



## AGRICULTURE



# Understanding Parasites on Pasture

By Brady Campbell,

Program Coordinator, OSU Sheep Team

Recently, I had a sheep producer ask me, "when do I need to start thinking about parasites on my pastures?" This is a great question and certainly a valid concern as livestock are making their way to pastures this spring.

Now I know what some of you are thinking, "I don't have issues with parasites. If I did, my sheep would be showing clinical signs of disease such as decreased appetite, decreased activity, or even death." However, this is a common mistake that we as producers make too often. Typically, clinical signs of parasitic infection are only noticed when the cases become severe. According to Dr. Thomas Craig, DVM, PhD, DACVM, most losses associated with parasitic infection are economic rather than clinical. Parasitized livestock are extremely inefficient as demonstrated by a decrease in overall animal performance, such as decreases in average daily gain and reproductive performance. In order to understand the effects of parasitism, we must first be familiar with how and why our livestock become infected.

### Parasite Life Cycle

To begin, let's first start with the life cycle of a parasite. For the purpose of this article, we will use *Haemonchus contortus*, more commonly known as the Barber's Pole Worm, as an example. With that we will start where it all begins, the egg. Parasite eggs are shed from an infected animal (sheep or goat) in the manure and start their infective life cycle on pasture. This is important to note as most parasites must hatch outside of the host and be consumed in order to the life cycle to continue.

Once the eggs hatch, the L1 and L2 stages of larvae develop and feed off of the bacteria present

in the manure. Parasitic larvae are considered infective once they reach the L3 stage. The development of an egg to L3 infective larvae can occur in a matter of 3-10 days and is dependent upon environmental conditions (temperature, moisture, humidity). L3 stage larvae will move out of the manure and use moisture, in the form of rain or dew, to move onto and up and down the forage leaflet. Once the larvae are present amongst the forage canopy, it will only be a matter of time until they are consumed by grazing livestock. Once consumed, L3 larvae will de-sheath and attach to the wall of the abomasum (fourth compartment of the ruminant digestive system). Upon attachment, larvae will feed off blood and begin to develop into a mature adult. Once reaching adulthood (approximately 18 days after attachment), the parasites will mate, females will produce eggs, and the vicious cycle continues. For those that didn't catch the math, these parasites consumed on pasture can reinfest the flock in a matter of 21 days. In addition, a mature *H. contortus* female has the capability of producing 5,000 – 10,000 eggs per day, talk about productivity!

### Factors

Now having a better understanding of the parasite life cycle, the next question becomes "what factors influence the productivity and longevity of parasites on pasture?" Parasites thrive in an environment in which is hot, humid, and among forages that provide a protective canopy from ultraviolet sunlight. Environmental temperature and moisture play a critical role in the development of parasites. In a lab setting, Besier and others (2016) found that the normal development of infective L3 stage larvae is anywhere in the range of 50°F – 104°F. To further support this claim, Dr. Craig (2018) states that a more ideal temperature



Image of an adult *Haemonchus contortus* parasite recovered from the abomasum of a lamb

range for optimal development is 72°F – 79°F with 100% humidity. Beyond these ranges, parasite hatchability and survivability decreases. However, this does not mean that grazing livestock are safe to graze without fear of parasites outside of these temperature ranges. Parasite development tends to be rapid in summer like conditions, but life expectancy is short due to heat and sunlight. Remember the de-sheathing process that I mentioned once the L3 stage larvae were ingested? The sheath of the L3 larvae is important as it prevents the parasitic larvae from drying out in the intense heat. However, with limited energy reserves, the larvae are not able to survive in these conditions for an extended period of time. On the flip side, parasite development is slow during spring, fall, and winter conditions, but survival is lengthy. As drying out becomes less of an issue during these periods, the L3 larvae are able to cope in these conditions and survive for a longer period of time. In areas with moderate to low temperatures, parasitic larvae are able to survive on pasture for up to a year, but in general most survive for 2-6 months (Craig, 2018).

Remember, parasites are not only found on forages within the pasture. As survival tools, parasites are also able to protect themselves by remaining in the manure pack or moving into the

soil when environmental conditions are not suited to their development. Therefore, short periods of dry weather and intense heat or cold temperatures may not be enough to destroy an entire parasitic population. Furthermore, your flock and herd can be a reservoir of parasites as well.

During unfavorable environmental conditions, parasites can undergo a period of hypobiosis, an arrested or stalled stage of development. This allows for the parasites to resume development and infection once conditions are favorable (i.e. warm weather in the spring and summer).

### Parasite management

So now that we have an understanding of how the parasite life cycle works and what factors influence their development, the next question always becomes "what can I do to get rid of the parasites?" Unfortunately, this is currently not an option. There is no silver bullet to parasite management and producers must adapt and learn how to raise their livestock in an environment in which parasites exist. Fortunately, due to continued research efforts at The Ohio State University and around the world, producers today have a list of management practices and strategies in their management tool boxes to help combat parasites aside from the use of anthelmintic or deworming products.

In order to keep this weeks post short, I'll save the discussion of on-farm parasite management for next week. In the meantime, be thinking about what management strategies that you currently use on your operation. You never know, sharing what you do and comparing it to our discussion next week may help both you and fellow shepherds down the road while combating issues associated with parasitic infection. Until next week, happy shepherding!

## On-farm Parasite Management Strategies

By Brady Campbell,

Program Coordinator, OSU Sheep Team

If you recall the article (Understanding Parasites on Pasture) from last week, we discussed the parasite life cycle and factors that affect overall survivability and of parasites on pasture. As promised, this week we will dive into a list of parasite management practices that producers have available in order to protect their herds and flocks from the losses associated with parasitic infection. With this being said, I'd like to first start with why previous recommendations that relied heavily on the use of de-worming (anthelmintic) products as a means of controlling parasites is no longer a viable option.

