

## Weed Spotlight

### Goatsrue Biology and Management

*Galega officinalis*

Article and Photos By: Corey Ransom,  
Utah State University Extension Weed Specialist



Image 2: Narrow seed pods are about 1 inch long  
used name for goatsrue; "Professor Weed".

Goatsrue is a long-lived simple perennial (i.e. tap-rooted) that reproduces from seed. Plants also re-sprout each year from large crowns. Goatsrue has dark green leaves that are oddly pinnate with 6 to 12 leaflets. Being a member of the Fabaceae Family (Legume family) goatsrue has pea like flowers that are purple to white. Flowers are produced on the end of branches and in leaf axils (Image 1). Seeds are produced in narrow seed pods about an inch long, that look like those produced by many mustard species (Image 2). Seed pods contain multiple yellow/green kidney-shaped seeds that are more than twice the size of alfalfa seeds (Image 3). A plant may produce more than 15,000 pods per plant (Evans and Ashcroft 1982). Seeds have high levels of dormancy and can persist in the soil for many years. (Continued on Page 2)>>>

Image 3: Seeds are yellow/green and kidney shaped. More than twice the size of alfalfa seeds.



Image 1: Goatsrue has pea like  
flowers that are purple to white.

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## Goatsrue (Continued from Page 1)

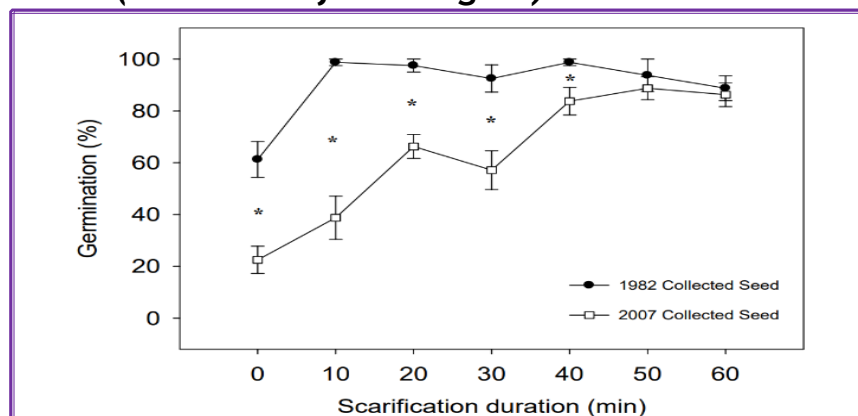


Figure 1: Germination of 26 year vs 6 month old goatsrue seed in sulfuric acid. Symbols represent means (n=8) of data combined over replicates, over 2 experiments; whiskers represent standard error. Values with \* between new and old seeds are significantly different at ( $P < 0.05$ ). Oldham 2009

Research at Utah State showed that seeds that were held in dry storage for 26 years germinated at similar rates to 6-month old seed after acid was used to break down the hard seed coat (Oldham) (Figure 1). This same project also found as many as 6,900 seeds/ft<sup>2</sup> in the soil under dense infestations (Oldham 2009). Plants can grow to 5 feet tall and exclude most other vegetation. (Image 4). Goatsrue distribution is commonly associated with riparian areas, but also can grow on roadsides, pastures and cropland.

All parts of the goatsrue plant including stems, leaves, flowering parts, and seeds contain galegine, a compound that is toxic to livestock. Livestock will generally avoid eating this plant, but may consume it if it is inadvertently baled with hay.



Image 4: Plants can grow to 5 feet tall and exclude vegetation.

Because of its invasive nature, toxicity to livestock, and limited occurrence in the US, goatsrue was selected as the target of a USDA-APHIS funded Federal Eradication Program. This program was carried out by multiple agencies and private landowners for over 12 years. The program estimated to have controlled over 85% of the mature plants by 1984 (Evans 1984), but funding for the project was pulled in the early 1990's. For years after that, the goatsrue infestation size expanded rapidly. In approximately 2014, the Cache County Weed Department initiated efforts to bring it back under management. Recent funding through the ISM Grants has helped intensify this management effort. Herbicide trials conducted by Utah State University demonstrated that several herbicides effectively control goatsrue (Oldham 2009). Interestingly, 2,4-D amine worked well at one site and poorly at another site. This was the herbicide of choice during the Federal Eradication project; possibly contributing to the mixed success of the project. Current efforts will likely be more effective based on the herbicide options now available.



## Project Journal

# Managing Purple Loosestrife in Weber and Davis Counties

Article and Photos By: Loralie Cox

The Weber River Cooperative Weed Management Area (WRCWMA) determined eradication of purple loosestrife and containment of larger infestations to be a high priority. In 2014 the CWMA began a purple loosestrife project in riparian and wetland areas Box Elder to Davis Counties. Infestations were identified by the Weber River CWMA members along the Weber and Ogden tributaries, and along the shores of Pineview reservoir. The total infested area was estimated to be about 75 acres.

In spring 2018, Garlon 3A and a surfactant were purchased and stored at the Weber County road department for use by different entities to treat purple loosestrife. Biological control agents were ordered and placed throughout the counties.

