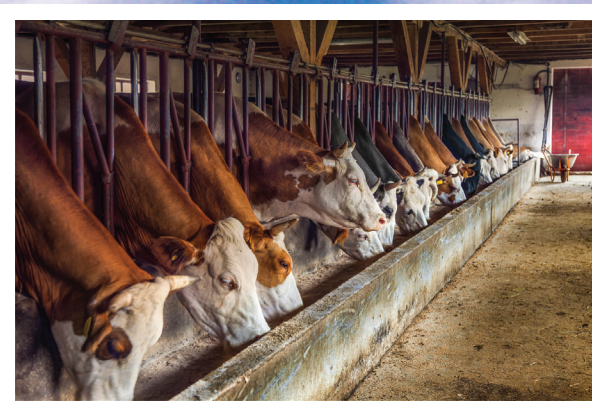
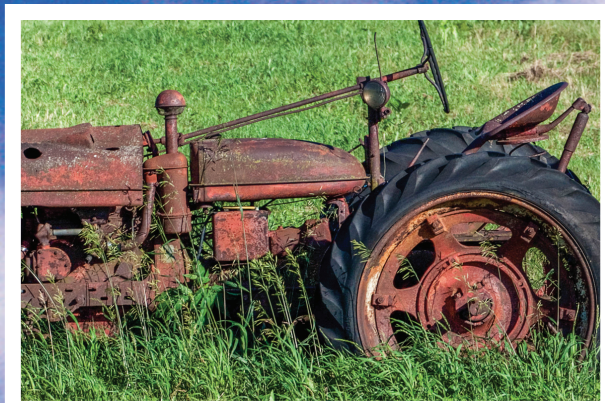


AgTimes



Tips for negotiating farmland leases

BY LINDA GEIST
University Extension

Renters and property owners are negotiating new farmland leases in response to lower farm commodity prices, says University of Missouri Extension agriculture business specialist Joe Koenen.

Communication helps landlords and tenants find a middle ground for new leases, Koenen says. Landlords in tune with lower farm prices recognize that tenants will request rent adjustments. "I know of renters who are negotiating leases. Several are being successful," he says. "Overall, so far it seems relatively smooth."

Some owners, however, resist the change. Landowners who invested in land with expectations of a set return seem most reluctant to renegotiate new terms, Koenen says. Open communication between landlord and tenant throughout the term of the lease — not just when down markets hit — is key.

"Communicate every year, not just when prices go down," Koenen says. Talk to landlords about income and expenses and how that affects your bottom line.

"Agriculture is cyclical," he says. "We're in a downturn. Everybody is in the same

boat."

He says income on current Missouri corn/bean rotation farms is down more than \$150 per acre.

Do not pressure your landlord to accept an unrealistic lower rate, he says. Renters do not want to put landlords in the position of putting the land out for bid. Renters should consider additional factors such as proximity to other ground they farm.

Tenants who are good stewards of rental property should remind landowners of this. Loyalty and tradition still matter in rural areas, Koenen says.

Koenen recommends that tenants offer something of value to landowners to offset the feeling that they are losing. Tenants may be able to offer services such as plowing snow on the landowner's roads, marketing timber on the property or fixing fences.

Don't bring up topics such as your new pickup truck or the expensive vacation you are taking, Koenen says. The landlord will be more willing to lower rent if he sees that you are cutting back on your budget. He recommends that renters do a five-year average of their farm income and expenses before meeting with the landlord.

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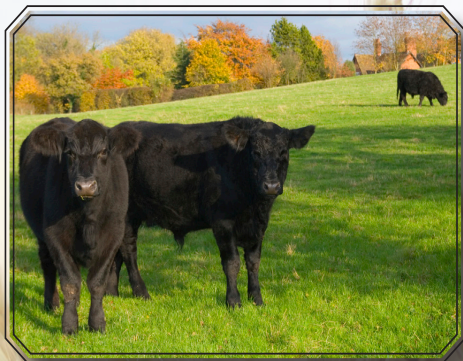
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There's still time: why responding to your Census of Agriculture is important

THE AMERICAN FORUM

There's still time. To ensure an accurate representation of the agriculture industry in this country, the United States Department of Agriculture's National Agricultural Statistics Service has extended their 2017 Census of Agriculture response deadline through spring, and the Rural Coalition/Coalición Rural (RC) is calling on all farmers and ranchers to participate.

Representing thousands of diverse producers throughout the United States, the RC has worked for 40 years to promote just and sustainable rural development that brings fair returns to diverse farmers and communities. It also works to protect the environment and bring safe and healthy food to consumers.

Serving as an advocacy voice, the RC was able to secure more than 30 sections of policies in the 2008 Farm Bill that provided more opportunities for small and minority producers, and developed methods and

models to serve its constituencies best.