In short, because of the continual use of anthelmintic products, the livestock industry is being faced with a huge production challenge, parasitic resistance. In this case, parasitic resistance is described as the heritable capability of parasites to survive what would be considered an effective dose of an anthelmintic product. There are several reasons why this may have occurred

on your farm including under dosing the animal (i.e. treatment not based on accurate body weight), repetitive on-farm use, failed dosing equipment (i.e. drench gun not dosing appropriate amount of anthelmintic due to an air bubble), or simply put, the continual and repetitive use of the products themselves. I understand that time is valuable and when we set out to do a task we want to get it done as quickly as possible. This may mean that we may not weigh every animal or that we treat every animal in the working system regardless if they are in need of a treatment or not. This is where the issue begins. Yes, anthelmintics still have a place in our production systems, but we must find alternatives to limit our use of these valuable products in order to prevent resistance from developing further and creating a greater issue. Therefore, if producers should limit the use of anthelmintic products, what other options do they have available in order to control parasitic infection?

### On-farm Management

Although change can be difficult, simple

changes in how you manage your flock or herd may just do the trick. For those that are able, rearing your livestock in a confinement-based system will significantly reduce issues with parasitic infection. Although rearing sheep in a confinement becomes expensive quickly, keeping your mind at ease knowing that parasites and other predators are no longer a concern in your operation may be well worth the investment. In addition, animals in confinement can be monitored more regularly and their diet can be managed more efficiently. An important note to mention that in this system, if your animals are coming off pasture and have no intention of returning back to pasture, consider treating all animals with an anthelmintic. If you were to not treat these animals, residual worms from pasture will remain within the animal, consuming blood, until their lifespan is up. Some parasites can live in the host in this manner upwards to 6 months.

For those that are more traditional in their management style and would rather decrease their feed costs by allowing their livestock to har-

vest their own feed, there are several management strategies that can be implemented on pasture as well. First of which is breed management. Specific breeds of sheep, including most hair breeds and some wool breeds, have shown to be tolerant to parasites. Record keeping systems, such as the National Sheep Improvement Program (NSIP), have EBV's that focus on Worm Egg Counts (WEC). These parameters allow producers to choose breeding stock that are more tolerant and resistant to parasites as those selected individuals tend to shed fewer eggs resulting in an increased ability to naturally protect themselves from parasitic infection.

The FAMACHA<sup>®</sup> eye scoring system is a quick, easy, and efficient method used to detect and determine when to treat for parasites on an individual basis. Using the Cover, Push, Pull, Pop technique, producers are able to determine an individual's parasite status in a matter of seconds based upon the color of the individual's mucosal membrane of the lower eyelid. An

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## On Farm Parasite Management

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important note to mention in this system is that the FAMACHA® eye scoring system is only valid when the parasite of interest is *Haemonchus contortus*. Using this monitoring system for detecting infection caused by other parasites is not valid.

Additional on-farm management practices that could be implemented in an operation include delayed weaning and fall lambing. We have already noted the benefits of delayed weaning previously in our article (How can Delayed Weaning Benefit your Operation?), so we will not cover it any further here. In addition, the use of fall lambing may be a viable alternative as well. Thinking back to our discussion last week, we discussed that the temperature range in which parasites thrive is somewhere between 50°F and 104°F. Using this to our advantage, if producers were to lamb their ewes during the fall when the weather is cooler in conjunction with high quality annual forages, perhaps lambs could be pasture fed during this time period with a decrease in negative effects caused by parasites. This research is currently being conducted and we will be collecting our third and final year of data this fall. Be sure to stay tuned on this piece of grazing research!

### Forage and Pasture Management

As a subset of on-farm management practices, when it comes to parasites perhaps a more important aspect would be forage and pasture management strategies. We all know the importance of rotational grazing, management intensive grazing, and strip grazing to mention a few. These types of management systems allow for maximal utilization of forages and have shown to be beneficial to our livestock, pastures, and our wallets. As a refresher, be sure to check out these two Ag-notes! (Comparison of Grazing Systems and Benefits of Rotational Grazing). There are also benefits to these types of systems in regards to parasites. As we mentioned last week, infective larvae can remain viable on pasture for up to 2 to 6 months. Now I know what you're thinking, "how can we leave our pastures idle for that long without grazing?" This range is for optimal conditions. During the heat of a dry summer, these infective larvae will not remain this long on pasture. In this case, by the time the paddocks are ready to be grazed again, enough time will have passed that the likelihood of reinfection will be reduced. However, what if this is during the warm and wet spring when forages are a peak growth. Allowing livestock to graze the paddock once and then harvesting the next rotation as a hay crop may be a viable and sustainable option. Removing the forage canopy via mechanical harvest and exposing the ground and remaining parasites on pasture to UV light will help dry the infective larvae out, thus rendering them non-viable.

Other options on pasture include supplementation of minerals and protein. We have talked before about the importance of mineral and mineral quality (With Sheep, The Cheapest Mineral Isn't), but mineral also plays a huge role in overall host immunity. For example, minerals such as

zinc, selenium, and even copper are beneficial in developing a healthy immune system to cope with parasitic infection. Ensuring that your flock or herd is always supplied with mineral is a must. In addition, research has shown that under conditions of parasitic infection, sheep demonstrate a lack in protein as compared to energy. This makes sense as parasites consume blood, they will also be consuming protein. Therefore, as a means to mitigate these effects, increasing the level of protein in the diet will help aid in coping with infection. Remember, you are feeding livestock on pasture, not feeding livestock concentrates that are housed on pasture. In other words, when supplementing protein, be sure to not to over feed as livestock will eat more of the concentrate, less of the pasture, and make your feeding program more expensive than it is intended to be.