In mid-July, WRCWMA contracted with PMG Vegetation Control to use backpacks to treat along the length of Bennett Creek which runs into Pineview reservoir. Kelly Wangsgaard, Weber Conservation District supervisor oversaw this project and assisted four technicians in gaining access to properties that required treatment. In August, two PMG technicians treated areas in Farmington Bay. Here they were able to use a truck with a hose.

Specialists sprayed Purple loosestrife at Pineview reservoir in September. Conditions were excellent and plants were still actively growing. About 50% of the loosestrife was in the flower stage. They were able to get excellent coverage due to the receded water level. The largest and most dense stand on the northeast portion was challenging. Riparian conditions were very muddy. On the second pass a 4-wheeler with a 25 gallon "Jack Rabbit" sprayer was buried in the mud. Much of the day was spend getting it unstuck. On Sunday, a high pressure sprayer with a hose reel was brought in and contractors used all 300 feet of hose to spray the area. The 4-wheelers did a fine job of spraying the rest.

Davis County weed supervisor Brandon Hunt treated 50 acres of purple loosestrife throughout Davis County and marked points in EddMaps. Weber County weed supervisor, Taylor Christensen, spot treated purple loosestrife in western Weber County along drain ditches and waterways. He estimates that Weber County treated over 24 miles of ditches and waterways and monitored for purple loosestrife.

*(Continued on Page 4)>>>>*



### Treatment of Purple Loosestrife

Weber River CWMA used Garlon 3A to treat purple loosestrife at a rate of 6 quarts/acre. A surfactant was used in all treatments.

Treatments were completed using backpacks, ATV's, trucks and hundreds of feet of hose.

Treatments were completed by contractors and cooperators from Davis County, Weber County, Utah Department of Agriculture, Utah Division of Wildlife, Weber Conservation District and the Utah Weed Supervisor's Association.

Thanks to the many people that made this grant possible!





Purple loosestrife root weevil collected in Davis County.



### The Invader -Utah Weed Supervisor's Association Newsletter

Editor: Amber Mendenhall

For questions, comments, article submissions or ideas please email:

utahsbuggirl@gmail.com  
-or-  
utahweedsupervisors@gmail.com



## Purple loosestrife (Continued from Page 3)

Biocontrol agents were harvested from a site in Davis County for the second year. All three biocontrol agents: *Nanophyes marmoratus*, *Galerucella* spp, *hylobius transversovittatus* were found, and relocated to other sites in the state. Several releases obtained from an insectary in Montana were taken to purple loosestrife infestations in Davis and Weber Counties by Amber Mendenhall.

## Biocontrol Today

# Houndstongue Biological Control: Status Report

By: Carol Randall, Weed Biological Control Specialist, USDA Forest Service

Houndstongue, *Cynoglossum officinale*, is an upright, herbaceous biennial or short-lived perennial that infests forests, rangeland, pastures, roadsides and waste places. Houndstongue is a toxic plant with hairy leaves making it difficult to control with herbicides; it is a Utah class 3: containment noxious weed and has been the subject of classical weed biological control research and development for decades.

To date there are no approved classical biological control agents for the management of houndstongue in the United States; however, research is ongoing on two potential classical biological control agents, *Mogulones crucifer* and *Mogulones borraginis*. Caterpillars of the native Police Car Moth (*Gnophaela* species) periodically cause significant houndstongue defoliation and are also being studied.

**Mogulones crucifer- Houndstongue Root-Feeding Weevil:** Canada released *Mogulones crucifer* (Coleoptera: Curculionidae), a European root-feeding weevil, as a biological control agent for houndstongue in 1997; however, because *M. crucifer* may feed on federally protected, non-targeted plants in environmentally sensitive areas of the United States, the weevils are considered pests in the U.S.A. The weevils are crossing the Canada/ U.S. boarder and have been found as far south as the WA/OR boarder and southwestern Montana. Studies to assess non-target feeding in the U.S.A. are underway, but it will remain illegal to collect and redistribute *M. crucifer* in the United States until researchers can determine *M. crucifer* will not cause serious ecological repercussions. A finding of no significant impact is required before United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA APHIS) will grant a permit for *M. crucifer*. (Continued on Page 5)>>>



*Mogulones crucifer*, Houndstongue root feeding weevil.



## Houndstongue biocontrol (Continued from Page 4)

**Mogulones borraginis- Houndstongue Seed-Feeding Weevil:** Adults of the seed-feeding weevil *Mogulones borraginis* feed on the developing stems, buds, and flowers of houndstongue; larvae consume developing seeds. The combination of adult and larval feeding can reduce houndstongue seed production by as much as 50%. Houndstongue is seed limited, so *M. borraginis* may greatly impair the population dynamics of houndstongue. Researchers at the University of Idaho are currently preparing a petition to USDA APHIS to permit *M. borraginis* so this biological control agent may be available to land managers for the management of houndstongue in the next few years.

