



Volume XVI
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Buck Test on Hiatus

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As some of you may have already heard, there will not be a buck test in Maryland in 2017. Last year was our 11th year of doing the test. The place needs a rest. The pastures will be killed, planted in row crops, then reseeded with forages.

The current test has run its course. There are too many goats that are not able to adapt to the test conditions. We never set out to make the test difficult, but various factors have converged to make this the situation.

We will consider a reboot of the test in 2018, but many changes would be necessary, including lower stocking rates (fewer goats), selection of consignments based on a lottery system, strict enforcement of the minimum weight requirement, a vegetation-free laneway, and a different strategy for supplementation.

I'm not sure how to handle the drug resistance problem that has become an issue. There's little value in the parasite data, if we can't zero out the goats' fecal egg counts (or at least get them close to 0). If we required a >95% reduction in fecal egg count with the initial sequential dosing, we might not have many goats left for testing. Goats whose initial egg counts are zero (or very low), but increase 13 days later would also not be eligible. This problem requires further thought.

As an alternative or addition to buck testing, we plan to offer a program which we are calling the Kiko Performance Initiative. It would provide EBVs (estimated breeding values) on all of your goats. It's a far better method of genetic improvement (and less expensive) than central performance testing. More about it later.

Thanks to everyone for all of your support over the last decade plus.

2017 Sheep Shearing School

The 2017 Maryland Sheep Breeders Association (MSBA) Sheep Shearing School will be held Friday and Saturday, April 14-15, 9:30 a.m. to 3:30 p.m. at Ridgely Thompson's farm at 1942 Uniontown Road, Westminster, MD 21157.

The school is open to anyone in Maryland, Delaware and surrounding states who wants to learn to shear sheep. Ownership of sheep or a desire to become a commercial shearer is preferred.

The New Zealand method of shearing will be taught. Shearing machines will be provided. Blade shearing will not be taught. Instructors are Aaron Geiman and Emily Chamelin-Hickman. Aaron is an Agriscience



teacher at North Carroll High School. Emily is a professional shearer.

The registration fee is \$100 per person and includes a copy of ASI's Sheep Shearing Notebook and an instructional DVD.

Pre-registration is required and no registrations will be accepted after April 1. Participation is limited to 15 people. The minimum age for a participant is 16.

Checks should be made payable to the Maryland Sheep Breeders Association, Inc. and mailed to Aaron Geiman at 429 Hook Road, Westminster, Maryland 21157. For more information you can send an email to mdsheepshearingschool@gmail.com

Jr. Sheep & Goat Skillathon

The Jr. Sheep and Goat Skillathon will be held Sunday, May 7, 2017 from 8:00 a.m. to noon at the Howard County Fairgrounds, in the dining hall.

A skillathon provides youth with the opportunity to blend knowledge and skills acquired in livestock judging, demonstrations, and care and exhibition of animals into a single activity. A skillathon competition consists of a series of stations where youth are tested on their knowledge and abilities related to livestock. Station topics may include identification (breeds, parts, equipment, meat, wool, or feed); evaluation/judging (fleeces, live animals, hay); a problem-solving activity; and a written quiz. All of the stations in this contest will pertain to sheep and goats and their products.



The Junior Sheep & Goat Skillathon is open to any youth between the ages of 8 and 18. Youth will compete according to their age on January 1, 2017 (4-H age). Individuals and teams (of 3 or 4) may compete. Pre-registration is required. No entries will be allowed on the day of the contest. Participants should bring clipboards and pencils to use during the contest. A donation will be requested to cover the cost of lunch (pizza + sodas).

Classes: Individuals and Teams in three age divisions: Juniors: ages 8-10; Intermediate: ages 11-13; Seniors: ages 14-18.

Awards: Presented at approximately 2:00pm. Top ten individuals in each age class. Top three teams in each age class.

How to enter: Register by April 28, 2017. Teams and individuals should register online at <https://form.jotform.com/70254820764961>. For questions, contact Christopher Anderson, 4-H Youth Development Specialist, Animal Science, University of Maryland Extension, Maryland 4-H Center, 8020 Greenmead Drive, College Park, MD 20740, phone: 301-314-7187, fax: 301-314-7146 or email: canders2@umd.edu.

For information about the skillathon and links to study resources, go to <http://www.sheepandgoat.com/skillathon>.