One point that we have failed to review is the importance of the forages themselves. Forages that are high in tannins (i.e. sericea lespedeza, birdsfoot trefoil, chicory, and plantain) act as a natural anthelmintics. Directly, these forages are high in by-pass protein. This means that this high quality protein bypasses the rumen, avoiding microbe degradation, and is utilized by the animal. The increase in protein allows the infected animal to cope with infection as we discussed above. Indirectly, these forages and more importantly the tannins, elicit an immune response. As a result, immune cells will coat the anterior (head) end of a parasite that does not allow for it to attach to the host (see image). Tannins have also shown to play an important role in the obomasal environment as well as they alter the pH and create conditions in which are not favorable for parasite establishment or survival.

### Other options?

What we have covered today just begins to scratch the surface on what you can do on your operation to protect your livestock from parasitic infection. Other options may include stricter pasture rotation moves, changes in stocking densities, alteration in grazing periods for ruminants, and the use of technology. We have discussed in great detail the latest technology, BioWorma (BioWorma – Natural Parasite Control and Worm-Trapping Fungus), that has just recently been released in the US. Additional technology that is continued to be looked at here at Ohio State includes the use of an Elutriator. In using an Elutriator, producers may be able to determine the parasite load on pasture prior to grazing. Using this machine may allow for producers to strategically graze their pastures to avoid high-risk situations.

Overall, it is ultimately up to you to understand what your parasite status is on farm and what strategies that you should implement in order to mitigate the negative effects associated with infection. If there are any other management practices that I may have left out that you do on your operation, please feel free to share those with me and I would be happy to write another piece on what you as the readers find to be the most effective management strategy on your farm. Until then, happy shepherding!

## UPCOMING WORKSHOPS:

### WEDNESDAY, MAY 15:

#### Hypertufa Make & Take

6 p.m., Ag Credit Bldg, 2nd Floor Conference Room,  
5362 US Hwy 42, Mt. Gilead

Registration includes program, handouts and a planter. Register by April 19. Space is limited - register early. FEE: \$20.00

### MONDAY, MAY 20:

#### Youth Gardening Extravaganza

6 p.m., Headwaters Outdoor Education  
Center, 151 Home Rd, Mt. Gilead

The Morrow County Master Gardener Volunteers and 4-H Youth Development offer youth hands-on gardening and horticulture activities from seed starting to wildflower ID. Register by May 17 by calling 419-947-1070.

### WEDNESDAY, JUNE 19:

#### How to Enter Flowers in the

#### Morrow County Fair

6 p.m., Ag Credit Bldg, 2nd Floor Conference Room,  
5362 US Hwy 42, Mt. Gilead

The Morrow County Master Gardener Volunteers will give tips on entering flowers or flower arrangements at the Morrow County Fair.

### THURSDAY, JUNE 27:

#### Herb Garden Make & Take

6:30 p.m., Ag Credit Bldg, 2nd Floor Conference Room,  
5362 US Hwy 42, Mt. Gilead

The Morrow County Master Gardener Volunteers will teach how to grow, use and preserve herbs. Participants will make an herb garden to take home. Register by June 21. FEE: \$12.00

Contact Carri Jagger with questions at  
419-947-1070 or Jagger.6@osu.edu

### OSU EXTENSION - MORROW COUNTY WORKSHOP REGISTRATION

Name \_\_\_\_\_ Phone \_\_\_\_\_

Address \_\_\_\_\_

Number Attending Hypertufa Make & Take (May 15): \_\_\_\_\_ x \$20.00 = \$ \_\_\_\_\_

Number Attending Herb Garden Make & Take (June 27): \_\_\_\_\_ x \$12.00 = \$ \_\_\_\_\_

Return with payment to: OSU Extension - Morrow County, 5362 US Hwy 42, Suite 101, Mt Gilead, OH 43338

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## Weed Management Considerations Following a Wet Winter

By Dr. J. D. Green, Extension Weed Scientist, University of Kentucky

Extensive wet weather conditions during the past fall and winter have resulted in pasture fields that have bare soil and thin vegetative cover, particularly in areas that have been used for winter feeding. Fields with thin stands of desirable pasture species are more likely to contain winter annual weeds such as chickweed, henbit, purple deadnettle, and mustard species. As these cool-season weeds die back, warm-season weeds such as common cocklebur and common ragweed will likely emerge this summer and take their place.

The first step in determining weed management options is to do a critical evaluation of pasture fields in the late winter/early spring. Scout fields looking for any developing weed problems. The primary question then becomes—does the existing stand of desirable forages appear to be healthy and potentially competitive against any emerging weed problems? If the forage stand is acceptable and weed pressure is light, then the best course of action may be to wait before making any herbicide applications this spring, but focus on other routine pasture management practices to promote the growth of desirable forage species. However, if you do see developing weed problems then you may want to take action in early spring to begin to correct these problems. In some cases, there may not be any good solu-

tions that will correct all weed problems observed. Highlighted below are some points to consider as you make those decisions. After evaluating the field, you must decide whether or not to 1) overseed or drill more forages into an existing pasture to improve the stand of desirable forage grasses or 2) spray to control emerging broadleaf weeds. In most cases you will not be able to do both practices in the spring since most broadleaf herbicides have the potential to injure newly emerging forage grasses and legumes. For pasture herbicides containing only 2,4-D it is generally recommended to wait 4 to 6 weeks after spraying before reseeding forage crops. Other broadleaf herbicide products may require a 6 month waiting period between application and seeding forage legumes and grasses (consult the label of specific herbicide products used). As a rule of thumb, if you decide to spray this spring you will need to wait until late summer or fall before seeding additional forages. If you reseed first, then it is recommended that you wait until the new seedlings have become well established before making a herbicide application this summer. It is important to also note that broadleaf type herbicides cannot be used in fields where clovers or other legumes have been seeded.

