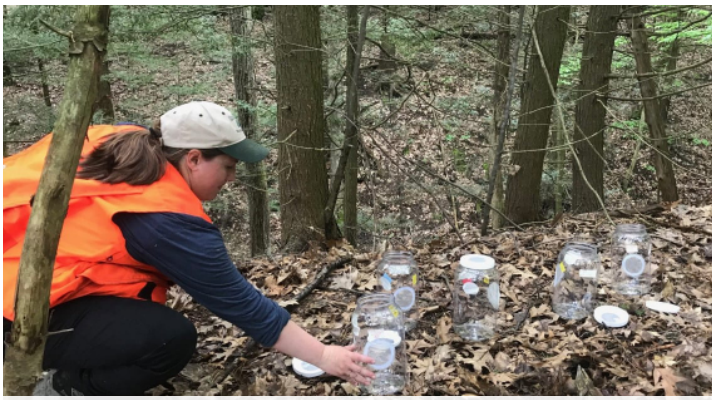
WNY PRISM

Partnering to Protect Western New York
from Invasive Species

Fall 2020 Newsletter:
Biological Controls

The WNY PRISM mission is to proactively identify, evaluate and address invasive species priorities in western New York using a coordinated partnership of local professionals, organizations and private citizens to improve, restore and protect local aquatic and terrestrial resources.



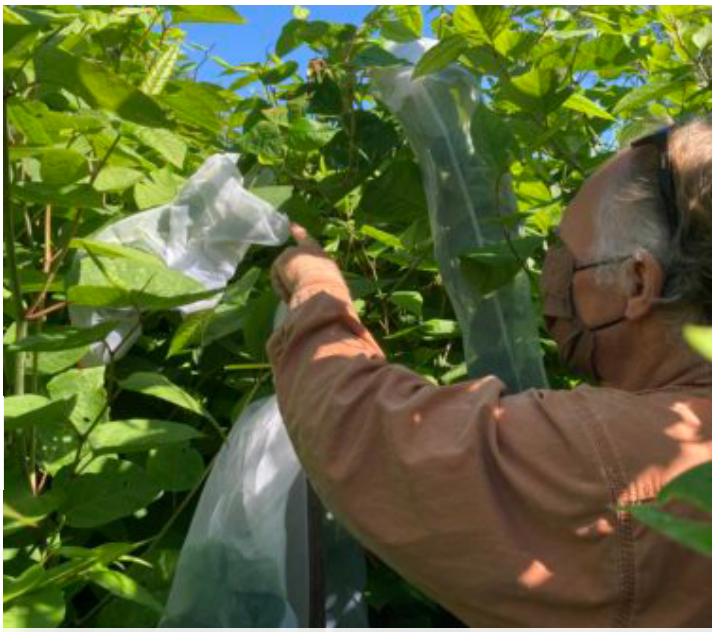
The NYS Hemlock Initiative releases the silver fly (*Leucopis* spp.) biocontrol for hemlock wooly adelgid. Photo credit: NYS Hemlock Initiative.

Biocontrol Breakdown:
What are they and how do they work?

Land managers have many options when it comes to invasive species management including manual removal, mechanical removal, pesticide treatments and biological controls. Biological control is the process of using one species, the biocontrol, to manage another species with the goal to reduce and mitigate the negative impacts caused by invasive species. Biological control is most often sought out for species that are widespread and lack other effective management tools and strategies.

Biocontrols can take several forms, the most well-known of which are called classical biocontrols. These are parasites, predators, or pathogens from the invasive species' native range that, upon receiving approval, are released into the invasive species' introduced range. Upon their release, a successful biocontrol will harm or impair certain functions of the invasive species, usually through a reduction in population size. However, the species will remain present in the system.

Biocontrols offer a powerful tool in the management



Dr. Bernd Blossey checking on Knotweed Psyllid (*Aphalara itadori*) from the June 2020 biocontrol release. Photo Credit: Dr. Stacy Endriss.

of invasive species, however scientists remain cautious of their future use due to some past mistakes. The modern biocontrol approval process eases most of these concerns by moving through multiple rounds of testing and regulation at both the state and federal level to ensure the highest levels of safety, both ecologically and economically.

