ERDC-EL
Moderator: Courtney Chambers
June 18, 2014
12:59 am CT

Courtney Chambers: At this time I'd like to give you today's speaker on biological control of alligator weed flea beetle annual collection and that's Ms. Angie Huebner. And she's a biologist at the U.S. Army Corps of Engineers Jacksonville District. She's been involved in invasive species management since 1998 and currently works to incorporate invasive species management in the Comprehensive Everglades Restoration Project. In addition to her Army Corps of Engineers duties, Angie is a Board of Director for the Florida Aquatic Plant Management Society and serves as Co-Chair for the Florida North Central Cooperative Invasive Species Management Area.

And more information on Angie can be found in her bio posted on the Invasive Species page along with a copy of the PowerPoint she'll be sharing with us today.

Angie, we are very happy to have you with us. So at this time, I'm going to give you the presenter right. We'll enter listen-only mode and then we can begin.

Recording: All participants are now in listen-only mode.

Angie Huebner: Thank you, Courtney. I'll go ahead and get started then. And, again, as Courtney stated I'll be talking about biological control of alligator weed and the flea beetle annual collection.

Biological control. It's the deliberate use of one organism to regulate the population of a pest organism. It can reduce or suppress populations of plants or animals.

Biological control pipeline. There are several things that must happen in order to get a biological control released into the United States and first is to find or to identify a natural pest of the potential species that you're going to control. And to do that you can conduct overseas surveys or wherever the plant might be located to identify those control agents. Then overseas research is conducted as well.

The plant must also go into - or the insect or whatever you've selected to use as a biological control has to go into quarantine to ensure that it does not affect either native plants or agricultural crops within the area where it will be released.

And, finally, after an extensive time for completing all of these different areas and if it is approved, the biological control can be released into the United States and then hopefully it will be established or it will establish itself within the area where you released it.

And then the final piece of it is technology transfer and providing the knowledge and methods on the use for the biological control to be transferred to scientists and managers for their use.

Courtney Chambers: Angie, this is Courtney. If you could just speak up a little bit louder. It's a little bit muted sounding.

Angie Huebner: Okay.

Courtney Chambers: Thanks.

Angie Huebner: Is this better?

Courtney Chambers: Yes, that's better.

Angie Huebner: Okay. All right. Sorry about that. So, biological control does have several benefits and disadvantages. One, use of biological control reduces or minimalizes use of chemicals for the control of the plant. Also, it can achieve long-term control if the species is able to establish. And also it's a very low maintenance cost as well.

Disadvantages like I just kind of discussed during the biological control pipeline is that it does - it can be a lengthy process to test and to get approval to do release for the biological control. And sometimes the bio controls can also be impacted by various things such as pesticides, parasites, weather conditions, and also, again, they may not be able to establish once they are released.

Alligator weed is an emerging perennial herb. It was accidentally introduced into the United States in 1897. It's most commonly found growing in water, but it can survive in a variety of different areas. It's native to South America. It's a federal noxious weed. It is on the prohibited or noxious weed list for Arizona, California, Florida, and South Carolina. It roots along banks and grows across the water surface in various rivers and streams and along canal. It forms thick mats which can inhibit the flow of water and these mats can break away and create obstructions for navigation and for recreation. It also increases mosquito habitat.

Distribution of alligator weed is from the coastal plains of Virginia to the extreme south Florida and westward to Texas and also California. It also includes Puerto Rico and it's also found in the northern states - northern range is Illinois, Kentucky, Arkansas, Oklahoma.

So some of the problems with alligator weed is that it displaces native plants, it disrupts water flows-- I just stated before -- and it can cause sedimentation. It also shades out submersed native plants and reduces the oxygen level below those mats. And, again, it does pose threats to navigation and recreation.

Alligator weed began threatening waterways in Florida in the early 1900s and by the late 1950s it had become extremely problematic in water bodies throughout the southeastern United States.

The Rivers and Harbors Act of 1958 actually authorized the five year pilot project for progressive control and eradication of water hyacinth and alligator weed and other noxious aquatic plants in federal waters. And this allow - this pilot project allowed the Corps to start having discussions with the U.S. Department of Agriculture and to evaluate potential bio control agents for alligator weed. And in 1959 they - the Corps and USDA began a joint study to evaluate those bio controls.