Another alternative to consider is the use of a partial pasture renovation technique to control or suppress growth of the weedy vegetation fol-

lowed by interseeding more forage grasses or legumes. This assumes that the field is not needed for grazing animals until the newly seeded forages become well established. In this approach a herbicide product containing paraquat (eg. Gramoxone) can be applied to kill back winter annual weeds. Leaves of actively growing forage grasses will also be "burned back" by the paraquat application, but established plants are not likely to be killed. Desirable forage grasses and legumes which have a good root system should regrow and resume active growth within a few days after treatment. Since paraquat has no soil-residual activity, desirable forages can be interseeded into the soil immediately after herbicide application. Paraquat is a "Restricted Use" pesticide, whereby only licensed and certified applicators who have completed training are allowed to purchase and apply it. Weedy plants such as curly dock, chicory, or Canada thistle with perennial roots or other weeds with established taproots (such as musk thistle) will likely survive this treatment.

If your course of action is a "wait and see" approach, keep in mind that smaller weeds are easier to control than after they increase in size. Specific details on herbicides labeled for use on grazed pastures and hay fields and their effectiveness on target weed species can be obtained from your local county

## Estimating Wheat Yield With Stem Counts

Between planting in the fall and Feekes 4 growth stage (beginning of erect growth) in the spring, winter wheat is vulnerable to environmental stress such as freezing temperatures with limited snow cover, saturated soils, and freeze-thaw cycles that cause soil heaving. All of which may lead to substantial stand reduction.

However, a stand that looks thin in the spring does not always correspond to lower grain yield. Rather than relying on a visual stand assessment, farmers should estimate the yield potential of their winter wheat crop by counting stems, before deciding whether a field should be destroyed. An alternative method to evaluate wheat stand is fractional green canopy cover (FGCC). Fractional green canopy cover can be used to measure the canopy surface area using the mobile device application Canopeo. The app can be downloaded for free here: <http://www.canopeoapp.com>.



FIGURE 1: Measurement tool used to consistently count the number of stems in one foot of row.

**Wheat Stem Count Methods:** Wheat stems (main stem plus tillers) should be counted at Feekes 5 growth stage (leaf sheaths strongly erect) from one linear foot of row from several areas within a field (Figure 1).

**Fractional Green Canopy Cover Methods:** Fractional green canopy cover should be measured at Feekes 5 growth stage using the mobile device application, Canopeo (<http://www.canopeoapp.com>). The camera should be held at a height to capture three rows of wheat in the image.

After counting the number of wheat stems or measuring FGCC, Table 1 can be used to estimate wheat grain yield. For example, if an average of 51 stems is counted from one foot length of row, the predicted grain yield would be 100 bu/acre. Similarly, if the average FGCC measurement was 35%, the predicted grain yield

Grain Yield (bu/acre)	Stem Count (# per foot of row)	FGCC (%)
85	27	17
90	34	23
95	42	29
100	51	35
105	63	41
110	80	47
115	100	53
120	—	59
125	—	65
130	—	71

## Assessing Winter Damage and Evaluating Alfalfa Stand Health

The winter of 2019 has seen a lot of variability including large temperature swings, snow cover, no snow cover, rain, sleet and ice. One constant for most areas of the state is that soils have remained wet and/or saturated throughout the fall and winter period. Add all of this together and there is the potential for some significant winter injury. Forage growers should plan to spend time assessing winter damage and evaluating the health of their forage stands, particularly alfalfa stands. Assessment and stand health evaluation can begin once plants start to green up and produce 2 to 4 inches of growth.

One of the primary concerns is the possibility of heaving damage. Tap rooted crops such as alfalfa and red clover are particularly susceptible to heaving damage. Conditions that increase the likelihood of heaving are wet, saturated clay soils with high shrink/swell potential, exposed to rapid freeze/thaw cycles. During these conditions plants can be physically lifted (heaved) out of the soil exposing the crown of the plant to possible low temperature damage and/or physical injury from harvest operations. In severe cases the plant can be heaved several inches or more out of the soil, breaking the taproot and killing the plant.

Forage stand health evaluation includes stem counts and digging plant roots. Select random sites throughout the field and evaluate the plants in a



one-foot square area. Check at least one site for every 5-10 acres. Increasing the number of random samples provides a more accurate assessment. Begin your stand health evaluation by counting the number of stems per crown. Do this evaluation in at least 4-5 random locations for every 20-25 acres. Stem density counts provide an indication of the yield potential of the stand. The following table is taken from University of Wisconsin Extension publication A 3620; "Alfalfa Stand Assessment: Is this stand good enough to keep?"

Over 55: Stem density not limiting yield
40-55: Some yield reduction expected
Less than 39: Consider stand replacement

While you are counting stems, take note of where growth is taking place. Healthy plants have symmetrical, even growth on both sides of the crown. Damaged plants often have more stems on one side of the plant than the other.

While plant and stem counts are useful, to get a true determination of stand health, crown and root tissue should be evaluated to provide an indication of how the plant will hold up to stresses in the coming growing season. This involves digging up plants and splitting the crowns/roots. Dig up five to six plants in those 4 to 5 random locations per 20-25 acres. Split the plant open. A healthy root will have a creamy white color and no to very little discoloration in the crown and taproot. These are the plants that have numerous shoots and the shoots are

evenly distributed across the crown of the plant.

Discolored crowns and roots indicate a plant health problem. They are a darker white, tending towards a tan color. There may be obvious areas of root rot and crown rot that are dark brown to black in color. There may be streaks of brown running down the root. These plants typically have fewer stems coming out of the crown and those stems may tend to be more numerous on one side of the crown as compared to the other. Generally, these plants green up in the spring of the year and appear productive, but because of their compromised root system, they may not survive the entire production year, especially if we have a hot, dry year.

In general, if more than 30% of the split roots have brown streaks running down the root and/or black areas of root/crown rot that cover greater than 30 to 50% of the roots diameter, then yield potential is significantly reduced. The grower may want to consider alternative production options such as terminating the stand after first cutting and planting to corn for silage or possibly to a warm season annual forage crop such as sudangrass or a sorghum x sudangrass. The previously mentioned University of Wisconsin publication has a root health rating system along with color photo illustrations that can be used to make a root health assessment (<https://fyi.extension.wisc.edu/forage/alfalfa-stand-assessment-is-this-stand-good-enough-to-keep/>).

