



Livestock 360°

Southeastern New York Cooperative Extension Livestock News

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We're Getting Ready for 2017

It's grant writing season around the office this month and many of us in the Ag program are sharpening our pencils and filling in the blanks of our budgets for next year's studies. There are a lot of great ideas floating around and we are working to nurture a crop of grants that support the diverse lot of farmers that we service in this area. Most of the grants are centered on large commercial operations, but with the recent influx of diversified farms in the area, we are developing some programming to support their unique needs. One innovative rancher in the area recently brought up the idea of using grass clippings as silage. I had never heard of idea, but after a little research I realized that it is common practice with a small but growing industry built up around it. Our goal is to test the feasibility of this procedure for small ruminant producers in the area.

We are also working on a grant to expand our very successful small ruminant fecal sampling program in the area. Parasites are the leading cause of losses in small ruminants in the area. In order to protect your animals, it is imperative that you check your animals and treat responsibly to avoid parasite resistance. The first step of this process is to understand the parasite life cycle, how to recognize their presence in your animals, and the best way to treat them. We will be offering small ruminant parasite classes in Ulster County this spring. Once you have completed the course you may utilize our fecal sampling lab that occurs once a month in Ulster. Here you have one hour to test as many fecal samples as you can for the amazing price of 5 dollars. This is a great deal considering that it is usually around 20 dollars per sample if you use your veterinarian. One goal of this particular grant is to extend the program into the surrounding counties. The funds would allow us to train other educators in the county and supplement the purchase of supplies to get their own labs off the ground. This is a very important issue facing producers around the country and we have found that prevention is the best treatment.

Cornell Cooperative Extension of Ulster County is partnering with the Glynwood Incubator on a number of grant funded research projects. These projects including a study on pasture improvement trials testing various ways to improve fallow pastures. This study will compare control versus experimental conditions investigating treatments such as liming, grazing pressure by various ruminants, Keyline plow tillage, and application of compost to find which

(Continued on page 5)



Cornell University
Cooperative Extension
Ulster, Orange, Sullivan
and Dutchess Counties

Cornell Cooperative Extension provides equal program and employment opportunities

2 Of Local Interest

Beef Quality Assurance Workshop

Wednesday, October 26, 2016

5:30 pm — 9:00 pm

Kinderhook Creek Farm

5168 South Stephentown Road

Stephentown, NY 12168



Cornell University
Cooperative Extension
Capital Area Agriculture & Horticulture Program



**Eastern Region New York
Beef Producers Association**

Open House on the Farm



Saturday, October 15, 2016. 10 AM - 3 PM
Sprucegate Holsteins Dairy, 302 Wallkill Rd., Walden, NY 12586



- ◆ Guided Tours!
- ◆ Farm Equip. & Milking Demos!
- ◆ Youth & 4-H Activities!
- ◆ Lunch and Snacks Available!
- ◆ Book Nook & Storytime!
- ◆ Local Ag Products!
- ◆ Fun Food Facts to Discover!
- ◆ Outdoor Games to Enjoy!
- ◆ Visit the Calves!
- ◆ Name the Calf Contest!

**A wonderful family outing! Bring the camera! Only \$1/
person suggested donation**

**Call or visit our website for info and directions:
845-344-1234 cceorangecounty.org**



Cornell University
Cooperative Extension
Orange County

Open House on the Farm 2016 is coordinated by
Cornell Cooperative Extension Orange County
and sponsored by Farm Credit East.



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The Agricultural Stewardship Association invites you to

Come Farm With Us!

A BUS TOUR OF FARM PROPERTIES IN
WASHINGTON & RENSSELAER COUNTIES

SUNDAY, OCTOBER 23RD 10 AM - 6 PM

**\$35 per person includes lunch and beverage at
Brown's Brewing Walloomsac Tap Room in Hoosick Falls**

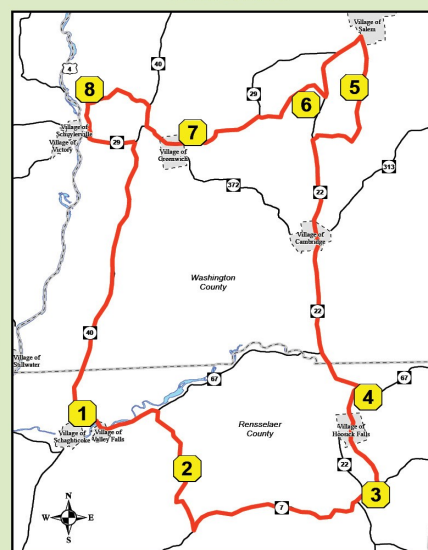
**REGISTER NOW at www.agstewardship.org
QUESTIONS? Janet@agstewardship.org**

