Forage News

Keeping Forage-Livestock Producers in Kentucky Informed
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Frost, Freeze, Hard Freeze

What is the real difference between a frost and a freeze? When water vapor condenses and freezes without first becoming dew, a thin layer of ice crystals form – this is frost. It generally has to be below 36 degrees to frost and include clear skies, moisture present and little wind. Plant tissue can be impacted, but not as severely as a freeze.

When the surface air temperature falls to 32 degrees or below, you have a freeze. Generally, if it is above 29 degrees, it is a light freeze that can kill most tender plants. If it is below 28 degrees, then it is considered a killing freeze or hard freeze – this freeze kills annuals and initiates shutdown of hardy perennials. After three hard freezes, most winter hardy perennial forages are dormant. Once dormant, they can be grazed with less harm to energy reserves.

There are times or situations when grazing prior to dormancy or a killing freeze is what is needed. If you want to suppress spring growth, then grazing hard prior to dormancy can be beneficial. If you are frost-seeding clover into the field later this winter, this suppression of the grasses in the spring provides a longer window for the clover to grow and become established due to reducing the competition of the existing perennial grasses. I've also found fields that have become dominantly grass, especially a monoculture of tall fescue, can be grazed hard prior to early fall pre-dormancy and, if a good seed bank is present, you can have increased diversity – more clover the following year.

Utilize less freeze tolerant forages first. Orchardgrass loses value fairly quickly after several heavy frosts and literally falls apart after several hard freezes. Tall fescues hold their value a long time and are the easiest and most ideal for long term stockpiling so save them for last. ~ Excerpt from Victor Shelton's Grazing Bites Newsletter. Past issues available at https://www.nrcs.usda.gov/wps/portal/nrcs/in/technical/landuse/pasture/

Pub of the Month: Red and White Clover Report 2021—PR-800

Gene Olson, UK forage variety testing coordinator, continues to release industry leading publications for KY producers. Gene runs the largest forage testing program in the region and his reports are also used by all our surrounding states. Several reports are already available and the remainder should be online by the new year.

Figure 1 shows the stand survival results from the red clover variety test planted spring of 2020. Notice that several entries are thinning by the end of the second growing season. This report confirms that improved varieties adapted for KY are well worth the money. Make sure to check out Gene's variety reports before purchasing seed. Also, buy or preorder your clover seed for 2022 frost seedings now since quantities will likely be limited with the heat wave in Oregon last summer. Download this publication from the UK forage website under the variety trials tab. https://forages.ca.uky.edu/

Variety	Seedling Vigor[1] June 3, 2020	Percent Stand 2020 Jun 3	Percent Stand 2020 Sep 24	Percent Stand 2021 Mar 24	Percent Stand 2021 Sep 29
Commercial Varieties-Available for Farm Use					
SS0303RCG	3.9	100	100	100	96
Gallant	3.8	96	97	97	96
Freedom!	4.3	100	100	99	97
GA9908	3.9	96	96	98	88
Blaze	4.6	98	98	98	97
Kenland (certified)	3.9	98	98	99	94
Renegade	4.6	100	100	100	79
Robust III	3.3	97	97	98	92
Redkin	2.5	45	53	53	68
Barduro	4.0	100	99	99	60
Rustler	4.5	100	100	100	30
Common O	4.8	99	98	98	20

New Study Investigates Methods of Laundering to Remove Pesticide Residues on Clothes

The type of Personal Protective Equipment (PPE) you wear when handling pesticides and during pesticide applications depends on the product label for the pesticides being used. After use of PPE, you should wash reusable PPE with soap and water for later use and dispose of single-use items. However, in addition to the required PPE, there is the other clothing worn during these activities. According to the EPA Label Review Manual, the minimum baseline label-required work clothes for pesticide handlers consists of a long-sleeved shirt, long pants, socks, and shoes. This applies to all end-use products (WPS and non-WPS pesticides) even if not stated on the label. These are considered work clothes, not PPE, and it is the responsibility of the applicator to launder these properly.