The lengthy approval process begins in the native range of the invasive species where researchers work to identify its natural predators. This identification process takes several years and once complete, a list of potential biocontrols is submitted to the United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA APHIS). The Technical Advisory Group (TAG), an independent voluntary committee comprised of state and federal employees, reviews the potential biocontrol list. Through

(*Continued on page 2*)

the review process, TAG assesses the risks associated with a release and may develop a list of important non-target species, including native and agricultural species, that the biocontrol may impact to inform the next round of testing, set within a laboratory setting. Tests are conducted to evaluate the biocontrol's host-specificity and host-preference with the desired outcome being a target-specific biocontrol that causes little to no damage on non-target species.

Successful management requires a multi-faceted approach.

Multiple parties are involved in this evaluation process including the primary researchers, U.S. Fish and Wildlife Service (USFWS), TAG and USDA APHIS. Each group aids the primary researchers and ensures they have considered all non-target species that the proposed biocontrol may impact, especially those listed as endangered and threatened. Once confident in the biocontrol's efficacy, a petition for release is submitted to TAG. From here the biocontrol could be dismissed, researchers may be asked to conduct more tests, often involving limited field testing, or the biocontrol may be recommended for release. Based on the input of all stakeholders, USDA APHIS makes the final decision on whether a proposed biocontrol is fit for release within the U.S.

In addition to the afore mentioned classical biocontrols, there are also biopesticides that utilize natural materials from animals, plants or bacteria, to non-toxically control pest populations. Biopesticides can be further categorized as either biochemical or microbial pesticides. Biochemical pesticides use naturally occurring substances that interfere with mating or attract insects to traps. In contrast, microbial pesticides use a microorganism to control the target species. In the case of microbial biopesticide Zequanox ®, dead cells from the soil bacterium Pseudomonas flourescens are used to disrupt digestive processes of zebra and quagga mussels, eventually causing death.

While biological control is often presented as a silver bullet that solves the problem of an invasive species, successful management requires a multi-faceted approach that draws upon all management tools and strategies. Biological control, performing as a long-term control method that is target-specific, safe and cost-effective, makes it a valuable part of any Integrate Pest Management plan.

Biocontrol Research in NYS

- **Knotweed complex biocontrol** *Aphalara itadori,* a sap-sucking insect, was released in June 2020 to test its effectivity in the field.
- NYS Hemlock Initiative continues its research on **several biocontrols for hemlock wooly adelgid**. The beetle *Laricobius nigrinus* has successfully established at several sites. Two *Leucopis* silver fly species are under observation in the field.
- **Swallow-wort biocontrol,** *Hypena opulenta*, a herbivorous moth, was released at several locations in NYS and resulted in 100% defoliation within four weeks at one test-site (*see page 5*).
- **Water chesnut biocontrol**, *Galerucella birmanica*, an herbivorous beetle, is under observation at Cornell's quarantine facility. A petition for field release is expected this fall.

Fall Webinar Series

WNY's Emerging Forest Pests and Diseases
Thursday, October 29; 2:00-3:00 PM
http://bit.ly/ForestPestWebWNYPRISM2020

Invasive Agricultural Pests and Diseases
Thursday, November 5; 2:00-3:00 PM
http://bit.ly/AgPestWebWNYPRISM2020

Managing Woody Invasive Species in the Winter
Thursday, November 12; 2:00-3:00 PM
Pesticide Credits Available
http://bit.ly/WinterMgtWebWNYPRISM2020

Emerging Aquatic Threats in WNY
Thursday, November 19; 2:00-3:00 PM
Pesticide Credits Available
http://bit.ly/AISWebWNYPRISM2020

For more information on these or other events, visit our website.

Regional and State Updates

- NYS DEC is working to update current pesticide regulations. Visit the DEC website to learn about proposed changes and provide comments.
- WNY PRISM continues to treat previously identified Japanese stiltgrass infestations and added several new sites in 2020. Over 27 garbage bags of stiltgrass were removed by hand this season.
- Starry stonewort (*Nitellopsis obtusa*) was found at Buckhorn Island State Park. It is the second known infestation in WNY and the first in Erie County.
- Porcelain berry (*Ampelopsis brevipedunculata*) was found for the first time in WNY at Delaware Park in Buffalo.
- Letchworth State Park had its first confirmed sighting of beech leaf disease.
- The New York State Department of Agriculture and Markets confirmed the presence of spotted lanternfly in Staten Island.
- WNY PRISM and its partners continue to survey for water lettuce (*Pistia stratiotes*) and water hyacinth (*Eichhornia crassipes*). Over 500 water lettuce plants were removed from Hyde Park Lake in Niagara County.