OUR STOPS INCLUDE:

1. Wiley Brothers Building & Hardware Supply (our start and finish)
2. An 85-acre farm in Pittstown perfect for a CSA or grazing operation.
3. In Hoosick we will stop at a 289-acre certified organic farm currently producing chicken, pork and beef, with prime soils along the Hoosick River.
4. Brown's Brewing Company - Walloomsac Tap Room - our lunch stop!
5. A 133-acre grass-based sheep dairy in the town of Jackson which has been managed organically for 20 years. The owners are willing to train a new owner in cheese-making.
6. A leasing opportunity for small scale production on a 148-acre farm in Jackson which is protected with a conservation easement held by ASA.
7. In Greenwich, a 95-acre former dairy farm which the owner would like to farm cooperatively with other partners.
8. A 65.5-acre farm with an established slaughter house used to process poultry. The property also includes a farmhouse, pole barn and former dairy barn.

More details on all the properties will be available to tour participants.

TOUR ROUTE



We will be traveling on a 38-passenger tour bus complete with rest rooms, WiFi, 110 outlets, and 3-point harness seatbelts. Between stops guest speakers will discuss:

- an overview of local agriculture and markets in Rensselaer and Washington counties
- how conservation options make purchasing a farm more affordable
- financing and grant programs for new farmers from Farm Credit East and USDA
- alternative financing available through investor organizations
- other farming opportunities not included in the tour stops



This tour is supported by the Hudson Valley Farmlink Network which is coordinated by American Farmland Trust and has received primary funding from the Doris Duke Charitable Foundation. ASA is a land trust working with farmers in Rensselaer and Washington counties who voluntarily wish to conserve their working lands for current and future agricultural uses. ASA is a member of the Hudson Valley Farmlink Network and an accredited land trust.



3 Dairy and Beef

Managing Shrink in Beef Cattle

Hank Bignell, Senior Livestock Educator, Capital Area Ag Program

There are a lot of things to think about when you are running a beef cattle operation. Cattle shrink doesn't typically come to mind as an important factor for new farmers but it is important to consider. Not only does it affect the weight of the cow, but it could also cost you the farmer money.

First of all, shrink in beef cattle is the loss in live weight from transporting the animal from one place to another. Typically, when cattle are without food and water for up to 12 hours, excretory shrink occurs which is easily recoverable with access to normal amounts of food and water. Tissue shrink is the loss of tissue weight and it is harder to recover. As mentioned before, restricting food and water can cause shrink but there are other factors that can play a huge role.

Cattle respond well to low stress and quiet handling procedures. Productive handling facilities can alleviate stress on the animal when conducting certain cattle management practices. When working with cattle remember to use common sense along with what we know about cows. Cattle use their herd instincts and like to follow each other. They also tend to work better on level grounds opposed to steep uphill or downhill scenarios. Use light to your advantage, cattle tend to go where the light is and stay away from dark areas in these situations. Diet, weather, environmental conditions, and weight can all contribute to shrinkage. Following correct [Beef Quality Assurance](#) practices can help reduce shrink.

For information on cost effects of shrink [Shrink in Beef Cattle: A Marketing Consideration](#), transportation effects [Transportation Shrink in Beef Cattle](#), and how to manage shrink [Managing Shrink and Weighing Conditions in Beef Cattle](#)



Illustration Credit: USDA

Shrinkage Loss Due to Different Handling Conditions in University of Wyoming study

| Conditions | Percentage of Shrink |
|--------------------------|----------------------|
| 8 hour drylot stand | 3.3 |
| 16 hour drylot stand | 6.2 |
| 24 hour drylot stand | 6.6 |
| 8 hours in moving truck | 5.5 |
| 16 hours in moving truck | 7.9 |
| 24 hours in moving truck | 8.9 |



Friday, October 21st
8:30 AM - 4:00 PM

Farmers, food business entrepreneurs, and community members near and far will have the unique opportunity to learn proven strategies to help them add value to farm products that can turn them into profit!