And through this program the Aquatic Plant Control Research Program was authorized in 1965. And this program helps to fund some of the things that we do today.

The search for the bio control agents then began after the study was initiated. Annual surveys were conducted in South America from 1960 to 1962 and there were additional surveys that were conducted in the southeastern United States.

Approximately 40 insects were recorded to be on alligator weed, but only five of those were considered to actually suppress the plants. When they tested the biocontrols for the plants only four were tested and only three of the four of the insects tested in their host range were approved for release and these included the alligator weed flea beetle, the thrip, and the stem borer.

And this is a picture of the thrip and some of the damage. You can see in the top left hand side. And then in the bottom photo is an immature thrip and the eggs.

And as you just saw the picture of the thrip the adults are small, black, elongated and they're approximately 2 millimeters in length. They have an average life cycle of 28 days.

Females deposit approximately 200 eggs on the leaves of the alligator weed. The adult and larvae both feed in the tips of the stems and this causes the leaves to deform and it stunts the growth of the plant. And sometimes the edges of the leaves will curl and provide shelter for the thrip.

And the alligator weed thrip also feeds on both aquatic and terrestrial plants.

Quarantine colony from Argentina was released in two different years -- in 1968 in Alabama, Texas and Mississippi and then in '67 in California, Florida, Georgia, and South Carolina.

The alligator weed stem borer. Here's a picture of the larvae and then the moth -- right here -- and then a picture of a plant that has been damaged.

The stem borer as you just saw is a light tan moth with approximately 20 millimeter wing span. Their life cycle is 39 days. And the females deposit single white eggs on the underside of the leaves with an average of 267 eggs over a six to eight day period.

The larvae are whitish with wavy tan longitudinal stripes. They tunnel into the tips of the stems and bore downwards. As they mature they exit the stems and they utilize silken threads to lower themselves to access other stems to bore into.

And as they mature they bore through the nodes and they seal the nodes, fill those holes to prevent water intrusion.. They also chew exit holes to the outside epidermis for the emerging moths.

The stem borer does feed on both the aquatic and terrestrial forms of alligator weed. And, again, it damages the tips and - which causes them to wilt very quickly and causes them - causes heavily damaged stem to (collapse).

And the difference between the stem borer and the flea beetle damage is that the leaves remain on the stem on the alligator weed whereas when the flea beetle feeds there's very little left of the leaves on the stem.

Eggs and larvae were both collected in Argentina and released in Florida and Georgia in 1971. And, again, eggs were collected and were released in Georgia and South Carolina from a different area. And this was in an attempt to establish a more cold tolerant population.

And quarantine and greenhouse colonies were also started and released in North Carolina in 1971 and Alabama in 1972.

The alligator weed flea beetle, it was the first insect to ever be studied for biological controls in aquatic weed. It was brought into the United States in 1964.

There was extensive quarantine testing done on the species. It is host-specific and it has not been reported on other host in over 40 years. And most of the feeding of the flea beetle occurs on aquatic alligator weed.

The alligator weed flea beetle is black with yellow stripes. They have well-developed wings which are capable of flying and this allows the adults to move from one area. When they have reduced the food source to very little they can move on to another area. They also jump or pop when they are disturbed and their life span is approximately 48 days.

Their life cycle is approximately 25 to 30 days and the eggs are deposited in clusters of 12 to 24 on the underside of the leaves. The females can deposit one egg cluster per day and with an average that total approximately 1130 eggs.

Eggs are yellow in color and the larvae -- right here -- feed on the underside of the leaves. When the larvae mature they bore into the hollow stem and develop into adult beetles.

The alligator weed flea beetle was field-collected from Argentina and released in 1964 in California and South Carolina, and in 1965 in Florida. They were also field-collected from Uruguay and released in 1965 in South Carolina. And, again, another release was made in Mississippi in 1965.

There were some issues with some of the sites not having established populations and so from the sites that - where the flea beetles were released in

Florida they were redistributed into Georgia, Alabama, North Carolina, Texas, Tennessee, Arkansas, and Louisiana.

This is a release that occurred in the Ortega River near Jacksonville in 1965. The flea beetles were released on alligator weed right in that area.

This was one year following the release of the bio-control,it eliminated the alligator weed.

This is some damage that - a person in Arkansas they have received flea beetles a couple a couple of years ago and they took these photos of the damage from the flea beetle and you can see it all turned brown and kind of wilted over in the photo.