Combination Dewormers: The Time is Now

Dr. Ray Kaplan
Professor of Parasitology
University of GA, College of Veterinary Medicine

Resistance to dewormers is a fact of life, and the situation has worsened greatly in recent years. Surveys indicate that most farms have worms resistant to at least two of the three major groups of dewormers. Many have resistance to all three groups, and some farms now have resistance to all available dewormers. But, having worms in your animals that are resistant to dewormers does not mean that all the worms are resistant. For instance, when all the commonly used dewormers were first introduced, their efficacy was >99%. Once efficacy falls below 95%, it indicates that drug resistance is present. At 95% the drug is still very useful, but once drug resistance is present, it usually worsens over time as more and more doses of that drug are given.

As the effectiveness of the dewormer decreases, it provides less and less benefit, and once it falls to <50%, it is no longer useful as a sole treatment. Given this situation, what is the best approach for using dewormers? Contrary to popular belief, rotating between dewormers will not prevent resistance from worsening, and is no longer recommended. Rather, dewormers should be used together at the same time in combination.

How and why do combination treatments work?

Research done in New Zealand has convincingly shown that the best approach is to use several different dewormers all at one time as a combination treatment. In fact, in Australia and New Zealand, there currently are few dewormer products sold as single drugs; most products contain 3, 4, or 5 different groups of dewormers (note: other countries have some dewormers that are not available in the US).

There are 2 major benefits to using drugs in combination:

- (1) You get an additive effect with each drug used, thus the efficacy of the treatment increases with each additional drug given (see Table 1 below); and
- (2) By achieving a higher efficacy, there are fewer resistant worms that survive the treatment, thus there is a greater dilution of resistant worms by



the susceptible portion of the population (see Table 2).

Furthermore, as seen in Table 2, the sooner you start using a combination, the better off you will be, since you see the greatest difference in the percent of resistant survivors when efficacy of dewormers is high. The more dewormers that are used in combination, the greater the efficacy of treatment will be. However, if all the dewormers individually have poor efficacy, the combination will not reach high efficacy. As seen in Table 1, once efficacy falls to 50%, even a combination of 3 dewormers will still fail to reach a 90% efficacy.

As an illustration of why combinations help reduce the development of resistance, but rotation of dewormers does not, let us look at some numbers. If two drugs each with 90% efficacy are used in rotation, then each time animals are treated 10% of the worms survive (the resistant ones). In contrast, if these same two drugs are used in combination at the same time, then the efficacy increases to 99%. This calculation involves a simple additive function; the first drug kills 90%, and the second drug kills 90% of the remaining 10% [$90\% + (90\% \times 10\%) = 99\%$]. Thus the efficacy achieved is now 10X greater and this then yields 10X fewer resistant survivors.

Because fewer resistant worms survive at each treatment, there is a greater dilution of the resistant worms among the majority of worms in refugia that are still susceptible. This then will greatly slow the development of drug resistance in the overall worm population. In contrast, if using a rotation of drugs, you would get 10X as many resistant worms surviving each time you treat. Additionally, given the high rates of drug resistance that are known to exist, it is likely that one or more of the dewormers will have poor efficacy, thus you risk rotating from an effective (or relatively effective) dewormer to an ineffective dewormer. By using dewormers as a combination, you eliminate the risk of rotating to a poorly effective drug, and get an additive benefit that maximizes the effectiveness of each treatment given.

Research shows that combinations are the best approach

But – it gets even better. Dr. Dave Leathwick (AgResearch, New Zealand) published a paper in 2015 in the International Journal

(Continued on page 4)

for Parasitology: Drugs and Drug Resistance, where seven farms previously diagnosed with resistance to at least two groups of dewormers were enrolled in a study where each farm implemented a tailored program of "best practice parasite management." The aim was to ascertain whether the programs, which included the almost exclusive use of combination dewormers, were able to prevent resistance from developing further. Strategies implemented on each farm varied, but had consistent underlying principles to avoid over-use of dewormers, manage refugia (and to ensure that only effective anthelmintics were used, by administering them only as a combination).

After five years, they demonstrated an overall improvement in the efficacy of the dewormers (when tested individually), indicating that the use of dewormers in combination, when applied with other best practices designed to reduce use of dewormers and maintain refugia, caused a reversion back toward susceptibility. So, there now is very strong evidence that using combination treatment is the best method for using dewormers and should be instituted on all farms immediately.

Precautions and issues to consider

Finally, before using this approach there are a few precautions to be aware of.

(1) In New Zealand and Australia, products are sold that contain a combination of dewormers, so only one product needs to be administered. In contrast, in the USA, no dewormers are yet sold in this formulation, so the dewormers need to be bought and administered separately. This increases the cost as compared to the products available in these other countries. Additionally, the different groups of dewormers are not chemically com-

patible, thus they cannot be mixed together in the same syringe. Rather, they need to be administered separately, but can be given one immediately after the other.