Various educational tracks will be available to participants where they can learn all about getting into the food business, including:

- Rules and regulations
- Marketing and labeling
- Packaging and distributing
- Product testing and food laws
- Sourcing locally

<http://ccext.net/sullivanccceCRM/civicrm/event/info?id=261&reset=1>



Pig Breeding Systems for Small and Beginning Pig Farmers

Adapted by Michelle Lipari, Livestock Educator, CCE Sullivan County

Originally published in Pig Information Gateway

Introduction

Breeding or mating systems are the approach taken to pairing a boar and a gilt or sow for breeding in order to incorporate or maintain desired traits. Because the genetics of a pig plays an important role in its performance and meat quality, all pig producers should be familiar with breeding systems for pigs. This factsheet provides an introduction to pig breeding systems and heterosis. Practical swine breeding systems for small and beginning pig farmers are also discussed.

Pig Mating Systems

A breed is defined as a group of animals sharing a common ancestry that have distinguishable, fixed characteristics who when mated with a member of the same breed will produce offspring with the same characteristics (Damron, 2013). Breeding or mating systems are the approach taken to pairing individuals for breeding in order to incorporate or maintain desired traits. There are two main types of mating strategies— positive assortive mating and negative assortive mating. In positive assortive mating we breed like to like in order to narrow the genetic pool so that the desired traits express themselves more frequently. In negative assortive mating we breed unlike to unlike in order to correct a deficiency or improve expression of a specific trait. Through these mating strategies five basic breeding systems arise:

Inbreeding—breeding individuals who are very closely related within the breed.

Linebreeding—a form of inbreeding which attempts to concentrate the inheritance of one ancestor or line of ancestors within a herd.

Outcrossing—breeding individuals that are less closely related within the breed.

Random mating within a breed—mating individuals within a breed without considering their pedigree.

Crossbreeding—a planned approach to mating pigs of very different genetic backgrounds which typically results in heterosis. Heterosis is the improved performance of offspring compared to the average of their parents.

Inbreeding and linebreeding encourage uniformity within the genetic pool and can be used to develop new breeds of pigs. However, as uniformity within the genetic pool increases, the potential for expressing undesirable genes also increases. This in turn can lead to a decline in performance commonly known as inbreeding depression. Outcrossing and random mating within a breed is used to maintain genetic diversity within a breed of pigs. While breeding like to like can support uniform transmission of superior traits to all offspring, usually some level of inbreeding depression occurs whenever breeds or lines within breeds are kept pure. Thus, crossbreeding is by far the most common form of mating strategy used in the U.S. swine industry because of the advantages of heterosis.

Heterosis

Heterosis or hybrid vigor is the improved performance of offspring compared to the average of their parents. Heterosis occurs when unrelated lines or breeds of pigs are bred to each other and can be thought of as the recovery of performance depressed by inbreeding in the parent populations. This advantage typically occurs via expanded genetic diversity. Heterosis tends to be largest for traits with low heritability such as prewean mortality and 21-day litter weight. For traits with high heritability—for example average daily gain—heterosis tends to be less.

The Anatomy of the Domesticated Pig ~ A Domesticated Member of the Species (*Sus Scrofa*)

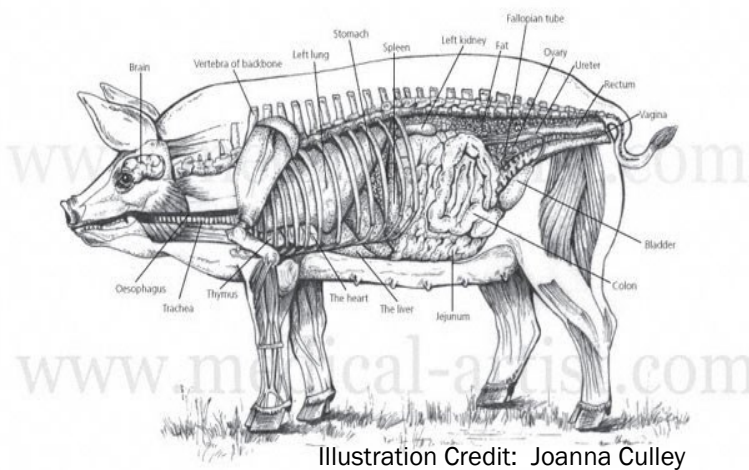


Illustration Credit: Joanna Culley

For most farms not raising animals primarily for breeding or show stock, a crossbreeding system is used because it provides significant improvements in traits relating to reproductive performance and mothering ability.