And just some up close pictures of some of the damage the flea beetle can cause on to the leaves and there's flea beetle (right) in that location.

So each year the Jacksonville District conducts an - collection and distribution of flea beetles to assist with control of alligator weed in other states. This work is funded by the Aquatic Plant Control and Research Program. And that is in coordination with the Corps of Engineers Engineer Research and Development Center.

Since the native range of the flea beetle is tropical the flea beetles cannot survive extended exposure to winter temperatures. And therefore Florida subtropical environment has very few days of temperature below freezing which allows the flea beetles to survive the winter months. So we can continuously have a population growing whereas in the northern states the flea beetle may not be able to survive so they have to be redistributed to help to control the alligator weed.

Alligator weed flea beetles are typically collected during the months of April and May. Weather conditions such as a mild winter or late frost can influence the time of collection. Therefore the collections have been conducted as late as July.

And of the three insects collected or the three insects that were released, the flea beetle is the most abundant and the one that is most efficiently collected. Therefore we target the alligator weed flea beetles during our annual collection.

In order to be able to distribute flea beetles out of the state of Florida there is - there are permits that are required to be in place. That permit is through the USDA Animal and Plant Health Inspection Service.

It's a PPQ 526 application permit to move live pest plants. The application can be completed online. All you have to do is to develop a user ID and password to log in and then you can go through the application process.

This is just a current permit that we have for the State of Virginia. And you can see that it identifies the Corps as the permitted and it has the permit application number and - for the state. What we do is just state that there'll be multiple releases within the state so that we're not tied down to just one location and have to have multiple permits for the same state.

We also do include all three insects on that permit so that if we are able to collect the other insects then we can transport those as well.

These are current state permits that we have in place - we have permits for 11 states. If there was someone to request flea beetles –for a state that we do not

have a permit for, we could or we would do a new application to acquire a permit.

We do ship flea beetles to various federal and state agencies throughout the southeast. And this year we shipped to three Corps of Engineers projects, one military installation and a national wildlife refuge as well as other state, federal and local agencies.

Field collection. As I said before we do the collection in the spring. Excuse me again. Sorry.

We do the collection in the spring. Our aquatic plant management control crew - at the North Florida Aquatic Control Unit located in Palatka began surveying in March looking for alligator weed and any damage to the alligator weed that would indicate that flea beetles are in the area.

When they're in the area and they locate fleabeetles or if they see flea beetle damage they'll utilize the sweep net with the airboat as you see here. They go very slowly across the mats to see if they can find alligator weed flea beetles.

Once we determine that the flea beetles are in place or the flea beetles are actually there we will schedule a collection and we'll notify the people that have requested the flea beetles that we will be doing the collection so that they can have people ready to receive them and place them out in their locations.

So we actually do the collection. Again, we use the airboats across - we do several passes across the alligator weeds and use the sweep nets to collect the insects. Once the person collecting thinks they have several flea beetles in their nets they will stop, check and get any or try to get any of the trash that's in there -- other vegetation -- try to get some of that out and then place those

in cups and the cups will be placed in coolers to help cool the flea beetles down so they are not as active and that we can work with them more easily when we get them back to the office.

So, now that we've collected them and we're back at the office, we store them overnight -- in the coolers all night and the following day we will sort and clean them.

And as you can see in the photo there's several flea beetles, but there's a lot of other vegetation and insects that are in there so we try to get all of that vegetation and the other insects out of the cup.

We estimate the number between 250 and 300 insects in each cup. We – estimate the number when we're sorting and cleaning. And we try to ship them - if we can, we try to ship them the same day. We find that helps to ensure their survival or ensure better survival.

Packing, they are required to be double contained and they're actually triple contained with the cup and the coolers and then the boxes on the outside. And we do ship them on ice to help keep them - to help keep their activities slow.

And the shipment handling instructions are also included which tell you where and how you can do the releases and the number per acre and where forms and boxes should be returned.

And this is just a copy of the shipment record that is required to be completed and returned.

And, of course, we try to get the flea beetles to the people as quickly as possible so they are shipped via FedEx overnight. And the only thing that we ask is that you return the box and the cooler for future use.

And this is how you can acquire flea beetles, is to contact me via email or cellphone. And this is the information that is required -- name, a physical mailing address, email, cellphone number and the acreage present.