Starry stonewort found at Buckhorn Island State Park with its characteristic star-shaped bulbil.

Invasive Species Profile: Water Chestnut

Water chestnut (*Trapa natans*) is an invasive species found throughout NYS in slow moving and still waterbodies. They are floating, aquatic, annual plants with roots that can reach lengths of up to 16 feet. Buoyant leafstalks support a set of triangular, toothed, floating leaves that form a rosette. An inconspicuous white flower is produced in July, followed by thorny nutlets in late summer.

Water chestnut forms dense mats that can entirely cover waterbodies.

Floating rosettes carpet waterbodies and block available sunlight, shading out native aquatic plants below. Their presence not only impairs native plant growth, but also reduces oxygen levels that can lead to fish kills. Recreational activities such as swimming and boating are also impacted by the dense mats and spiky nutlets of water chestnut that are extremely painful when accidentally stepped on.

Given a resurgence of reports of water chestnut in the Southern Tier, WNY PRISM and its partners revived the Water Chestnut Working Group, which last met in 2016. This is a collaborative group of local organizations concerned with water chestnut education and management. In 2020, Working Group members conducted over 20 surveys and removed hundreds of plants across the region.

Working Group efforts will benefit our waters and prevent the spread of water chestnut. But manual removal alone can't contain larger infestations. Researchers at Cornell University have been studying a new biocontrol for water chestnut. *Galurecella biramanica*, a leaf beetle, has been shown to adversely impact water chestnut and a proposal for field studies is expected this fall.

As individuals we can help limit the spread by cleaning our aquatic gear and report sightings to iMapInvasives. Please see WNY PRISM's Best Management Practice for treatment advice on existing infestations.

Biocontrol of Invasive Phragmites: A 2020 Update

Written by: Audrey Bowe, New York Invasive Species Research Institute

Introduced in the early 1900s, *Phragmites australis* (commonly known as "*Phragmites*") has arguably become one of the most successful invasive wetland plants in North America, occupying thousands of acres in the Northeast, displacing native plants and resisting many forms of management. This combination of widespread distribution, negative impact and difficulty of control led to the initiation of a research program in 1998 to develop a biocontrol for this species.

Mature larva of *Archanara geminipuncta*. Photo Credit: Patrick Häfliger at CABI, Switzerland.

Work with this program has been ongoing for over two decades and currently two European stem-feeding moths, *Archanara geminipuncta* and *A. neurica*, are the most promising agents that have been identified. Experiments in Europe documented reduced flowering, decreased height and decreased weight of *Phragmites* stems that were attacked by these agents. Impacts to invasive *Phragmites*' native counterpart (*Phragmites americanus*) in North America was a special concern in the development of this program, and therefore potential negative impacts of these moths on native *Phragmites* were addressed in detail. Experiments looking at *Archanara*'s preference between native and introduced *Phragmites* have shown the prospective agents display a strong preference for introduced *Phragmites*, and a more complete risk assessment suggested that releasing these two moths into the field poses little risk to regional native *Phragmites* populations.

Petitions to release *A. geminipuncta* and *A. neurica* were submitted in both the US and Canada, and in spring 2019, agencies in Canada approved these agents. Canadian researchers have since field released both *Archanara* species in Ontario. In the United States, the process has been slower. In 2019, the Technical Advisory Group recommended field releasing these agents, however a final decision on approval in the US is still pending at USDA APHIS. In 2020, restrictions related to Covid-19 have greatly limited further research in North America, however progress on developing an artificial diet for mass rearing these moths, should they be approved for release, is advancing.

Adult *Archanara geminipuncta*. Photo Credit: Patrick Häfliger at CABI, Switzerland.

Contact Us!