Crossbreeding Strategies

Because of hybrid vigor, crossbreeding systems are used on almost all U.S. pig farms. There are several different approaches to crossbreeding that producers may use, each with different advantages and challenges

Terminal System

One of the most common crossbreeding strategies in the U.S. swine industry is the terminal system. In this system crossbred females are bred to a terminal sire (either purebred or crossbred) and all the offspring are sold. This is a simple system to manage, will create genetically uniform groups of pigs from year to year, and captures 100% of available hybrid vigor in the females and all offspring. The drawback to this system for small and beginning farmers is that you will have to purchase all replacement gilts and boars. Regularly purchasing replacement gilts may be cost prohibitive and increases the potential for introducing novel pathogens into your swine herd.

Rotational Systems

Many small pig farms use a rotational system. In this system boars of selected breeds are rotated into the herd with each generation of replacement gilts. Replacement, cross-bred gilts are raised on-farm which helps support herd biosecurity. Table three summarizes various crossbreeding strategies in terms of complexity and percent heterosis maintained in the offspring. As the number of breeds included in the rotation increases, the amount of heterosis maintained also increases. A rotational system does not allow maximization of hybrid vigor but is a common system due to the potential for lower cost when compared with purchasing replacement animals. If natural service is used a large number of boars (at least one of each breed used in the crosses) may need to be kept on the farm in order to maintain the planned genetic program. Historically the cost of purchasing and maintaining multiple boars and the level of record keeping necessary to track each generation of offspring led to most farms settling on a three breed rotation. Using artificial insemination allows a wider variety of boars to be accessed without having to maintain those individuals on site. Today with the availability of purchased semen and personal computing technology some of the barriers to more complex breed rotations have been reduced.

Combination System

There is also the option of utilizing a combination of the two systems. A small subset of the herd is kept in a rotational system that is used primarily to produce replacement gilts for the entire farm. Some of the replacement gilts are kept within the rotational system, but most are bred to a terminal sire with 100% of the offspring being marketed. This combination allows you to raise your own replacement gilts and maximize hybrid vigor in most of the pigs raised for market. For producers managing a small group of sows and gilts, this system can become cumbersome and difficult to manage well. Detailed recordkeeping and management are needed to insure the success of this system.

Adapted from Pig Information Gateway *Pig Breeding Systems for Small and Beginning Pig Farmers* (2015)

<http://porkgateway.org/resource/pig-breeding-systems-for-small-and-beginning-pig-farmers/>

(intro from page 1)

technique is the most effective and least expensive. Another study involves planting warm season annual forages such as sorghum and pearl millet to see how these warm season forages can get us over the grass slump of the dry summer season.

So you have a novel idea for something that you would like to try out on your property? There are many different grant structures that aim to focus and support innovative farm practices. If you are interested the first place to start would be the SARE grant data base that provides abstracts of studies that have been funded in the past. Take a look at some of the other studies that have been conducted. You never know, your idea may have already been attempted or you may be inspired to try out some new ideas. Either way I guarantee that you will learn something in the process.

6 Crops and Feed

Making Forage on a Very Small Scale: Grass Clipping Silage

Adapted by Jason Detzel, Livestock Educator, CCE Ulster County
Originally Published in Small Farm Canada by Ray Ford

Joanne Mathias is a *Small Farm Canada* reader with an acreage in Port Angeles, Washington, and a common problem: “I need more alternate feed sources,” says Mathias, who tends sheep, chickens, pigs and an orchard on 13 acres. “I’m tired of going to buy hay.” Instead, Mathias wants to make silage — forage that’s naturally fermented inside a sealed container — but without the silos, or round bale wrappers big farmers use. “In this area we have tons of grass in the spring and really lousy haymaking weather,” she wrote in an e-mail. “It’s also really difficult to find someone who will cut and bale small fields.” Why not, Mathias wondered, turn surplus grass into silage using a riding mower and garbage bags? So in a departure from my usual column, I was assigned to make small-scale silage and submit the results to an expert taste panel. I was a little nervous; the tasters can be a tough crowd.



How silage works

Hay and silage are as different as beef jerky and dill pickles. Hay preserves nutrients by drying or “curing” forage to about 15 per cent moisture. Rapid drying inhibits the growth of molds and microbes, preserving nutrients in the hay. “Ensiling” is all about getting the right environment for the type of bacteria that produce lactic acid, the acidic juice that pickles the forage. Important factors are moisture level (typically in the 40-70 percent range, depending on the type of silage), and a low-oxygen environment, achieved by sealing tightly-packed forage in a silo or bag. During the ensiling process, bacteria ferment the sugars in the grass. The tangy lactic acid preserves nutrients while remaining palatable for ruminants. Instead of waiting several days for hay to dry, silage can be baled and wrapped within a day or so of mowing (sometimes within hours.) Other benefits include fewer lost leaves and more nutrients retained.