**Native *Gnophaela* species- Police Car Moth:** Two indigenous tiger moth species which primarily feed on native bluebell species (*Mertensia*) and stickseed (*Hackelia*) species, *Gnophaela vermiculata*, also known as the Police Car Moth and *Gnophaela latipennis*, were found feeding on houndstongue plants at several locations in Montana, Idaho, Oregon and California. The caterpillars feed in a group and cut off the flowering stems of houndstongue plants, which consequently produce no seeds. Researchers at the University of Idaho continue to study these moths.

## Ask the Experts

### Indaziflam - Another Option for Managing Invasive Annual Grasses

By: Todd Neel, Pesticide Specialist, USDA Forest Service

In the Western United States, invasive annual grasses such as downy brome (*Bromus tectorum*), Medusahead rye (*Taeniatherum caput-medusae*), and African wiregrass (*Ventenata dubia*) pose a significant threat to our nation's forests and grasslands.

These species reduce rangeland biodiversity and productivity, functionally change the cycle of wildland fire, and may serve as ladder fuels, driving otherwise manageable fires into forests or communities at the wildland urban interface. Successfully managing these invaders relies on the use of integrated pest management, including the use of herbicides that may help mitigate this landscape-level problem.

A relatively new addition to the toolbox for managing invasive annual grasses is indaziflam, sold under the trade name Esplanade 200 SC®. Over the last several years, university researchers across the west have been conducting trials to determine both the efficacy of indaziflam against invasive annual grasses, as well as any potential non-target effects.

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### Disclaimer

Applicators must always read and follow product label directions, and have the product label and any supplemental labelling in their possession at the time of application. This article does not constitute endorsement or recommendation of any pesticide product by the author or the U.S. Department of Agriculture, nor does it imply that uses discussed have been registered. Use of pesticides is regulated by state and federal laws. Applicable regulations must be obtained from the appropriate regulatory agency prior to their use.



Corey Ransom demonstrates test plots using Indaziflam on medusahead. Photo: Jerry Caldwell

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## Indaziflam (Continued from Page 5)

In Utah, studies conducted by Dr. Corey Ransom have demonstrated that indaziflam may provide better control of invasive annual grasses than other common herbicide treatments (glyphosate, imazapic, and rimsulfuron) with less non-target damage to desirable forage grasses <sup>1</sup>. Indaziflam may also offer multiple seasons of control, allowing the recovery of perennial species on sites with a viable soil seed bank, as well as a longer window for application when compared to traditional herbicide treatment options, since it is applied as a pre-emergent and does not readily degrade in sunlight after application.



*Indaziflam test plots on medusahead rye. Photo: Jerry Caldwell*

While indaziflam may be a very effective tool, caution should still be exercised. The stewardship guide for Esplanade 200 SC® <sup>2</sup> notes that non-target damage may occur in:

- Areas with desirable perennial species not listed in the tolerant species table of the Esplanade 200 SC® label, especially if these species are a dominant component of the perennial plant population.
- Areas with desirable perennial *Poa* species or *Festuca* species (fescues). Some species in these genera were shown to be intolerant to indaziflam (the active ingredient in Esplanade) in fine turf settings. Additional testing in natural area situations is needed.
- Areas with small or young perennial grasses with crowns less than two inches in diameter.
- Areas where substantial soil disturbance has occurred such as from mining operations or landslides.
- Soils with 20% or more gravel content or soils with >85% sand.

Land managers should take into consideration that treatment of sites where there is not an existing mix of desirable perennial grasses to provide a viable soil seed bank may result in the creation of bare ground, and plan a restoration strategy accordingly. Ongoing research has also shown that an increase in grazing pressure resulting from the removal of annual grasses may result in native grasses being uprooted after treatment with indaziflam. While Esplanade 200 SC® is not currently registered for use in grazed areas, the EPA has issued Utah a Section 18 label exemption that is in effect from 6/10/18 – 6/09/19, allowing it's use in grazed areas specifically for the control of ventenata and Medusahead. This exemption does require a two-week grazing, forage, and haying restriction <sup>3</sup>.



## Conference Review

# North American Invasive Species Conference

October 15-18, 2018, Rochester, Minnesota

By: Dave Bingham and Amber Mendenhall

Three representatives from Utah were able to attend the joint NAISMA/Upper Midwest Invasive Species Conference. Tim Higgs, Dave Bingham and Aaron Eagar attended presentations from the U.S. Department of Homeland Security. They toured poison hemlock along the Mississippi River (and helped push the tour bus out of a riparian weed patch.) Aaron presented to the group of over 700 attendees about Utah's noxious weed program. Dave represents Utah on the NAISMA board. Next year's conference will be held in Saratoga Springs, New York.



Photos: Tim Higgs

## Utah's County Weed Supervisors

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UTAH WEED SUPERVISOR ASSOCIATION

160 North Main  
Nephi, Utah 84648



# The Invader

Utah Weed Supervisors Association Newsletter



*Houndstongue  
Photo: Morgan Mendenhall*

*Goatsrue  
Photo: Corey Ransom*

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