(2) All dewormers should be administered at the full recommended dose whether administered singly or in combination.

(3) When using dewormers in combination, meat and milk withdrawal times will be equal to the dewormer used with the longest withdrawal time period

(4) If using dewormers in combination, it is critical to maintain refugia; thus, one should be using a selective treatment approach based on FAMACHA© (see FAMACHA© section of the ACSRPC website for more information on this method and for further explanations of refugia). The presence of refugia is essential to realize the full benefits from combinations. In fact, if refugia are not maintained then you will not get the necessary dilution of the resistant survivors, and this will then lead to having multiple-resistant worms that can no longer be controlled with the combination treatment.

(5) If the efficacy of your dewormers are >80%, it is possible you may not notice any difference in the clinical response of treatments when applied singly vs. in combination. However, the impact on the further development of resistance could be quite large (see Table 2).

(6) Any safety precautions that exist for a single dewormer will also exist when used in a combination; however, there are no known additional risks with using more than one dewormer at the same time.

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Table 1: Impact of using dewormers in combination on the efficacy of treatments.

The increases in efficacy are due to a simple additive effect as per the equation below:

Where D1= efficacy of dewormer 1, D2= efficacy of dewormer 2, D3= efficacy of dewormer 3, C2=efficacy of D1+D2, and C3=efficacy of D1+D2+D3

$$C2 = D1\% + (100 - D1\%) * D2\%$$

$$C3 = C2\% + (100 - C2\%) * D3\%$$

Drug 1 (%)	Drug 2 (%)	Drug 3(%)	Combination (%)
80	80		96
80	80	80	99.2
90	90		99
90	90	90	99.9
60	95		98
60	60	95	99.2
99	99		99.99
60	60	60	93.6
50	50	50	87.5
40	40	40	78.4

Table 2: Impact of combination on percent of resistant worms that survive.

Table shows the % of worms killed by a single dewormer vs a combination treatment with two dewormers both with the same efficacy, ranging from 80% to 99%. The last column shows the magnitude of the difference between % of worms killed and % surviving when one or two dewormers in combination are used. Note that the higher the efficacy of the drugs, the smaller the difference in efficacy when used in combination, but the greater the difference in the % of resistant survivors.

Efficacy of Dewormer		Single Dewormer	2 Dewormers in Combination	Fold Difference
99	% Killed	99	99.99	1.01X
	% Surviving	1	0.01	100X
98	% Killed	98	99.96	1.02X
	% Surviving	2	0.04	50X
95	% Killed	95	99.75	1.05X
	% Surviving	5	0.25	20X
90	% Killed	90	99	1.1X
	% Surviving	10	1	10X
80	% Surviving	80	96	1.2X
	% Killed	20	4	5X

Featured Breed: *Charollais Sheep*

When folks hear the word Charollais they have visions of muscular white cattle that were imported from France in the 1960's. Few people know there is also a sheep breed with the same name. After visiting France this past December and having a personal encounter with two such ewes, I felt it would be a good feature breed for this issue. The ewes I observed and handled were useful sheep.

Charollais originated from the same region of France as the Charolais cattle, Charolles, Saone Loire. They originated in the early 1800's from a cross between Leicester Longwool with local landrace breeds. The breed is used primarily as a terminal sire to increase the muscling and growth rate of the lambs. The rams reach sexual maturity at 7-8 months. Births are considered relatively easy with ewes having an extended breeding season.



(picture courtesy of the Charollais Sheep Society)

The fleece of the Charollais generally weighs between 4.5 and 5.5 pounds (2.0-2.5 kg) with a staple length of 4 to 6 cm and the quality being 56's to 60's. The micron range is between 29 - 30.5. The wool is short and fine. Charollais sheep can be found throughout France, with a particularly high concentration in Bourgogne, the Massif Central, Poitou-Charentes, the Limousin and the south-west.

The breed has spread far beyond its native region thanks to a combination of maternal abilities and meat production qualities. The Charollais sheep is bred free-range or semi-free range, with mating primarily in the autumn. The breed also makes it possible to raise lambs through grass-grazing.

Early maturity and ewe prolificacy are completed by high suckling abilities: ewes can thus suckle their lambs without difficulty, 80% of twin births being raised together. The rapid growth rate of the Charollais allows farmers to produce heavy lambs with carcasses free of excess fat. Furthermore, the fine-boned structure and conformation of the lambs make the Charollais a prime meat-producing sheep.