The lawn connection

For anyone who’s struggled with 2012’s high hay costs, making silage from grass clippings seems like a no-brainer. In the U.S. alone there are an estimated 40 million acres of lawn, making turf the country’s largest irrigated “crop.” Most of that crop is either dumped, composted or left on the lawn. Calling this “a missed opportunity for livestock producers,” Colorado State University extension director Tom McBride fed grass clippings to a flock of sheep, and tracked their performance. McBride got the idea when he was gazing his own flock in a suburban utility corridor. Landscapers were dumping clippings in the area, and the sheep were cleaning them up. “Bluegrass lawn clippings would make a desirable winter feed if ensiled,” he concluded. “Grass clippings alone had crude protein levels of over 20 per cent on a dry matter basis . . .” McBride tested the flock’s urine for signs of pesticides from the grass. Herbicide levels were low and became undetectable two days after he ceased feeding the silage. Building on McBride’s work, Wyoming landscaper Todd Graus invented the BioPac’r, a unit that fits in the back of a pickup truck and compresses grass clippings into square bales. When the bales are sealed in plastic bags, the forage begins ensiling and can be sold to livestock farmers. “We’re taking something that people treat as waste and turning it something landscapers can sell, and farmers can feed,” he says.

Small-scale silage

But what if you’ve only got a handful of ruminants, a few sheep, say, or a family cow? Conventional silage equipment doesn’t make sense on a limited acreage. Instead, I borrowed silage techniques originally developed for small farmers in Nepal. With a few tweaks, they worked well in northern Ontario.

Step one: Mowing, Sept. 9th, 2013

Since my mulching lawnmower chops up the grass too finely (and lacks a bagger) I used the farm mower-conditioner to knock down two samples of forage: a stretch of 14-inch tall orchard grass, and a patch of 8-10 inch-tall regrown pasture. This latter sample was mostly grass with some clovers and dandelions.

(*Silage from grass clippings page 6*)

(Continued on page 11)

Breeding Season on the Forefront

Rachel Moody, Livestock Educator, CCE Orange County

It is that time again! Now show season is over, it is time to get ready for breeding those does. Not ready to breed yet? Not a problem, but planning ahead is important to ensure a successful year for both producer and goats.

Preparation: Before even breeding your does you want to make sure they are in top condition and ready to go. You want to make sure they are gaining weight at least three weeks prior and after breeding. This does not mean overweight, but at optimal weight. If they are too thin they may not show signs of heat or even ovulate properly. You want to make sure she is a healthy weight before kidding as well so she can produce plenty of milk without draining herself of energy. One way to do this is with Body Condition Scoring (BCS). The scale is from 1 to 5, a one is emaciated and the health is threatened, a five is very fat and long term health is being compromised as well as conception and issues kidding. Three is the optimal score for a goat, however sometimes it will be a little less during milk production or rut for bucks and maybe more during pregnancy. Nutrition is very important for conception, pregnancy and post kidding.

Bucks are not to be ignored either. The buck has the greatest genetic impact on your herd and also at least 50% of



Photo Credit: Cornell Cooperative Goat Program

breeding problems can be traced back to the buck used. Check the BCS on your buck as well because will worry and lose weight (as much as 50 lbs.) during rut. Since they tend to eat less during this time you should use higher quality feeds and minerals, especially in large operations where he has a big job to do and needs his strength.

For both does and bucks make sure they are wormed at least 30 days prior to breeding and don't under-dose, this can kill off weaker worms and create paradise for stronger worms. Give BoSe if you are in a selenium deficient area 30 days prior. Selenium deficiencies can cause lower conception rates, weak heats, low motility in sperm, retained placentas, weak kids that "knuckle under" and more susceptibility to infectious diseases. Consult a veterinarian for dosage since overdosing is toxic. You also want to make sure to trim hooves since this is a highly active time for both genders. You want a both males and females to be able to stand for breeding, and the **buck has** more of that to do than the does. Another suggestion for the buck is to clip his belly hair and keep an eye on his legs. Bucks urinate on themselves to attract the female, as unattractive as that sounds it works, and if he gets carried away with this he can get urine scald on the front legs.

