Dairy E-News

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Get Ready To Plant Winter Annual Pastures

John Jennings, Professor

Winter annual pastures make great additions to a forage program. They can supplement low quality hay, fill in grazing gaps and greatly reduce purchased feed cost. The summer rain this year has produced abundant pasture and hay, but overall quality is low due to harvest delays caused by the same rains. Last fall many producers chose to rely on the good hay crop despite it's poor quality instead of managing for fall grazing. Cattle didn't fare well with low quality hay and a long, cold winter.

Winter annuals include cereal rye, wheat, triticale, oats, ryegrass and even forage brassica. Timing of planting is important to produce fall grazing. When planted in late August to early September, these forages can provide excellent grazing by November. Dr. Paul Beck's research has shown that rye or wheat planted in early September on a tilled seedbed or no-tilled in a sod suppressed with herbicide was ready to graze in November. But the same forages planted in late October were not ready to graze until spring.

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Rye grows more in cool weather than wheat and can provide earlier grazing than wheat, although wheat seed is less expensive. Oats are excellent quality but are prone to winterkill. One strategy is to plant oats in early September to produce high forage yield by cold weather and graze them out in late fall, since they may winterkill anyway. Annual ryegrass produces less forage in fall than small grains, but spring growth can be tremendous.

Ryegrass grows later in spring than small grains and seed is inexpensive. A common practice is to plant a mixture of ryegrass with wheat or rye. The small grain produces forage in fall and early spring, and the ryegrass continues to grow later in spring.

Typical seeding rates are 100 pounds of small grain with 20 pounds of ryegrass per acre. Nitrogen fertilizer, typically 50 to 60 pounds per acre, should be applied at planting for fall grazing. Fertilizer should be applied according to soil test recommendations.

Staggered planting can spread out forage production. Winter annuals can be planted in September by methods mentioned earlier for fall grazing, and other pastures can be no-tilled in October to provide more spring grazing. Variety selection is important. Some varieties can produce good fall growth, and others produce very little fall growth. Check with your county agent for a list of suggested varieties.

Forage brassicas have become popular since the 2012 drought. Dairy producers in many states have been grazing forage brassicas for several years. Forage brassicas include turnip, rape and hybrids. These forages should be planted between late August and September 15. Later plantings produce very low yields. University research in 2013 showed that forage brassicas can produce over 2,000 pounds dry matter per acre by mid-October and can produce up to 5,000 pounds dry matter per acre by December. Seeding rates are 5 pounds per acre for a pure stand and 3 pounds per acre when mixed with small grain or ryegrass. Brassica mixed with ryegrass has worked well in farm

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demonstrations. The brassica provides excellent fall grazing, and the ryegrass provides spring grazing. Use soil test recommendations for P and K applications. Nitrogen fertilizer is necessary for fall forage production. Recommended N rates are 50 to 60 pounds per acre.

Several seed dealers across Arkansas are handling forage brassica seed, but ask early to be sure the variety of choice can be ordered in time for planting.

Pest management is another important part of a high quality fall grazing program. Armyworms can devastate a fall small grain crop, so new fields should be scouted closely after emergence until cool weather. Consult with your county agent for recommended products for armyworm control.

Cattle Grubs

Kelly M. Loftin, Associate Professor
Ricky F. Corder, Program Associate

Many producers are still having issues with fall armyworms and horn flies, but now is the appropriate time to consider controlling another important pest, the cattle grub. Cattle grubs are the immature stages of warble or heel flies. Although two species of cattle grubs occur in the United States, the common cattle grub, *Hypoderma lineatum*, is the most common. Adult heel flies are nuisances, occasionally causing cattle to run wildly with their tails in the air (gadding) or to stand for long periods of time in deep shade or water. These defensive activities result in reduced milk production and/or reduced weight gains. However, the greatest impact is from the grubs (larvae) that are internal parasites of cattle.

After hatching, larvae burrow into the host's skin and begin migrating to the esophagus and other organs. Larval migration is injurious to these organs, and the cysts that form on the host's back cause swollen, often pus-filled areas that adversely affect the host's health. Weight loss and a decrease in milk production can result from grub infestations. In addition, at slaughter, some of the damaged meat must be trimmed and discarded; the hide's value is also reduced by the holes and scar tissue.

Adult heel flies are not frequently seen. They are hairy flies that look like honeybees at a glance but only have vestigial mouthparts and do not feed as adults (Figure 1). Larvae are internal parasites that are usually concealed except for an occasional small bump (warble) on the back of cattle.