And with that I will try to answer any questions that you may have.

Courtney Chambers: Great. Thank you, Angie. We'll return to interactive mode.

Recording: All participants are now in interactive talk mode.

Courtney Chambers: So at this time you should be able to unmute your phone line and ask any questions. Or if you're more comfortable using the chat feature you can submit your question that way.

(Mark Cornish): Hi, Angie, this is (Mark Cornish). When you're doing your harvest, this year was a particularly good harvest. Is there a reason for that? Did you have more people out there collecting beetles or was there, you know, just a good year for catching bugs?

Angie Huebner: No, I'm glad you asked that, (Mark). And I had intended to talk about that. But as you can tell I'm having some problems with coughing. I'm not really sure. It wasn't that we had more people. I think it was just a better year than what we'd had in the past years.

We'd actually had a record number of flea beetles collected in 2009 which was 369 cups or approximately 92,000 to 110,000 insects collected. And then the

years following 2009 until this year the numbers collected were a lot lower. And the only thing that - or the main thing I think that it is attributed to is we had a frost, a real heavy - actually a freeze in Northern Florida and there was frost all the way down into extreme southern Florida. And I think that had more to do with the population of beetles than our collections. I think that had something to do with it and that the flea beetle was or has just been recovering over the past couple of years and this year it seems to be back.

(Mark Cornish): Great. Thank you.

Angie Huebner: To add to that, (Mark) -- sorry -- we collected - I think we collected a total of six days. I think it was. I would have to look back. It's either five or six days. And those were like half days so they weren't complete. So I think the population has just returned this year.

Courtney Chambers: Angie I received a question wondering if it was too late in the year to request beetles.

Angie Huebner: Yes. It is this year.

Courtney Chambers: Okay. So what time of the year should - what's the prime time again for that?

Angie Huebner: Well, you can collect - the collection is from - usually from April through May, but we've collected in March and in to July - June and July as well. That's really weather dependent. If someone wanted flea beetles, they could request them now. I haven't started my 2014 list because I haven't had any request for them yet, but I can start my 2014 - I'm sorry, 2015 list. And that's what I do, is just keep a running list for the next year because I'll have people call me after the end - after we've already collected and say, "Hey, I would

like some flea beetles," and it's already too late. I start my list for the next year.

Courtney Chambers: I see. Okay. Thank you.

Man: Question. This is (unintelligible) up here in Headquarters. Just a question here, in terms of managing that natural resource there, do you have a specific area where you're collecting those beetles or is this a - can that expand and how do you decide whether or not you're basically impacting the resource?

Angie Huebner: We do collect from various areas within the St. Johns River which I think I failed to mention that. But it's along the St. Johns. It's where we do our collections.

And it can - it varies from year to year because of what - where the plants are. So if we had high water the plants will not be there or if we have low water they may have expanded into other areas.

So we just - when we're out conducting treatments of aquatic plants, our applicators are continuously looking. When they know that it's time to do collections or it's going to be time to do collections they start monitoring those areas to see if there are flea beetles located in those areas. Did that answer your questions?

Man: Yes. I think it's sort of like a delicate dance if you're using something to try to eliminate the invasive and at the same time trying to maintain a population that you control so you're never really eliminating the invasive there.

Angie Huebner: No. And I think that might be difficult to do, I guess. It's because there are so many little pockets where vegetation exists...to be able to get everything. But

that's where, you know, the flea beetle does add to that. And the various (resource) management does help those areas; where we don't treat the flea beetle controls vegetation in those areas. As you know, alligatorweed always comes back in the spring and so the flea beetles.

Man: Okay. Thank you.

Courtney Chambers: Any other questions for Angie this afternoon?

All right. Well, Angie, do you have any final comments and notes for us today before we wrap up?

Angie Huebner: No. I'm just sorry that I had to - that I was coughing so much. I hope that it wasn't broken up really bad. That and also I would just like to add, if there are people that would like to request flea beetles for next year to please - probably the best way to do that is to send me an email with their information and I can start my list for 2015.

Courtney Chambers: Great. Well thank you. And thank you for persevering through the - through this sickness. I know that's hard. But we really appreciate you sharing with us today. And thank you participants for joining in and asking questions.

And I just encourage you to watch for upcoming notices on additional invasive species webinars. And I hope you all have a wonderful afternoon.

END