Breeding: Now that we have the animals all prepped, it's time for breeding. We want to make sure to identify the does in heat. It can differ for breeds but the main signs for does are: swollen vulva, mucous discharge, frequent tail wagging (flagging), bleating, pacing the fence, standing in heat, decreased milk production and increased urination. For bucks: urinating on heads, beards, mouth, chest and legs turning yellow in color. They also bleat or blubber a lot, snort, grunt, flehm (curl the lip in the air), fight other bucks and pace the fence. You will want to have the buck visible to the does to encourage heat. Does cycle about every 18-21 days, estrus (heat) is 2 to 3 days and standing heat is 12-36 hours. During this time you want to put the doe in with the buck, especially in dairy operations. With meat goat operations you can put one buck in with about 50 does and leave him there for about 45 days, or two heat cycles to make sure he gets all the does. Leaving him in too long can result in a loss of interest in breeding. After his time is up, put the buck back in his pen. This way you will know who the sire is to which kids.

Unseasonal: Not all goats are seasonal breeders; examples would be Nigerian Dwarfs and Tennessee Meat goats.

(Continued on page 8)

Even though you can breed year round, you want to make sure you time the breeding so the does are kidding in optimal weather conditions, especially in the Northeast! There are ways to take seasonal breeders and breed them out of season. Some ways are using artificial lighting techniques and pharmaceutical techniques (drug therapy).

For more information on this subject you can visit www.goatword.com/articles/pregnancy/reproductivemanagement.shtml . Also in this article is mention of estrus synchronization so that all does come in heat around the same time and kid at the same time. A lot of this is done in dairy cow operations, along with artificial insemination.



Photo Credit: Cornell Cooperative Erie Program

Other Considerations: Make sure young does are at least 60-70% of the average adult weight before breeding for the first time. This reduces problems at kidding time as well as breeding young does to smaller bucks (even if it is a different breed). Also only breed once a year, even in commercial businesses. Asking a nursing/milking doe to also feed herself, kids and reproduce is a lot and will decrease her productive life, add wear to her udder and produce inferior kids. You should also limit the amount of does a young buck can service. You always want to improve your herd, so make sure to choose genetically superior bucks and make sure not to overuse the bucks to reduce inbreeding.

So now that you have checked off all the items on the breeding check list and all the does are bred and the buck is on vacation, it is time to get ready for kidding time! Always monitor the does during their gestation and make sure they are at optimal weight to reduce complications at birth.

For Further Reading

www.ansci.cornell.edu/goats/CSGSymposium/bodycondscore_goat.pdf
www.extension.org/pages/19720/goat-reproduction-puberty-and-sexual-maturity
www.goatword.com/articles/pregnancy/reproductivemanagement.shtml
www.dairygoatjournal.com/81-5/marilyn_grossman/
www.tennesseemeatgoats.com/articles2/behavior.html
http://smallfarms.ifas.ufl.edu/alternative_enterprises/articles/article05-gary.pdf
www.dummies.com/how-to/content/how-to-breed-your-goats.html
<http://www.dummies.com/how-to/content/how-to-prepare-goats-for-breeding.html>



9 Poultry

Garlic Use in Livestock Animals for Gastrointestinal Parasites

Carrie Anne Doyle, CCE Ulster County

Gastrointestinal parasites cause great financial damage and health problems in various types of livestock, from sheep and chickens to goats and cattle. Pharmaceutical companies manufacture synthetic drugs to treat them, but unfortunately, over time parasites can become resistant, and the drugs ineffective, so different treatments are sought (Jackson and Coop 2000). In some parts of the world, especially rural areas in developing countries, it's difficult for farmers to access synthetic drugs. As a result, farmers seek alternative treatments which are less expensive and more readily available, such as plants growing in the local habitat or commonly used in foods. One plant which is often cited as effective against gastrointestinal parasites is *Allium sativum*, better known as garlic.



Garlic has been used for thousands of years to improve health in many applications, and even now, it is said to have antibacterial, antiviral, and antifungal properties, and can benefit the cardiovascular and immune system in humans as well as animals, from the family pet to the farmer's livestock. The legitimacy of garlic's effectiveness in treating parasites in livestock varies, as demonstrated in stories told by farmers based on personal experience ("anecdotal"), as well as in the results of academic research studies ("scientific").

So does garlic work against gastrointestinal parasites? That question is difficult to answer with a definite yes or no. Looking at various studies done and farmer experiences, many factors seem to affect the results, so that the answer is, sometimes yes, sometimes no. The variables include:

- The form of garlic used (dried, fresh, extracted and placed in alcohol, etc.),

- The species of parasite tested and the animal host,

- The parameter measured to evaluate garlic's effectiveness,

- How the garlic treatment was applied.