One year is required for the completion of the common cattle grub life cycle. In spring and summer, eggs are deposited in rows on the lower leg hair of animal hosts, usually cattle. Up to 12 eggs are deposited on each hair, and each female lays a total of up to 500 eggs. Within a week of being deposited, eggs hatch into larvae.

Newly hatched larvae immediately burrow into the skin at the base of the hair and migrate through the connective tissue to the mucous membrane of the gullet. After a few months, the larvae migrate via connective tissues to positions just beneath the skin on the back and cut a tiny hole in the skin to breathe. Protective cysts form around the grubs. Cattle grubs spend a total of 7 or 8 months in the animal. Mature larvae (third stage) (Figure 2) exit the animal, drop to the ground and pupate. An adult fly will emerge in 15 to 75 days after pupation.

Figure 1. Common cattle grub adult. *Photograph by Lyle J. Buss, University of Florida.*

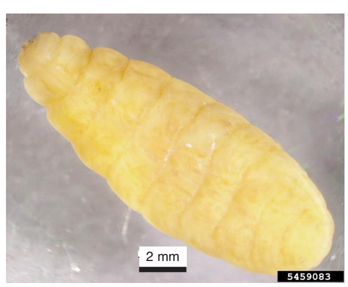

Figure 2. Common cattle grub larva. *Photograph by Pest and Disease Image Library, Bugwood.org.*

Adult flies are ready to fly and mate very soon after emergence. Adult heel flies do not feed and remain active for only a few days. Heel flies do not enter barns; therefore, animals housed indoors during the heel fly season are not impacted.

Control of adult heel flies is not practical; however, management efforts can be aimed at the parasitic stage within the host. Proper timing of grub treatment is critical to ensure optimal control and eliminate adverse host-parasite reactions in treated cattle.

Cattle grub treatments should be administered after heel fly activity ends but before larvae are in the esophagus or back. If treated at the improper time, dead or dying grubs can cause a toxic reaction in cattle that can result in death. In Arkansas, treatment against cattle grubs should take place between August 1 and October 15.

Endectocides provide effective grub control. In addition, some systemic organophosphate insecticides will kill cattle grubs. Before treating dairy cattle for cattle grubs, carefully read the product label. Products labeled for use on beef cattle may not be labeled for use on lactating dairy cattle. Remember, treatment for cattle grubs after October 15 can result in toxic reactions from dying grubs. Animals that have been treated for cattle grubs at the end of the heel fly season can be retreated with endectocides during the winter months without causing grub-related reactions. Products registered for cattle grub control are listed in the dairy cow section of the 2014 Insecticide Recommendations for Arkansas (see http://www.uaex.edu/publications/mp-144.aspx).

Water for Dairy Cattle

Shane Gadberry, Associate Professor

Water intake for a dairy cow can be estimated from food consumption, feed dry matter percentage, milk production, sodium intake, protein intake and air temperature. These relationships make a lot of sense. For example, milk is one mechanism whereby cattle lose water, and daily water losses through milk are estimated to account for 26 to 34 percent of total losses. Water accounts for 56 to 81 percent of total body weight of a cow, and as her system manages acid-base balance through absorption and excretion of electrolytes, water plays an important role in providing an aqueous media for nutrient transport and elimination. During the hot days of summer, water is also important for body temperature regulation.

Given water intake can be estimated from feed intake and milk production, the inverse of this relationship would also be expected to be true. Changes in water intake may ultimately result in a change in feed intake and milk production. Therefore, water supply and quality should not be overlooked.

The most important aspect of water management is supply sufficiency. Water supply can be affected by the number of watering stations, water capacity per station and refill rate per station. Water access per cow is greater with troughs that provide a greater surface area, and surface area/tank size has been shown to affect water intake by preference in dairy cows on pasture.

While there may appear to be a sufficient supply of water, external factors such as stray voltage may affect response to the water supply. Stray voltage is recognized as <10V between two points. Research with applied voltage at the water source on cow welfare and milk production has shown mixed responses.

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In a study published in 2010, 1.8V was applied at the water source over eight weeks in a permanent or random application. The voltage altered cow activity, but activity differences varied by week. Random voltage appeared to be more intrusive to normal activity by week 8. Water intake, milk production and milk composition were not affected by the level of stray voltage in this study.

Although studies have not been able to produce production insults from low levels of stray voltage, dairy operations should be cognizant of the issue of water sources carrying electrical current. Because stray voltage can be variable, evaluating sites for stray voltage is better accomplished with a multimeter with data logging capabilities.