The Journal of Pesticide Safety Education recently published a study, which compared a number of different factors that could affect pesticide residue removal when laundering work clothes after pesticide exposure. The factors included pesticide type (carbaryl vs. permethrin), pesticide exposure level, type of washer (full-fill vs. high efficiency washers), clothing type (blue jeans, work shirt, t-shirt, or cotton/polyester blend shirt), and drying method (electric drier vs. clothesline). They also studied transference of pesticide residues from work clothes to baby Onesies during laundering.

The results showed that both types of washers were effective at removing both carbaryl and permethrin residues from work clothes, but they did find that residues after laundering were higher on clothing that had higher residues levels prior to washing. Blue jeans consistently retained more pesticide residues than the other fabric types. Regardless of type of pesticide or rates applied, pesticide residues were transferred to the baby Onesies when laundered together. There were no significant differences in pesticide residues found with the drying method used.

Our recommendations after pesticide applications include:

- At the end of each work day, launder all work clothes and PPE.
- Work clothes and coveralls can be washed in either a high efficiency or full-fill type washer.
- Wash work clothes separately from other household clothing.
- While wearing protective gloves, wash other PPE by hand in soap and water, then air dry.
- Rinse and discard non-reusable items.
- Dispose of any heavily contaminated items as household hazardous waste.

~ Ric Bessin from Kentucky Pest News. Source of Information: Walker, T. and others. 2021. Comparing the Removal of Pesticide Residue from Clothing with Different Washing and Drying Methods. Journal of Pesticide Safety Education. Vol. 23.

Pub of the Month: Soil Sampling and Nutrient Management in Small Ruminant Pastures—AGR-265

Pastures for sheep and goats are fertilized to ensure a reliable supply of energy, protein, and other nutrients for a long season of grazing. This publication gives basic soil sampling recommendations for all pastures in KY and unique considerations for small ruminant pastures. Download this publication from the UK forage website under the Soils and Fertility tab.

Research to toilet train cows aims for positive environmental impact

This research may seem like a joke at first, but read the whole thing and there may be some application down the road. It also reminded me (Ray) of how trainable cattle are. If NZ cattle can be trained to urinate in one spot, then I'm sure KY cattle can be trained for intensive rotational grazing (as many of you have already done).

Cow urine is high in nitrogen which is helpful for growing grass, but as it breaks down in the soil, it can result in two problematic substances – nitrate and nitrous oxide. Nitrate from urine patches can leach into lakes, rivers and aquifers, where it pollutes water and contributes to the excessive growth of weeds and algae. Nitrous oxide is a long-lived greenhouse gas.

If cows could be trained to urinate in a "toilet" at least some of the time, nitrogen could be captured and dealt with before it pollutes water or turns into nitrous oxide gas. "We've shown proof of concept that we can train cows and train them easily," said Dr. Elliffe, a University of Auckland NZ professor of psychology. "Cattle urine is a major cause of our nitrogen problem. Any reduction in that would make a difference."

"People's reaction is, 'crazy scientists,' but actually, the building blocks are there," said Dr. Matthews, a University of Auckland honorary academic and director of an independent research company. "Cows have bigger urinations when they wake up in the morning, which demonstrates they have the ability to withhold urination. There's nothing in their neurophysiology that radically differentiates them from animals, such as horses, monkeys and cats, that show latrine behaviour."

Matthews has been around cows for a long time – he grew up on a dairy farm and did his PhD research on learning and preference in cows. In 2007, during a radio interview about the environmental impact of cattle excretion, the host suggested Matthews should toilet train them. It was a joke – but it got Matthews thinking.