Taking the time to assess the extent of winter injury to forage and to do a stand health evaluation will allow the grower to determine the yield potential of the stand and whether or not the stand needs to be replaced at some point this year.

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## Scrapie Program Update Clarification – What You Need to Know

By Kyle Partain, American Sheep Industry (ASI) writer/editor

New regulation improves scrapie eradication program.

A long-awaited scrapie rule was published this week in the Federal Register. The rule – which was first proposed in 2015 by U.S. Department of Agriculture’s Animal and Plant Health Inspection Service – has been anticipated by the American sheep and goat industry since 2016.

For the most part, the industry will not notice much of a difference in the scrapie eradication program, but some segments will see a change. Particularly, changes will be noticed by goat producers and those moving animals in slaughter channels (except wethers less than 18 months of age) or transporting unidentified sheep or goats.

Importantly, the rule incorporates into regulation APHIS’ long-standing policy to use genetic testing to identify genetically resistant or less susceptible sheep for exemption from destruction and as qualifying for interstate movement. The rule takes effect on April 24, 2019.

Producers are asking the American Sheep Industry Association how the rule affects them. As mentioned before, most producers will not notice a change to their current practices. However, goat producers and those who move animals in slaughter channels or who move unidentified animals will be affected by the rule changes.

A foundational component of the scrapie eradication program is the ability to trace diseased animals to their flock of origin. The new rule makes the identification and record keeping requirements for goat owners consistent with those requirements that sheep owners have followed for many years. Like sheep producers, producers of goats for meat or fiber and slaughter goats more than 18 months of age will be required to officially identify their animals to their flocks of birth or flocks of origin, and to maintain certain identification records for five years. There is flexibility in the type of official identification that can be used, but the device or method must be approved in accordance with USDA regulations.

A sheep or goat must be identified to its flock of origin and to its flock of birth by the owner of the animal (or his or her agent) before commingling the animal with sheep or goats from any other flock of origin. This includes unloading of the animal at a livestock facility approved to accept unidentified sheep or goats and that has agreed to act as an agent for the owner to apply official identification. The animal must be identified prior to commingling with other animals from other flocks of origin. When transporting unidentified sheep, the owner or the owner’s agent must have an owner/hauler statement that contains the information needed for the livestock facility to officially identify the animals to their flock of origin and – when required – their flock of birth. Ownership changes also require the sheep and goats to have official identification.

APHIS notes that if the flock of birth or flock of origin is not known because the animal changed ownership while it was exempted from

flock of origin identification requirements, the animal may be moved interstate with individual animal identification that is only traceable to the state of origin and to the owner of the animals at the time they were so identified. However, to use this exemption the person applying the identification must have supporting documentation indicating that the animals were born and had resided throughout their life in the state.

Sheep and goat producers who are new to the program and are requesting their flock identification number for the first time may receive some assistance in obtaining tags. Currently, APHIS will provide up to 80 plastic flock ID tags – free-of-charge – to producers who have not received free tags from APHIS in the past. APHIS will discontinue the availability of no-cost metal tags for producers. For more information, visit USDA’s Sheep and Goat Identification page. To request official sheep and goat tags, a flock/premises ID or both, call 1-866-USDA-Tag (866-873-2824).

One of the purposes for the changes to the current scrapie eradication program is to ensure that all potential pockets of infection are captured so that the United States can be officially declared free of scrapie. Full eradication of the disease will ultimately reduce producer costs and improve trade opportunities for American sheep and goat products.

A key part to this effort is identifying all sheep and goats that are moved in interstate commerce. Fortunately, the majority of sheep and goats that are moved in interstate commerce are already identified back to their flocks of origin and birth, but there are some populations that have not been previously included. The new regulation makes some changes to capture animals that previously were not required to be identified.

APHIS will now require that those individuals – or their agents – who move unidentified sheep or goats to a market or other premises where they will then be identified and those moving animals in slaughter channels (except wethers less than 18 months of age) to have an owner/hauler statement that indicates specific information needed for official identification and record keeping. This includes the name, address and phone number of the owner and the hauler (if different), the date the animals were moved, the flock identification number or the PIN that is assigned to the flock or premises of the animals, the number of animals, and the species, breed and class of animals. If breed is unknown, the face color for sheep must be recorded and for goats, the type (milk, fiber or meat) must be recorded.

The name and address of point of origin – if different from the owner address – and the destination address must also be included in the

owner/hauler statement. If moving individually unidentified animals or other animals required to move with a group/lot identification number, the group/lot identification number and any information required to officially identify the animals must be included on the owner/hauler statement. For animals in slaughter channels, the owner/hauler statement must indicate that the animals are in slaughter channels (except wethers that are less than 18 months of age).

An owner/hauler statement is not required if the animals are not in slaughter channels and are officially identified or are traveling with an Interstate Certificate of Veterinary Inspection, commonly called a health certificate.

Animals moved from one premises owned by the producer across state lines to another premises owned or leased by the producer – such as for grazing – will need an owner/hauler statement unless an ICVI is required.

ASI will keep the industry informed as it continues to evaluate the changes to the scrapie eradication program regulations, and its impact on producers. Additional educational material will be available soon to help producers comply with the regulation changes.

