If so, for whom?

I work for the Canadian Food Inspection Agency. I began as a master's student. My professor's son noticed about five years ago that a wasp was carrying beetles into a hole in the ground. His father became curious and did more research. The wasp was a native to the eastern U.S. and was described in the 1830s. By studying what the *C. fumipennis* took into the colony, they later found two new species of beetle previously unknown to Canada.

How long have you been researching the *Cerceris fumipennis*?

They published their findings in Ontario in 2005. I've been working on this research for more than two years. My professor was Dr. Stephen Marshall, author of *Insects, their Natural History and Diversity*. The leap that he made was this idea of using one insect to search for other insects.

What did your research reveal?

We knew going into it that they would take EAB. We didn't know if it was a practical tool. We wanted to make sure the wasp would bring in a good number of EAB, so if the trees are infested, these wasps could tell us before it was too late. The wasp also had to be human tolerant. We wanted an insect that would ignore humans and go back to their work. One of the reasons I enjoyed this project was the opportunity to study insect diversity by looking at what kinds of insects the *C. fumipennis* brought back to its site. I also enjoy investigating how large a beetle the wasps can carry, what factors influenced the nesting, what parasites attacked the wasps, and other aspects of the wasp colony.

What did you do after your discovery?

The project could have ended once we knew the the wasps were tolerant of human presence near their nest. But I'd go to conferences and listen to people talking about their frustrations with trying to keep up with the monitoring of a rapidly spreading EAB infestation. So I began looking at using a mobile platform (trailer) to move the colonies to survey sites. We eventually designed a steel scoop that could cut and plop the once-stationary colonies onto the trailer.

What is it about the *C. fumipennis* that makes it so important in this regard?

We have a native wasp that catches buprestid beetles, one of which is the new pest EAB. We then discovered that *C. fumipennis* could tolerate researchers studying them. That was our master's project. We have since started experimenting with a mobile system which should help us move the wasp colonies where and when we need them. Because of the wasp species' broad distribution we can safely move the colonies anywhere EAB might spread to.

Is this the first time to your knowledge anyone has used a native wasp to search for an invasive insect?

Yes it is, to my knowledge. This is a beautiful example of this new concept called biosurveillance. Insect collectors have been taking advantage of this system for a

while. They would collect beetles from wasp colonies. But this is the first time anyone has used it to locate a pest.

What are you doing now in the project?

Now is the shift from using the naturally established colonies to getting mobile colonies up and running. We know we can move wasps hundreds of miles and have them promptly return back to work at these new sites search for pests. Now we are trying to determine if the system is practical when compared to the current EAB monitoring tools.

The United States is currently using prism traps and trap trees (involving bark stripping) to search for EAB. This summer the USDA has set up 84,000 EAB prism traps (a sticky trap monitoring tool). We're hoping the wasps will be less labor intensive, faster and cheaper.

There is also a possibility that the wasps are more sensitive than the current traps, and that the wasps may find the EAB at a lower level than the traps.

We want to determine which survey methods might be the best at detecting the pest beetles. The goal is to find the pest (after it arrives in a new location) before it's too late (and the population has grown too large to contain or eradicate).

We need to find them and remove the beetles from the environment or contain them so they can't spread.

What is your tie to the forest service?

USDA APHIS and Forest Service provided the funding for two projects. The first project was to study the wasp in the U.S. before it comes out in Canada. We did studies of the wasps' behavior in Florida this spring. The studies were to see if we could improve the number of wasps in a colony and increase the quantity of beetles they could collect during a day (EAB is not known in Florida, we were dealing with native beetle prey). We found that by simply putting a sprinkler nearby and watering the area once a week we could triple the colony nest density. In addition, if you police the colony you're able to improve the number of beetles each wasp brings back to the nests. Policing which wasps enter what nests insures that the owners can spend more time collecting beetles and less time defending their nests.

The other project that the USDA APHIS and the Forest Service have supported is the training of state and federal staffs to use the colonies within their own states. We're just about to send off our technicians to do this. In 2009 the colonies will have already been found and the American staff will be conducting biosurveillance work.

What are your long term plans for the project?

I certainly think it would be exciting to push the boundaries of biosurveillance. But for myself, we have one of two outcomes: If we find that using mobile colonies are not practical, we'll go back to focusing on naturally established wasp colonies. But on the other hand, if the mobile colonies prove practical, then over the next few years we will be increasing the program to search out new infestations and monitoring the status of old infestations. If they prove practical this summer, the colonies will become the standard tool for monitoring EAB in the U.S. in Canada.

How do you feel about the U.S. Forest Service and several state agencies applying your research in the fight against EAB?

I saw their proposal the other day. Number one, I'm absolutely delighted that a system we thought up has become an accepted approach in science. At the same time, there is that nervousness -- I hope it works.

What agencies are you currently working with?

It's a bit confusing to think of how we're going to coordinate it all. Obviously we can't make these steps alone and it will require a lot of coordination to get the colonies rolling. This collaboration also provides checks and balances to make sure the system runs optimally. We will need interaction with more and more groups to get it widely accepted.

Will you move on to other related insects to see if their behavior is similar?

My part in the project would be to continue to network with the project so other researchers and managers can take it further.

What can you tell me about the *C. fumipennis*' stinging behavior regarding humans?