In 2015, Matthews was working with Professor Lars Schrader at the Federal Research Institute for Animal Health in Germany when Schrader suggested toilet training to deal with ammonia emissions, which result from contact between faeces and urine. Previous international attempts to toilet train cows had seen little success, but Matthews thought that with his expertise, he might be able to do better. He brought in Elliffe, who has complementary skills in behavioral analysis, to help. **Continued on page 3**

Forage Timely Tips: December

- ✓ Begin utilizing stockpiled pastures. Graze pastures with orchardgrass and clovers first. Save tall fescue pastures for late winter grazing.
- ✓ Using polywire, strip graze stockpiled pastures to improve utilization. Start at the water source and allocate enough forage to for 2-3 days. Back fencing is not necessary.
- ✓ Make plans to frost seed red and white clover onto closely grazed tall fescue pastures in February.
- ✓ Supplement hay as needed.
- ✓ Minimizing waste by utilizing ring feeders.

Upcoming Events (see Forage website for details and to register, click on EVENTS)

JAN 9-11—AFGC Conference, Wichita, KS
JAN 14—Forages at KCA, Lexington, KY
Feb 24, 2022—Kentucky Alfalfa and Stored Forage Conference, Bowling Green
Late April, 2022—KY Grazing School, Princeton, KY

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Continued: Research to toilet train cows aims for positive environmental impact

With their German colleagues, Matthews and Elliffe worked with 16 calves at a farm operated by the Research Institute for Farm Animal Biology in Germany. First, they demonstrated that most calves could be trained to “hold it.” If they began to urinate in the wrong place, the scientists would make their collars vibrate. While the vibration didn’t hurt them, most of the calves soon learned to walk a short distance to a latrine pen.

Next, Matthews and Elliffe put the calves in the latrine pen, which was bright green to differentiate it from other pens, and rewarded them with a favoured food treat if they urinated there.

“This is how some people train their children – they put them on the toilet, wait for them to pee, then reward them if they do it,” said Matthews. “Turns out it works with calves too. In very short order, five or ten urinations for some animals, they demonstrated they understood the connection between the desired behaviour and the reward by going to the feeder as soon as they started urinating.” The next progression was to increase the distance cows had to walk to the latrine. If “accidents” occurred in another part of the barn, scientists would squirt a little cold water at them. Most of the calves soon learned the ultimate toilet-training skill.

“Very quickly, within 15 to 20 urinations on average, the cows would self-initiate entry to the toilet. This is very exciting because it means they were paying attention to their bladder getting fuller,” said Matthews. “By the end, three-quarters of the animals were doing three-quarters of their urinations in the toilet.” The calves received only 15 days of training and the majority learned the full set of skills within 20 to 25 urinations, which compares favourably to toilet-training time for three- and four-year-old children.

The next step for Matthews and Elliffe is to bring their research to the New Zealand context. In the Northern Hemisphere, cows spend much of their time in barns. In New Zealand, they spend most of their time outdoors. This makes toilet training more of a challenge. However, cows do gather for milking and receiving supplements, so it may be possible for them to use a latrine at those times. Installing latrines outdoors may be another possibility. Even if these changes result in a lower success rate, reducing urine patches would have significant environmental benefits.

“If we could collect 10 or 20 percent of urinations, it would be sufficient to reduce greenhouse gas emissions and nitrate leaching significantly,” said Elliffe. Another challenge will be to scale up so it’s economically feasible to train millions of animals. This could be accomplished by using urination-detecting sensors and automatic reward systems. Trained cows could be transitioned into not expecting a food reward after every urination, the researchers say.

With help from UniServices, Matthews and Elliffe have met with representatives of the New Zealand dairy industry, who are interested in the research as a potential way of avoiding the herd reductions that may otherwise be necessary to meet emissions targets. A further application of the research may be to extract and reuse nutrients, such as nitrogen and phosphorus, from the collected cow urine. ~ Lindsay Matthews, Uniservices and the University of Auckland. Full article with photos. https://www.uniservices.co.nz/research-to-toilet-train-cows-aims-for-positive-environmental-impact

Bonus: Photos from Grazing School!