Water temperature and quality are additional concerns. Cows prefer moderate water temperatures (60 to 80 degrees Fahrenheit); however, warming and cooling water in cold and hot environments, respectively, have yet to demonstrate improved production over multiple research studies.

One of the water quality issues of greatest concern would be algae blooms during summer. Of particular concern is the blue-green algae that can produce toxins. Algae concerns made recent news with Toledo, Ohio's water supply being affected by the algae bloom on Lake Erie.

Nitrate is another concern as conversion of nitrate to nitrite can lead to asphyxia. While there are also upper limits to various metals that may be present in the water supply, the occurrence of nitrates and these metals causing issues in Arkansas is not common.

Total dissolved solids or salinity is the third issue regarding water quality, and issues with salinity on water intake are greatest during summer months. Studies with saline water have also resulted in variable production results. Therefore, high saline content of water offered during summer may have a negative impact on feed intake and milk production.

Lastly, high sulfate content can be an issue, especially if exacerbated with high dietary sulfur. When water quality is a concern, water samples can be submitted through the county Extension office for analysis.

Managing Phosphorus in Pasture-Based Dairies

Dirk Philipp, Assistant Professor

Phosphorus is a macronutrient and essential for plant growth. Although not required in the same quantities as nitrogen, phosphorus is important for a variety of plant-metabolic functions. Soil-native phosphorus levels are relatively low and often cannot provide the amounts needed for the highly productive forages we use today in field cropping applications and pasturing. Forages, either grasslike or broadleaf plants, have different nutrient requirements that make site- and plant-specific fertilizer application a necessity.

In a pasture situation with multiple species present on the farm or even in one paddock, fertilization to meet plant nutrient requirements while preventing excess phosphorus buildup and possible translocation to adjacent streams is a challenge. Normal concentrations of phosphorus in waterways are low and limiting for algae growth, so excess phosphorus in runoff can easily trigger water quality impairments through increased algae growth.

Managing nutrients, in particular phosphorus, can be challenging in dairies, which are open systems with nutrient transfers across system borders.

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Managing Phosphorus cont.

These nutrients enter dairy farms in the form of concentrated feeds and supplements in addition to the fertilizer purchased to maintain forage production. Conversely, nutrients leave the farm in the form of milk and crops exported. In conventional dairies, nutrient imports from concentrated feed and supplements exceed exports.

In a dairy operation with a substantial amount of grazing, most of the nutrients contained in manure are returned to the pasture. Nutrient imports occur from concentrated feed or hay. However, unlike cropping or hay systems with large nutrient removal rates, pasture systems retain most nutrients on site when properly managed, despite a possible overall reversed positive nutrient balance.

Although phosphorus is mostly bound to soil particles and is not prone to leaching such as nitrogen, management can be difficult. This is because plants need larger quantities of nitrogen than phosphorus, but deposition of manure stemming from concentrated feeds may offset that ratio. Manure distribution also plays a role, and it has been shown that with multi-paddock setups, manure pile distributions are more even. Nevertheless, differences in nutrient concentrations across the landscape remain because of the natural grazing patterns and behavior of cattle that include congregating as a herd and spending time as a group around water access points, shade areas, gates and feeding troughs.

There are ways to contain phosphorus on site as much as possible, and a more even manure distribution is one possibility. Monitoring soil fertility through regular soil sampling is very effective as well and allows the producers to apply any needed fertilizer in a targeted and relatively precise fashion. Areas where cattle congregate are called heavy-use areas and should be avoided for sampling, as such places contain much higher nutrient loads, which will skew the results. Synthetic fertilizer should be applied based on these soil test results. The goal is to apply fertilizer in a targeted fashion to meet plant nutrient needs for a particular time during the growing season. Therefore, growth curves and plant physiology have to be taken into consideration for managing soil fertility.

The main process by which phosphorus is carried away from a pasture is though runoff and transport of soil particles to which the phosphorus is attached. Unlike nitrogen that may leach in certain forms, phosphorus stays put unless pastures are managed inappropriately. Therefore, the most important implication is that pastures should not be overgrazed, not even in parts. Otherwise, bare soil will be exposed and particles dislodged when heavy rains occur. In addition, limiting heavy-use areas to zones far away from streams will reduce the likelihood of runoff reaching waterways. Lastly, maintaining and reestablishing riparian zones provides buffer strips that will filter runoff in case it occurs and collect phosphorus and other nutrients within these zones. These riparian areas can be grazed during certain times of the year to utilize forage accumulated there.