SUNY Buffalo State
Great Lakes Center, SAMC 319
1300 Elmwood Ave.
Buffalo, NY 14222

(716) 878-4708

wnyprism@buffalostate.edu
wnyprism.org

WNY PRISM

wnyprism8

WNY PRISM

Moth Larvae Successfully Defoliate Swallow-wort Plants

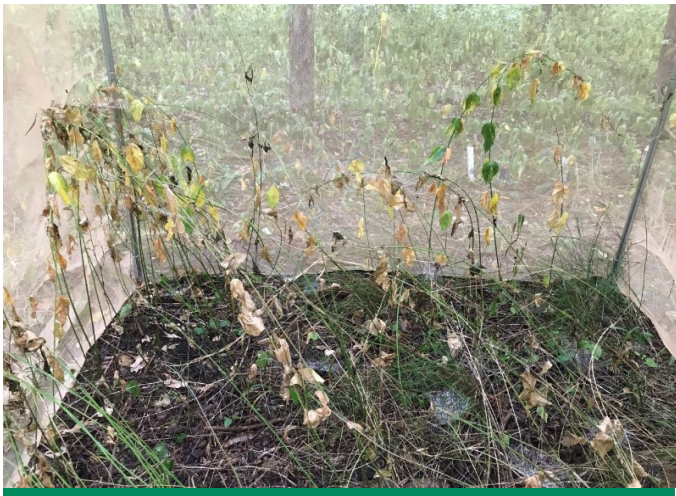
Written by: Rob Williams, Program Director, St. Lawrence Eastern Lake Ontario PRISM (SLELO PRISM)

In our quest to protect the native characteristics of our local natural landscapes, we are often challenged with finding new techniques to manage invasive species. Most readily available techniques offer short term suppression at best, whereas biological controls offer longer term control. There is a clear need to develop biological controls when and where appropriate.

This past summer a biological control was released in the Thousand Islands region of New York, often referred to as the epicenter of swallow-wort introduction into North America, with promising results. Native to Ukraine and southern Europe, swallow-wort (*Cynanchum* spp.) was likely introduced to North America as an ornamental plant and it soon spread to several northeastern states. The plant creates extremely dense monocultures that spread over acres of otherwise biologically diverse natural systems.

Swallow-wort plants before *Hypena opulenta* larvae feeding. Photo Credit: Rob Williams

The SLELO PRISM (St. Lawrence Eastern Lake Ontario PRISM), assisted with caged releases of *Hypena opulenta* a moth native to Ukraine that feeds exclusively on swallow-wort. Moth pupae were released at four sites within the Eastern Lake Ontario and St. Lawrence Region. Within one week successful adult moth emergence occurred followed by immediate egg laying. Within four weeks nearly 100% defoliation of swallow-wort plants occurred as the result of feeding by the *Hypena* larvae. Defoliation of swallow-wort plants reduces the plants' ability to photosynthesize and therefore its ability to produce seeds. After four weeks, the research cages were removed and the insects were liberated into the environment.



Completely defoliated swallow-wort plants 4-weeks after adult ***Hypena*** emergence. Photo Credit: Rob Williams

What makes this effort successful is not necessarily the defoliation of swallow-wort plants, but the ability to achieve adult emergence of the *Hypena* moths. *Hypena* can over-winter in our climate so researchers are hopeful that predation on the diapaused pupae will be light and adults will emerge again next summer.

This successful effort was a cooperative effort between the SLELO PRISM and multiple organizations that include: The New York Invasive Species Research Institute, the Thousand Islands Land Trust, SUNY-ESF, University of Rhode Island, the USDA Agricultural Research Service, NYS DEC and local volunteers.

WNY PRISM Steering Committee Members

Buffalo Niagara Waterkeeper | Chautauqua Watershed Conservancy | Cornell Cooperative Extension
Ecology & Environment, Inc. | Natural Resource Conservation Service USDA - NRCS | New York Sea Grant
NYS Nursery and Landscape Association, Inc. | NYS Office of Parks, Recreation, and Historic Preservation
Roger Tory Peterson Institute of Natural History | Great Lakes Center - SUNY Buffalo State
United States Army Corps of Engineers, Buffalo District
USFWS, Lower Great Lakes Fish and Wildlife Conservation Office