By looking at some of the studies conducted, and anecdotal feedback of livestock producers like yourself, I hope to shed some light on the effectiveness of garlic. A discussion of several studies and anecdotes is outlined below. Here are some anecdotes from farmers of garlic used as a treatment for parasitic worms:

Little Pig Farm: "...we have found garlic and rosemary to be the most effective. We also use diatomaceous earth which our feed mill mixes directly into the feed ... supplemented once a month by adding 2 tablespoons of garlic to their feed once a day." He goes on to say "Recently we took some stool samples to our veterinarian...and the tests came back negative for parasites. That's right, negative."

Our Little Flock: "Garlic and garlic juice isadded to kelp, added to dry feed, mixed with molasses and salt, mixed with bread-molasses-milk and salt, etc. The main idea is to be sure that each animal gets at least a teaspoonful at proper intervals, you can give 2 teaspoonfuls if you feel the worm problem merits it. You can be creative in how you administer the garlic juice."

These are just a few of the many personal experiences told by successful farmers who use garlic as a treatment, and so many variations and factors exist. Garlic seems to be working and is less costly and potentially more effective in some cases than manufactured drugs against gastrointestinal parasites in livestock. Now let's look at some studies carried out by university researchers.

(Continued on page 10)

SCIENTIFIC STUDIES

These studies represent just a handful of the many studies performed on this subject. There was at least one control group (no treatment) plus two or more treatment groups, with the garlic treatment increasing in concentration. Details are available in original articles but omitted for brevity.

A Bangladesh study (Hasan et al. 2015) involved the **Black Bengal goat** (*Capra hircus*) and unspecified species of parasites (egg count performed using McMaster counting chamber). A **garlic solution** was given to the goats twice daily for 60 days, and the results were in increase in weight in all groups (including control group), and a decrease in the egg count proportionate to treatments.

In a North Carolina study (Worku et al. 2009) **Boer goats** were given a garlic solution and the nematode species ***Haemonchus contortus***, as well as **coccidia** (a type of protozoa) were studied, and treatment given as a drench of a **garlic juice**, and used several parameters of measurements. The fecal egg count in *H. contortus* count decreased in all groups, including the control group, so no significant difference was found. In coccidian, a decrease occurred in the highest dose, compared to the control group, but other groups varied. Overall the results of this study were inconclusive but showed a strong possibility that garlic can be effective against coccidia.

Another study was done in vitro (outside of the body) (Shalaby and Farag 2014) using parasitic worms ***Haemonchus contortus*** (nematode) and ***Monezia expansa*** (flatworm) collected from **sheep** in Egypt. Using a scanning electron microscope, the anterior (front) end of the worm was observed to look for changes after varying applications of garlic oil extract (see images below). The results showed a significant negative effect on the cuticle (surface) of the worm, causing it to be wrinkled and distorted. The changes were proportionate to the doses given, to the point where in the *H. contortus* sample, lesions occurred, and in *M. expansa*, the suckers of the head of the worm became swollen and eventually closed off. These changes strongly indicate that garlic can treat these species of parasitic worm.

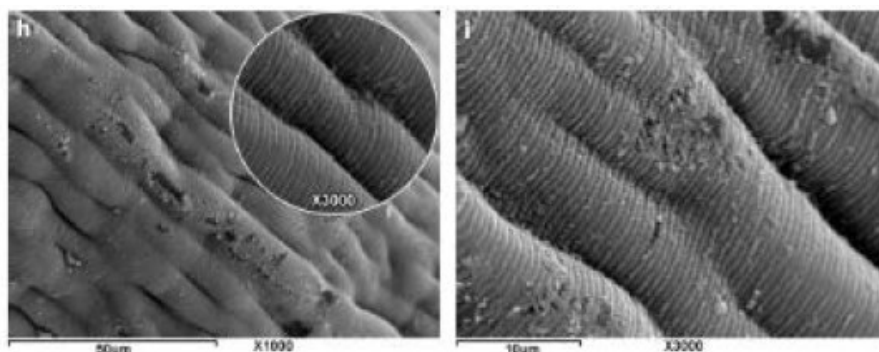


Figure 1. Lesions and wrinkled cuticle (surface of worm) in the highest concentration of garlic treatment of *H. contortus* (image from original study).

CONCLUSION

Many variables exist as stated in each case, such as the species of animal host and parasites studied, and the type of application and parameters measured to evaluate garlic's effectiveness. In reality, there are even more factors we may not take into account, because of incorrect assumptions. It is variables such as this which often cause the biggest mysteries. Further research is warranted on the use of garlic and other plant compounds as a way of improving the health of our livestock.