The wasp has a stinger and it knows how to use it to paralyze its prey. The convenient thing is the wasp doesn't seem to realize that it can use its stinger for defense. We pick up wasps, handle them, but they never have they attempted to sting us. They will try to bite us, pull away, everything except sting us. That is in part because like many non-social wasps they haven't evolved to a point where they realize they can use their stinger for defense. The stinger of bees and wasps began as an egg-laying device. It then evolved into something that can be used to paralyze and kill its prey. The final step in this evolution will be to use it as a tool for defense. They are just not smart enough yet to know the power they have, and that is to our benefit.

Will forest health managers be working with outside groups to get help in finding the colonies?

The naturalist community has a better understanding of where these colonies are than we do. We need their help.

What is the major difference regarding stinging between social and non-social wasps?

The stinging part is just a tiny aspect of the behavioral differences that distinguish many social wasps from their solitary cousins.

Colleen Teerling, Maine Forest Service entomologist:

What is the Maine Forest Service's role in this issue?

We helped get the *C. fumipennis* project in the Northeast started because I was interested in it. Dennis (Souto) was also excited about it. I put in a couple of proposals, one which we got for *Cerceris* work in the Acadia National Park area. The other we didn't get. But then NA expanded it to cover New England and New York, shuffled it around to the different states and it was picked up.

What is your role in this issue?

I am considered the principal investigator on the proposal for Northeastern States because I wrote the proposal. However, Mike Bohne is really coordinating all this. I'll go down for the training and then help train people from the other states.

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

Did you or others from your agency help push for this initiative?

I helped to originate the proposal in New England.

In West Virginia, Maryland and other places, I have nothing to do with that.

How do you know Phillip Careless?

I only met Phillip once in NY at the Forest Pest Council Meeting.

This was a fairly recent discovery that the wasp preys on EAB.

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

We're going to start in the south and along the coast because we know there are wasps in those areas. The other reason we're starting there is because that is a higher risk area for EAB because of all of the campers who go there.

Some of the colonies we'll start to monitor, to see if they bring back any EAB. Phillip mentioned that if you monitor a colony until they bring back 40 insects then you'll be fairly certain there is no EAB in that area at that time.

The other technique we know works is girdling a tree. The tree becomes stressed and is then attractive to the EAB. The EAB smells the tree's stress compounds, and then attacks it. Then you have to strip away all of the bark all the way up the trunk looking for the EAB. It's a huge amount of work and you have to do it very carefully so you don't strip away the galleries looking for them. It also kills the tree in the process. It is also extremely expensive to do.

This process is probably going to be a lot cheaper than stripping bark off trees. You can send a person around to monitor a colony for a few days, and then send them on to another colony to monitor that for another few days. You're also saving trees in the process of monitoring for EAB. It is also expected to be more efficient than bark stripping. Of course it's less labor intensive.

It's encouraging that a native wasp will prey on an exotic species. That way you don't have all of the issues of bringing in another exotic species to control the population of the first one. Because this species is native, it reduces the expense and concern of bringing in another species.

The other way to monitor for the EAB is using the purple traps. Nobody really knows yet how well they are going to perform.

Have you worked with him in the past?

I noticed that West Virginia is expected to be a major location for the training. Maryland and Pennsylvania are also expected to be training states for the project. When is the ME Forest Service expected to receive training to search for, locate and monitor the wasps?

What kinds of people will receive the training?

One of the most enthusiastic groups is the Maine entomological society, a group of amateur and professional entomologists. We hope a lot of them will be searching for wasp colonies for us this summer.

This wasp is fairly distinctive in markings, in its type of nest hole and the areas in which it nests.

Why do you think this issue is important?

Using one insect to monitor for us is a neat idea. Using a native insect is even more interesting.

How will monitoring this wasp help to combat the EAB problem?

The hope is that we will be able to catch EAB infestations early on, perhaps within the first year or two. Right now, often infestations aren't found until several years later. Your options become much more limited in the management of EAB at that point.

If we catch it earlier, it will be a much smaller infestation. It will improve the possibility of eradicating the population.

Mike Bohne, Acting U.S. Forest Service Northeastern Area Durham Field Office Forest Health Group leader:

How is the U.S. Forest Service involved in this issue?

We are funding and coordinating biosurveillance training and the cooperative survey effort in New York and New England. We're developing an on-line database for states to submit their survey data. We'll help identify all beetles collected by the wasp.

What other agencies are involved in this initiative?

All of the state forestry agencies in New York and New England are taking part. New York State Ag. & Markets might also be involved. WV, MD and PA folks also involved and may submit their data to the database.

Is the Forest Service providing funding for the project, and if so, how much funding is the agency providing?

Yes, for the survey project it is \$37,000 matching dollars. We're also funding research in Florida and training in WV, MD and MD.

Why is it important to detect new infestations early?

The earlier we detect an infestation the more options we have for management and eradication.

How does this technique compare in relative effectiveness for monitoring EAB infestations?

It has potential of being a less expensive, less destructive and more effective means of detecting EAB at low population levels.

What is the future of this project?

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

As a forest entomologist I'm accustomed to look in and around trees for insect activity. I never thought I'd spend so much time looking at the ground to benefit forest health. This project has me looking at entomology in a whole new way.

Will the beetle-hunting wasp be used to control the EAB?

While the *Cerceris* wasp is an excellent biosurveillance tool, it will not be an effective bio-control agent because EAB is so prolific.