These meat production traits explain the broad use made of Charollais rams for terminal crossbreeding, both nationally and internationally. Rams are currently propagated in more than 20 countries. The Charollais breed thus represents 40 to 50% of French sheep genetic material exports.

Outside of France, the Charollais breed is considered a terminal sire breed so emphasis on selection has been placed on its excellent fleshing qualities and growth. The purpose is primarily to breed rams for crossing with commercial ewes to produce quality meat lambs for slaughter. Easy lambing is an important trait associated with the breed. The fineness of bone of the breed also contributes to the higher killing out % of their progeny.

More Information On Sheep & Goats Can Be Accessed At:

<http://www.sheepandgoat.com/>

<http://www.acsrpc.org> or wormx.info

<http://mdgoattest.blogspot.com>

<http://www.sheep101.info/>

<https://www.facebook.com/MDSsmall>

<http://issuu.com/mdsheepgoat>

<http://mdsheepgoat.blogspot.com>

<https://www.youtube.com/c/MarylandExtensionSmallRuminantProgram>

Precision Sheep and Goat Farming

By Susan Schoenian

Most agriculturists associate precision farming with agronomic crops: farmers using GPS to map their farms and apply site-specific management to their fields. Precision sheep and goat farming is similar. It uses information technology (IT) to manage individual animals (or groups), as opposed to applying the same nutrition and management to the whole flock or herd.

Precision sheep and goat farming starts with electronic identification (EID or RFID). EID contains a microchip that is embedded in an ear tag or (rumen) bolus. It can also be implanted under the skin of the animal. The chip is read electronically by a reader (scanner): a hand-held device or a panel reader that attaches to a scale or raceway. The ID can be transferred to a scale indicator, sorting gate, drenching gun, or any computing device (computers, tablet, or smart phone) with wireless capability. EID can integrate with various management software, including spreadsheets.

Some countries (Canada, UK) already require compulsory electronic identification of livestock, as part of their national animal identification programs. It is not known if the US will eventually require mandatory electronic ID of sheep, goats, or other livestock. As compared to visual ID, EID can be read quicker and without human error.



Merino rams with EID in (Australia)

to facilitate genetic improvement of their stock. They had laptops and LCD monitors in their barns which displayed all the pertinent data of their sale rams. All rams had extensive EBVs (estimated breeding values). EID facilities data collection for quantitative genetic evaluation. In fact, one of the most important applications of precision sheep farming is the identification of superior and inferior animals.

Several farms had automatic drafting systems. As sheep go through the systems, they are automatically weighed and sorted according to pre-programmed criteria. One farm was participating in a trial using weight as a variable for determining body condition score of ewes. Armed with this information, the farm (5000 ewes) would be able to separate ewes (without touching them) into different groups for feeding or preferential grazing.

Weight can also be used to determine the need for deworming. Lambs and kids which fail to meet performance targets could be sorted into groups for deworming. There's even a drench gun that integrates with EID; dose is automatically calculated according to the animal's weight. No more over or underdosing!

The farm was also field testing a solar-powered "parenting gate" (or pedigree matcher) to match ewes with their offspring. This technology is useful in low-labor pasture lambing and kidding situations where it is impractical to tag all offspring at birth. In Australia, they are field testing solar-powered ear tags (smart tags), which are able to track a ewe's location, grazing, and maternal behavior. An ear tag which can detect a fever in a calf is already being marketed in the US.

The application of precision farming technologies to sheep, goat, and other livestock farms is staggering. The technologies will continue to evolve and get less expensive. The challenge will be to determine which technologies are cost-effective on individual farms. Few sheep and goat farms in the US may be able to justify full-blown automatic drafting systems, but there may be components of precision sheep farming that can be applied to many farms.

Note: Susan Schoenian is currently on sabbatical, from December 1, 2016, until May 31, 2017. The focus of her sabbatical is technology: using technology to raise sheep and goats and using technology to deliver extension education programs.



Automatic weighing & drafting system (New Zealand)

While on a recent study tour of Australia and New Zealand, I visited several farms which employ precision sheep farming techniques. Stud farms were using EID

Improving Pastures by Frost Seeding

Frost seeding is a popular option to improve forage yield and quality of pasture and hay land. The principle of frost seeding is to broadcast forage seed in the early spring when the ground freezes at night and thaws during the day usually in late winter typically 40 to 50 days before grass growth begins in the spring.



