

## Forage-based Parasite Control In Sheep and Goats In the Northeast U.S.



Photo courtesy of Natasha Pettifor,  
Cornell Sheep and Goat Program.

### About this project

Gastrointestinal nematode (GIN) parasites, such as the barber pole worm (*Haemonchus contortus*), are a serious problem affecting small ruminant production throughout the Northeast region and world. These parasites cause poor growth, anemia, and death in severe infections.

GIN parasites are a primary concern when raising sheep and goats on pasture, and many producers rely on the use of chemical dewormers to help manage the problem. Not only has widespread dewormer resistance begun to occur, but organic producers are hindered by a lack of alternative parasite control options.

Consumption of specific forages containing condensed tannins (CT) has been effective to suppress GIN infection and provide adequate parasite control in some regions of the U.S. The use of CT forages and other rotational grazing practices are promising methods for maintaining goat and sheep health and profitability in keeping with organic production principles. This project has joined several land grant university researchers, educators, and farmers together to research, demonstrate and evaluate the potential of Birdsfoot trefoil (*Lotus corniculatus L.*) to suppress GIN parasites in the Northeast. We will extend this and other pasture management practices to organic and transitioning producers.

### Birdsfoot trefoil and condensed tannin forages

Condensed tannins (CT), also called proanthocyanidins, are naturally occurring plant compounds that significantly affect the nutritional value of forage by forming complexes with proteins, carbohydrates and minerals. Tannins, in low to moderate concentrations, can provide other animal health benefits in addition to observed anti-parasitic effects.

Birdsfoot trefoil (*Lotus corniculatus L.*) has recently been identified as a promising CT forage well suited to Northeast growing conditions. It is a legume that minimizes bloat, improves protein uptake and has other environmental benefits in addition to possible anti-parasitic effects. Other promising CT legume forages include Sanfoin (more suited to western U.S.) and Sericea lespedeza (does not overwinter well in colder climates).

Research and knowledge are needed to fully explore CT forages and identify the types and amount of bioactive compounds responsible for the GIN suppression and their modes of action. Best management practices to establish and manage birdsfoot trefoil under organic production standards for pasture and hay production are also required.



Birdsfoot trefoil (*Lotus corniculatus L.*)  
Photo courtesy of Oregon State University  
Forage Information System  
<http://forages.oregonstate.edu>

## Project objectives (Sept. 2012 – Aug. 2016)

- Evaluate Birdsfoot trefoil (BFT) cultivars
  - Assess agronomic growth characteristics & condensed tannin profiles
  - Assess the anti-parasitic effect of BFT cultivars
  - Identify tannins critical for anti-parasitic activity
  - Assess the effect of BFT on immune function
- Develop and demonstrate on-farm establishment & management of BFT nurse pastures
- Evaluate herd / flock health and economic outcomes of BFT pasture mixes for GIN suppression
- Extend practices to organic & transitioning small ruminant producers

## Project partners and contacts

### Cornell University

Coordinate on-farm BFT demonstrations and field evaluations; and lead outreach and extension programs.

tatiana Stanton, Ph.D. - [tls7@cornell.edu](mailto:tls7@cornell.edu)  
Dept. Animal Science

### University of Rhode Island

- Evaluate BFT accessions for agronomic traits, collection of material for tannin analyses and feeding trials, and increase seed of promising varieties.
- Evaluate response of *H. contortus* (barber pole worm) in sheep when exposed to BFT extracts.

Rebecca Brown, Ph.D. - [brownreb@uri.edu](mailto:brownreb@uri.edu)  
Dept. Plant Sciences and Entomology

Katherine Petersson, Ph.D. - [kpetersson@uri.edu](mailto:kpetersson@uri.edu)  
Holly Burdett - [hburdett@uri.edu](mailto:hburdett@uri.edu)  
Dept. Fisheries, Animal and Veterinary Sciences

### Virginia-Maryland Regional College of Veterinary Medicine; Virginia Tech

Project parasitologist leading the GIN parasite research components in partnership with WVU and URI.

Anne Zajac, DVM, Ph.D. - [azajac@vt.edu](mailto:azajac@vt.edu)  
Dept. Biomedical Sciences and Pathobiology

## Additional resources - Birdsfoot Trefoil

*Birdsfoot Trefoil* – Penn State Agronomy Facts 20  
<http://pubs.cas.psu.edu/freepubs/pdfs/uc087.pdf>

*Birdsfoot trefoil for grazing and harvested forage* – North Central Regional Extension Publication 474 (Univ. of Wisconsin)  
<http://www.uwex.edu/ces/forage/pubs/birdsfoot.pdf>

*Birdsfoot Trefoil, a Valuable Tannin-Containing Legume for Mixed Pastures* – MacAdam, J. et al., 2006. Online. Forage and Grazinglands doi:10.1094/FG-2006-0912-01-RV.  
<http://naldc.nal.usda.gov/download/11931/PDF>

### West Virginia University

- Manage field evaluations and conduct sheep grazing trials of commercially available BFT cultivars.
- Evaluate immunological responses in sheep fed BFT.

Jim Kotcon, Ph.D. - [jkotcon@wvu.edu](mailto:jkotcon@wvu.edu)  
William Bryan, Ph.D. - [wbryan@wvu.edu](mailto:wbryan@wvu.edu)  
Div. of Plant and Soil Sciences

Scott Bowdridge, Ph.D. - [scott.bowdridge@mail.wvu.edu](mailto:scott.bowdridge@mail.wvu.edu)  
Div. of Animal and Nutritional Sciences

### University of Wisconsin-Madison

Characterize tannin profiles of BFT cultivars and identification of bioactive components.

Jess Reed, Ph.D. - [jdreed@wisc.edu](mailto:jdreed@wisc.edu)  
Chris Krueger - [ckrueger@wisc.edu](mailto:ckrueger@wisc.edu)  
Dept. Animal Sciences

**For more information about this project including additional resources and updates:**  
<http://web.uri.edu/sheepngoat/orei/>



Cornell University



VirginiaTech



THE UNIVERSITY OF RHODE ISLAND



West Virginia University