(Previously published in the ASI weekly newsletter: March 29, 2019)

## Spring Breeding on Fescue Pastures

By Dr. Roy Burris, Beef Extension Specialist, University of Kentucky

Most Kentucky beef producers have spring-calving cow herds that graze fescue pastures which have high endophyte levels. Getting a high percentage of cows bred in May, June, and July to calve in March, April, and May can be a challenge. I personally prefer fall-calving for that reason, but I also believe that we can have successful breeding performance in the spring. There are some keys to getting a high percentage of cows pregnant for a spring calving season. The most general problem, in my opinion, is that the winter feeding program isn’t adequate to support required body condition for early rebreeding. Cows should enter the breeding season in good body condition (Body Condition Score 5) which doesn’t always follow our winter feeding programs. It seems that we sometimes try to “rough ‘em” through the winter and hope that spring grass will “straighten them out”. That is a sure formula for delayed breeding or open cows. Spring-calving cows need to conceive early in the breeding season (before late June) for best results. We conducted a trial at the UKREC (Western Kentucky) several years ago in which similar cows were separated into three breeding periods of 45-days each on high-endophyte fescue – see Table 1. Cows which were exposed to bulls from June 19 to August 4 had a pregnancy rate of only 59%. At this location, the average maximum daily temperature reaches 90°F by about June 20. This elevated temperature, coupled with the en-

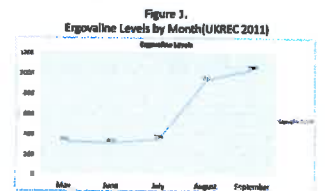
dophyte that is present in most fescue pastures, likely contributed to that decreased performance.

Table 1. Effect of time of breeding on beef cows grazing high-endophyte fescue (UKREC 1992, 1993) (UKREC)

Breed	Timing of breeding		
	6/19 – 8/5	8/21 – 7/8	9/19 – 8/6
Pregnancy rate (%)	76.8*	78.0*	59.3**
	8/2	7/4	8/3

\*\*Means on the same line with different superscripts are different (P < .05)

We have also measured the alkaloid levels in high-endophyte fescue at this location. Since the primary culprit in toxicity of high endophyte pastures seems to be ergovaline, let’s look at ergovaline levels (Figure 1) across the growing season. After our July (about July 10) measurement, the ergovaline levels increased dramatically. So this toxicity, coupled with high temperatures, appears to mean that breeding will not occur at acceptable rates in July, August and September. Therefore, cows need to be pregnant by the end of June for best results.



Ergovaline levels differed greatly by pasture, too (see figure 2). That information could make it possible to avoid the “hot” pastures during the

summer months. The trial in Table 1 was conducted in the “hot” pasture (unknown to us). The two yellow pastures are high endophyte but always gave better than expected results in past years. The ergovaline levels can explain a lot. Armed with this information, we would prefer to be in the yellow areas during heat stress and breeding.



There are several other keys to a successful breeding season. Obviously, fertile bulls are extremely important and breeding soundness evaluations (BSE) are essential. Think fertile bulls and cycling cows! A complete mineral supplement needs to be available on a year-round basis. If artificial insemination (AI) is used, that brings on the need for managing the details of AI and estrous synchronization protocols. In the short run, don’t let cows lose condition as the breeding season nears. Lush, watery grass might not support regaining condition after calving, peak milk production and rapid re-breeding. Do whatever it takes to get ‘em bred and bred early!

# AGRICULTURE

## Considerations if Starting Over with a New Seeding

By Victor Shelton, NRCS State Agronomist/Crazing Specialist

March 20th was officially the first day of spring this year. If you look at growing degree days (GDD) for the last month around the state, we have had about thirty percent less than the average. We've talked about GDD's before.

Growing Degree Days are calculated by taking the average between the daily maximum temperature and daily minimum temperature and subtracting the base comparable temperature for each day. Days are then added together to compare periods. It is probably the most common way of assessing where we are in plant growth compared to other years, since weather is different from year to year. Growing degree days provides a "heat" value for each day. The values added together can provide an estimate of the amount of growth plants have achieved. Some people use GDD's to predict when plants will reach a certain growth stage. The developmental stage of most organisms has its own total heat requirement. I like to compare different years. Even though last spring was really wet to begin with, we had enough GDD's to boost early growth and to make this year look a bit puny so far. We are somewhat behind, but I expect it to catch up soon. Fields that have had a lot of damage this winter from pugging may be damaged so badly they will not recover or be very productive. Even if not totally destroyed, they may have enough damage and open bare soil that weeds may be a major problem. Severely damaged fields, ones that have more than thirty percent bare soil showing, might indicate a good opportunity to totally start over with improved forages. But, evaluate them thoroughly, they might not be as damaged as they appear and fertilize if needed.

If starting over with new improved forages, you need to completely terminate all existing forage, especially if it has any anti-quality factors such as ergovaline in old Kentucky 31 tall fescue. Time helps, along with some good herbicides. Interseeding grasses into established grass stands just doesn't work well. Established grasses will almost always out-compete seedling grasses. Seed, labor and time is too valuable to not succeed. First, the year prior to conversion, graze, clip or mow the field to prevent it from going to seed. This really helps to greatly reduce the KY31 seed bank.

A spray-smother-spray method works very well. Graze the spring growth, then spray the stand with a non-selective herbicide, wait a week



Forage growth on March 3, 2018 in southern Indiana. Growth has been slower in 2019.

or two to let that forage die back and start to decay and then drill in a summer annual forage, such as sorghum-sudangrass, sudan grass, a millet, or a mix. This summer forage can later be grazed or, depending on what was planted, cut for hay.

In August, spray the field a second time to make sure that there are no remaining perennial species and to kill any remaining summer annuals. When conditions are good, no-till drill the new improved species into the field. New fields will need adequate time to grow before being grazed. Ideally, if planted in the fall, grazing should be restricted until the next fall. Since you are investing a lot of money to get a new stand of forages, you will want to protect that investment, so you will want them to last. Most would not think about it, but even KY31 tall fescue takes time to fully establish as a solid stand, so have patience with your newly seeded stands.

For technical assistance in choosing forages, seed varieties, rates for reseeding pastures, seeding methods, and fertility contact your local soil and water conservation district or extension office. For assistance in herbicide recommendations, consult your local extension office.