In the end, the decision is yours whether to try garlic, and many different sources and ways to administer it are available. When considering treatments, gather information and keep in mind that no one situation is the same, so you will want to monitor the effectiveness of the treatment. This will help you decide whether to continue, or try something else. For any help, ideas, or information on any livestock issues, consult our Livestock Educator, Jason Detzel at jbd222@cornell.edu or call 518-567-4506. Also please share your experiences with garlic-we'd love to hear from you!

Step two: Bagging

After allowing the grass to dry for 60-90 minutes, I used the squeeze test (see sidebar) and reckoned the moisture in the 60-70 per cent range. The crop was hand-raked and compacted into a heavy duty 4-mil garbage bag. Air was vacuumed from the bag with a shop vacuum; the bag was tied with twine and then inverted into a second bag. The vacuuming and tying process was repeated until the sample was triple wrapped. (The outer two bags can be used for silage later. The inside bag could be reused for garbage after the silage is fed.) Two samples, about a bushel each, were stored in a rodent-proof bin for eight weeks.

Step three: Assessment, November 13th, 2013

“Nothing wrong with that,” says Wayne Crossfield, my dairy-farming neighbor. The forage is greenish-brown, with a tangy silage smell. Of the two, the pasture regrowth looked better to me, perhaps because the orchard grass was too close to maturity and had less sugar to ferment. Wayne said I could have let the grass dry longer without getting it too dry. (The grass should be limp and wilted, but not so dry that it’s starting to curl.) Less moisture might have made for quicker acid production and more rapid pickling. But overall, Wayne said, I had good feed.

Step four: the Tasting Panel

A bit like introducing kids to pickets, silage is an acquired taste for sheep who haven’t eaten it before. I fed small amounts of silage to replacement ewe lambs after their morning hay ration. Within a day or two they were eating it with the gusto normally reserved for grain. Clearly a thumbs-up (or hoofs up). So what about using a side-discharge or bagging lawnmower on shorter grass — the 3-6 inch height you’re more likely to have around the barn or in the orchard? The good news is it’s easier to make silage with short grass clippings, rather than the longer, more mature grass I cut with a haybine. Finer clippings pack more tightly, hold less air, ensile more quickly, and can be ensiled at a slightly higher moisture, typically 65-72 per cent. Whether all this effort makes sense depends on your situation. Small-scale silage is labor-intensive, but if you’ve got the right lawnmower, lots of clean lawn, and a few sheep or a single cow, it could be a tasty addition to a hay-based ration. Plus, it’s nice to see the lawn earn its keep.

When silage goes wrong

Too much or too little moisture, too much oxygen, or contamination from soil, faecal matter, or even dead animals will all interfere with the forage’s fermentation. Warning signs include silage that’s red, orange, black, white or slimy from fungal mold or bacterial growth, and silage that smells rancid or musty. If it doesn’t smell good don’t feed it. If in doubt, ask a local dairy farmer. In the field, cut high to avoid picking up faeces or soil. Be especially careful if you’re raking. It’s best to avoid mechanical raking, but if you must, make sure the tines are set so they’ll always clear the ground. Potential concerns involving lawns include pesticides and endophyte-enhanced turf grasses. If you’re going to use your lawn for silage, it makes sense not to spray. Endophytes, on the other hand, are a naturally-occurring fungus bred into turf grasses, usually fescues, to deter pests. The same fungus is bred out of farm grasses to make them more palatable for livestock. I haven’t heard of endophyte problems from feeding grass clippings, but if you’re going to harvest your lawn for silage, or graze it, it makes sense to avoid endophyte-enhanced varieties when establishing the turf.

Getting the moisture right

If you don’t have a moisture meter, try the squeeze test: grab the forage and squeeze it into a tight ball. If the ball holds its shape and you can squeeze juice out of it, it’s too wet (75 per cent moisture or more.) I ensiled my portion when the ball barely unfurled without free juice, probably putting it in the 60-70 per cent moisture range. If I was doing it again, I’d probably wait a few more hours, for a slightly drier forage. If in doubt, ask a neighbor who makes silage bales.

For more info:

Haylage and Other Fermented Forages, J.W. Schroeder, North Dakota State University Extension Services.

Little Bag Silage, Ian R. Lane.

Silage Making for Small Scale Farmers, U.S. Agency for International Development (USAID).

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<http://smallfarmcanada.ca/2014/making-forage-on-a-very-small-scale/>



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