Frost seeding works best on clay and loam soils that experience soil movement with the freezing and thawing action that takes place that time of year. The main advantage to frost seeding is the ability to establish desirable species into an undisturbed sod at a low per acre cost. Producers have to simply buy the seed, broadcast the seed and watch it grow. There is no spraying, tillage, stone picking, nor loss of grazing for a summer that comes with re-seeding a new pasture. And in many cases the end result can be almost as good as a new seeding.

The common practice is to add clovers, birdsfoot trefoils, and some grasses such as annual ryegrass to a pasture when the legume percentage in the pasture is less than 40 percent. The existing grass pasture is not tilled or sprayed, just the clover seed is broadcast over top with the hope that the clover seedlings will compete and grow with the grass in the summer. Even thin stands of grass can be very competitive in the spring of the year. These existing grasses can out-compete the new seedlings for moisture, especially during a dry period in the spring, and the frost seeding may fail.

Frost seeding works best with legumes and grasses that germinate fast and at cool temperatures. Recommended species and seeding rates are shown in Table 1. Red and white clovers are the most effective for establishment. Birdsfoot trefoil is less successful due to slow establish-

ment. Alfalfa does not frost seed well because its germination is variable at cool temperatures. There are several benefits to adding legumes to pastures including higher quality forage as well as nitrogen to support grass growth.

Although legumes are the most successful for this system, some grasses can also be successfully frost seeded. Of

the grasses, annual ryegrass and orchardgrass frost seed with the greatest success; brome grass has intermediate success; reed canary and timothy have the least success. Typically, annual ryegrasses will go to seed in the summer; therefore, on these farms, ryegrasses should be seeded with the intent of meeting single season forage needs. Orchardgrass will contribute to forage yields in the seeding year while brome grass will need a full season before plants become productive.

Since grass seed is light, it will not throw as far as heavier legume seeds when broadcast. If seeded as a mixture, this difference in seed weight will result in alternating strips of grass and legume plants. Therefore, seeding the species separately will result in a more even distribution of grasses and legumes. To spread the establishment cost risk of frost seeding, it is generally better to seed at lower rates and repeat in successive years than to seed at higher rates in any one year. Many farmers frost seed 25% of their acreage each year so that they are spreading their risk over different years.

In the spring, excessive growth and competition should be controlled. Frost seeded pastures should be grazed or clipped in the spring at regular intervals to allow sunlight to enter the canopy. Do not allow animals to graze plants low enough the first or second rotations that they ruin the new seedlings before adequate roots are developed.

Summary– Frost seeding will not increase the productivity or quality of a pasture if soil nutrients and pH are not in acceptable ranges for the species you are trying to produce. Most often, pastures are a product of management practices. Many times a change in grazing practices (allowing rest periods) or addition of soil nutrients will correct declining pasture production. If you are thinking of making a frost seeding and do not know what your nutrient levels are, a soil test can be a valuable tool. It can tell you if your pastures need more seed or just more “feed”.

Table 1. Recommended Species and Seeding Rates for Frost Seeding Species

Specie	Seeding Rate (lbs per acre)
Red Clover	2 to 4
White Clover	2 to 4
Birdsfoot Trefoil	4
Annual Ryegrass	5 to 6
Orchardgrass	2 to 4
Smooth Brome grass	8 to 10

*Note: Timothy and Reed Canarygrass are not recommended

Upcoming Events



February 24

Frederick County Sheep Breeders Meeting
Lambing Discussion
Contact: Peter Vorac
Email: pvorac@comcast.net

March 1-11

Regional NSIP Workshops
Workshops held in WV, PA and NY
Info: <http://mdsheepgoat.blogspot.com>

April 14-15

MD Sheep breeders Sheep Shearing School
Westminster, MD
Info: <http://mdsheepgoat.blogspot.com>
Contact: mdsheepshearingschool@gmail.com

May 6 - 7

Maryland Sheep & Wool Festival
Info: <http://sheepandwool.org/>
Contact: office@sheepandwool.org

May 7

Junior Sheep & Wool Skillathon
Contact: Christopher Anderson
Phone: 301-314-7187
Email: canders2@umd.edu

WORD SEARCH FUN!

CHAROLLAIS	PASTURES
CLOVER	RESISTANCE
COMBINATION	RYEGRASS
DEWORMERS	SEEDING
FORAGE	SHEARING
GOAT	SHEEP
KIDDING	SKILLATHON
LAMBING	WOOL
ORCHARDGRASS	WORMS

S F M N F D S G X T G E P L G
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E N E C V I H W I I S O N O I
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I W U T Z E R R N T M R A I I
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G R M I W S H L G S B I R T P
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