I was recently at a good workshop on Novel tall fescues. In the late 90's, the University of Georgia and Ag-Research in New Zealand isolated naturally occurring endophytes that produced alkaloids associated with good persistence, vigor and drought tolerance, but did not produce toxic ergot alkaloids associated with poor animal performance. The first MaxQ tall fescue releases were Jesup and GA 5. There are several available today. These endophyte-friendly tall fescues provide increased average daily gains, good yields and even persistence as good or better than even KY31. This is a huge improvement over low endophyte varieties that were not very persistent and were sometimes eventually taken back over by old KY31.

If you are having issues with endophyte-infected tall fescue then switching may be worth the effort and expense. Symptoms for grazing animals include heat stress, rough summer coats, narrowing of blood vessels that can cause loss of hooves, tails, and ears, reduced intake and gain, low birth weights and poor reproduction rates. Research shows that switching from endophyte-infected fescue to Novel or other forages can potentially double the rate of gain on cattle.

I really don't know what some of the hills located in the fescue "belt" would look like today if they hadn't been seeded to tall fescue back in the 40's. It certainly has prevented a lot of soil erosion, but thank goodness there are better alternatives today that also protect soil while providing good, nutritious forage.

It would be impractical to replace many fields of KY31 tall fescue at one time. Many producers are already stocked higher than they should and taking very many acres out of production for even one season is very hard to do. It is best and most practical to just try and convert a field or two at a time. As fields are added, concentrate first on using those, once established, for 30 days

prior to breeding for improved pregnancy rates on cows. As more fields are added, start utilizing them for growing animals, improved gains, and improved milk production of lactating cows.

It's not always possible or practical to eliminate all the KY31 tall fescue on your land. If not, dilution is a fair to good defense, especially with red clover. High-density, short-duration grazing systems with sufficient rest periods help to promote diversity in monocultures of tall fescue. Limit the use of nitrogen fertilizers that will actually increase the ergovaline toxin in tall fescue and reduce clover at the same time. Nitrogen will boost grass yields, but it also feeds the toxic fungus. Avoid grazing close to the ground or the seed heads of KY31 tall fescue where the toxin generally concentrates.

## Trace Mineral Deficiency

By Jeff Cave, District Veterinary Officer, Agriculture Victoria, Wodonga

Have you ever wondered whether your stock have a trace mineral deficiency? Trace minerals such as copper, cobalt, selenium, and iodine are only required in small amounts but are still essential for optimal production, and for life. In contrast, macro-minerals such as calcium and phosphorus are required in larger amounts. Trace mineral deficiencies arise when the amount of the mineral in the food that is available for absorption by the animal through their gut is insufficient to meet their needs.

Growing animals have the highest demand for trace minerals. For example, growing lambs need about twice the selenium in their diet that adult sheep require. They are also born with minimal reserves stored in their body, so a dietary deficiency will become apparent sooner than in an older animal with previous body stores.

Interactions of trace minerals with other minerals in the animal's gut may reduce the availability of the trace mineral to the animal. There are similar interactions at the plant and soil level: soil pH, rainfall, fertilizer application, and stage of plant growth can cause mineral deficiencies to appear only in some years. Importantly, the trace minerals needed by animals are not always essential for plant growth. Because of all these interactions, soil and plant tests are not a reliable indicator that animals will not be deficient.

Rapidly growing pasture (such as lush spring growth) is lower in trace minerals than winter or mature pasture, but deficiencies do not occur in every year.

The signs of deficiency vary according to the mineral involved:

- **Copper deficiency** presents most dramatically as enzootic ataxia ('swayback'), a condition causing paralysis of the hind limbs of newborn or very young lambs. Less apparent signs include steely wool, anemia, and reproductive loss.

- **Cobalt deficiency** is an ill-thrift disease of reduced appetite and growth, decreased wool production, anemia, and poor reproductive performance. Affected animals often have 'white

liver' disease. We measure vitamin B12 (which contains cobalt) to assess whether cobalt deficiency exists, and treat with the same.

- **Selenium deficiency** causes 'white muscle' disease, with white lesions in the red skeletal and cardiac muscle tissue, leading to lameness or sudden death. Ill-thrift, reduced wool growth, and ewe infertility are also reported signs of deficiency.
- **Iodine deficiency** results in an enlarged thyroid gland known as 'goiter'. There are effects on the developing fetus, including reduced fetal size, brain retardation, and increased lamb mortality.

Although these disease states are most severe in younger lambs, the condition of 'weaner ill-thrift' of weaned [...] lambs can have trace mineral deficiencies as part of its complex of causes.

Farmers in areas that are deficient in trace minerals will routinely supplement their livestock with trace minerals as a preventive measure, using any of [free choice mineral], licks, drenches, rumen boluses, and injections. Not all areas [...] are deficient in any one or all of these trace minerals. It is ideal to test young, rapidly growing animals on fast-growing pasture to see whether a trace mineral deficiency actually exists. A decision can then be made about whether trace mineral supplementation is really necessary.

Caution should be taken with over supplementation, especially of copper, because sheep are very susceptible to copper toxicity.

For further advice, please contact your local veterinarian.

(Previously Published on Agriculture Victoria: Sheep Notes)



# OSU EXTENSION CALENDAR OF EVENTS

## MAY 2019

- 1 Cattlemen's Meeting, 6:30 p.m., Ag Credit Building Conference Room
- 6 Morrow County Dairy Board, 12 p.m., Ag Credit Building Conference Room
- 6 Jr. Fairboard, 7 p.m., Fairgrounds
- 7 Spring Clean Your Financial Routine – 6:30-8:30 p.m., Ag Credit Building Conference Room
- 9 Morrow County Pork Producers, 7 p.m., Ag Credit Building Conference Room
- 14 Live Healthy Live Well Spring Series: Healthy People: Aging & Eating, 5:30 p.m., Community Services Building Conference Room, Entrance B (building beside hospital)
- 15 Hypertufa Class Make & Take, 6 p.m., Ag Credit Building Conference Room
- 16 4-H Horse & Pony Committee, 7:30 p.m., Ag Credit Building Conference Room
- 20 Youth Garden Evening at Headwaters Outdoor Education Center, 6 p.m.
- 21 Live Healthy Live Well Spring Series: Healthy Finances: Spending Leaks, 4:45 p.m., Mt. Gilead Public Library – 3rd Floor
- 21 Walk With A Doc – Mt. Gilead Cherry Street Admin. Building – 12 noon – 1 p.m.
- 22 Livestock Quality Assurance General, 8:15 p.m., Fairgrounds
- 23 Sr. Fairboard, Fairgrounds
- 27 Memorial Day, Office Closed
- 28 CARTEENS – Ag Credit Building Conference Room, 6:30-8:30 p.m.
- 28 Live Healthy Live Well Spring Series: Healthy Relationships: 5 Steps to Grandparenthood Greatness, 5:30 p.m., Community Services Building Conference Room, Entrance B (building beside hospital)

- 29 Horse Quality Assurance Only/Safety Clinic, Fairgrounds Youth Building, 6:30 p.m.
- 31 Goat Clinic Registration Due for T-Shirt

## JUNE 2019

- 1 **ALL 4-H/FFA HORSE/PONY/MINI PROJECT FORMS DUE TO EXTENSION OFFICE (I.D.'s, PAS, Scholarship, King & Queen Apps., Etc.) (NO EXCEPTIONS)**
- 1 Livestock Possession Date (Unless noted differently on requirements)
- 1 Mandatory Pre-Fair Weigh-In/Registration For Feeders, Market Goats, & Market Sheep, Fairgrounds 7-11 a.m.
- 1 Mandatory Breeding Rabbit Registration, Youth Building, Fairgrounds, 7-11 a.m.
- 3 Morrow County Dairy Board, 12 noon, Ag Credit Building Conference Room
- 3 Jr. Fairboard, 7 p.m., Fairgrounds
- 3 Canning Basics: Pressure Canning & Water Bath Canning – 6:30 p.m., Ag Credit Building Conference Room
- 5 Morrow County Cattlemen's, 6:30 p.m., Ag Credit Building Conference Room
- 7 Ambassador Application Due to the Extension Office for Goat, Rabbit, and Poultry
- 7 Jr. Fair Entries Due To Junior Fair Office Only
- 7 BBR Papers Due With Entries
- 7 Early Judging Registration Due To Extension Office or Junior Fair Office (Please RSVP)
- 8 Horse PAS Show, Fairgrounds, Pleasure First, 9 a.m.
- 11 Goat Clinic/Quality Assurance, 6:30 p.m., Fairgrounds Large Arena
- 11-12 Youth Wild Days at HOEC (See Article in 4-H section)

- 13 Morrow County Pork Producers, 7 p.m., Ag Credit Building Conference Building
- 17 Livestock Quality Assurance General, 6:15 p.m., Fairgrounds
- 18 Speaking Contest Registration Due To Extension Office
- 18 4-H Marketing Contest Entries Due To Extension Office
- 19 Cloverbud Fun Day Registration Due
- 19 How To Enter Flowers In The Fair, 6:00 p.m., Ag Credit Building Conference Room
- 20 Ohio State Fair Entries Due To State Fair Office/Online Entry
- 20 Horse & Pony, Ag Credit Building Conference Room , 8 p.m.
- 24 County 4-H Speaking Contest, 6 p.m., Ag Credit Building Community Room (2nd Floor)
- 24 Dog Poster's Due To Extension Office
- 24 Early Project Judging, 6 p.m., Youth Building
- 27 Sr. Fairboard, Fairgrounds
- 27 Herb Preservation and Make & Take Class – 6:30 p.m., Ag Credit Building Conference Room
- 28 Writing Projects Due To Extension Office
- 29 Cloverbud Fun Day, 8 a.m. – 12:30 p.m., Fairgrounds Youth Bldg
- 30 Horse PAS Show, Morrow County Fairgrounds, Pleasure First, 9 a.m.

- 4 Extension Office Closed
- 9-13 Morrow County 4-H Camp
- 11 Pork Producers, 7 p.m., Ag Credit Building Conference Room
- 11 Broilers Pick-Up, Fairgrounds, 12:30 p.m. **Bring Box!**
- 16-17 Youth Wild Days, 9:30-11:30 a.m., Headwaters Outdoor Education Center
- 17 Miscellaneous Project Judging, 9 a.m. – By Club
- 18 Food Project Judging, 9 a.m. By Project
- 18 Clothing Project Judging, 2 p.m. and Style Show, 7 p.m.
- 18 Horse & Pony, Extension Office, 8 p.m.
- 23 CARTEENS, 6:30-8:30 p.m., Extension Office
- 24-Aug. 4 Ohio State Fair
- 25 Sr. Fairboard, Fairgrounds
- 29 Jr. Leaders, 7 p.m., Extension Office

## AUGUST 2019

- 1 Market Rabbit Pre-Fair Registration, 5 p.m.–8 p.m., Youth Building **MANDATORY**
- 1 Jr. Fair Board, Fairgrounds, 8:30 p.m.
- 5 Dairy Board Meeting, 8 p.m., Ag Credit Building Conference Room
- 5-6 Mandatory Livestock, Horse, and Dog Skillathons
- 7 Cattlemen's Meeting, 6:30 p.m., Ag Credit Building Conference Room
- 8 Pork Producers, 7 p.m., Ag Credit Building Conference Room
- 10 MoMazing Race
- 15 Horse & Pony Committee, Fairgrounds, 8 p.m.
- 26 Fair Check-In Day
- 27-Sept. 2 Morrow County Fair

## JULY 2019

- 1 Dairy Board Meeting, 7:30 p.m., Ag Credit Building Conference Room
- 3 Cattlemen's Meeting, 6:30 p.m., Ag Credit Building Conference Room
- 3 July 3rd Celebration, Fairgrounds

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