Small and minority producers need policymakers to continue to respect their value. According to the 2012 Census of Agriculture, small farms make up 88 percent of all U.S. farms. It's data like this that demonstrate economic importance. With a new Farm Bill around the corner, this is the time to be counted.

The Census of Agriculture, conducted just once every five years and sent to every farm and ranch in the country, is the only source of uniform, comprehensive, and impartial agriculture data down to the county level. Providing an overall picture of U.S. agriculture, census data are then relied on when making important decisions about farm policy, disaster relief, loan programs, research, technology development, infrastructure improvements, and more.

Trade associations, extension educators, agribusinesses, even farmers and ranchers themselves have used census data in support of American agriculture.

For nearly 30 years, the Outreach and Assistance to Socially Disadvantaged and Veteran Farmers and Ranchers (OASDFR) Program has been the primary tool to help historically underserved producers gain access to USDA's credit, commodity, conservation, and other services.

In the four years of the 2008 Farm Bill, the program received \$75 million in mandatory funds, about \$18 million per year. According to the 2012 Census of Agriculture, during that time, the number of Hispanic and Asian-American farmers increased 21 percent, African-American farmers increased 12 percent, and Native American farmers increased 5 percent.

In the 2014 Farm Bill, Congress expanded OASDFR to include Veteran farmers, making increased funding all the more necessary. However, that Farm Bill reduced mandatory funds to only \$10 million annually.

If everyone is counted, data from the 2017 Census of Agriculture will help make the case for restoring the additional funding

needed to bring OASDFR to its previous or better levels. But this is just one example of how census data have been and will be used. For farmers and ranchers, the Census of Agriculture is their voice, their opportunity to be represented in the data. There's strength in numbers.

This year's Census of Agriculture aims to show an even more detailed account of the industry. Producers will see a new question about military veteran status, expanded questions about food marketing practices, and questions about on-farm decision-making to better capture the roles and contributions of new farmers, women farmers, and others involved in running the business.

What will the 2017 Census of Agriculture tell us about changes over the last five years?

We will see, but now is the time to ensure an accurate representation of the industry — not just for the future of your operation but your community as well. We urge you to respond to your Census of Agriculture today.

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Inexpensive soil tests can save farmers thousands

BY LINDA GEIST
University Extension

COLUMBIA — Soil tests can save farmers thousands of dollars, says Manjula Nathan, director of the University of Missouri Soil and Plant Testing Laboratory.

Too often, farmers follow routine fertilization schedules and end up applying too much fertilizer to fields, Nathan said. A simple soil test gives the farmer accurate information to guide nutrient management decisions.

Two Lawrence County farmers shared their savings stories with MU Extension agronomist Tim Schnakenberg.

One farmer had fertilized his cattle pastures every year with the same fertilizer. “He budgeted a lot of money to do it,” Schnakenberg says.

One year, he spent \$270 on soil sampling. He reported saving \$20,000 that he would have spent on fertilizer. Another businessman bought a farm

and budgeted \$10,000 for nutrients. He spent \$85 for soil tests that showed that nutrient levels were fine. “Soil testing is a great investment compared to the cost of lime and fertilizer over several acreages,” Schnakenberg says.

In other cases, however, soil tests show low fertility levels. Area MU Extension agronomists can review test results with farmers and make unbiased, research-based recommendations to build up fertility levels.

Fall is a good time to submit soil samples, Nathan said. The lab processes about 32,000 field crop tests annually. Spring is the busiest time. Sampling in fall gives producers sufficient time to make plans for fertilizer applications.

You can take samples to your county MU Extension center or mail them directly to the lab on the MU campus. A basic soil test is \$12.50 per sample if you submit directly to the lab. There is a small shipping charge if you take samples to an MU Extension center.

The MU soil and plant testing lab has a one-day turnaround time. Regional agronomy and horticulture specialists and firms with accounts at the lab receive the soil test results by email on the same day they are processed. Users may also access soil test results online with a password. If you are receiving results by mail, it takes about seven to 10 days from submission to county extension offices to receipt of results.

“Soil testing is an essential management tool for efficient nutrient management that results in improved production and optimized returns,” Nathan said.

The Soil Testing and Plant Diagnostic Services website at soilplantlab.missouri.edu has downloadable submission forms, instructions for taking and submitting soil samples, information about available tests, and a guide to interpreting test results. For questions, call 573-884-0623 or email soiltestingservices@missouri.edu.

Soil testing not just for farm fields, can benefit gardens, flower beds

COLUMBIA — If a little is good, a lot must be better. All too often, that’s the approach home gardeners take when plants and flowers don’t do well, says University of Missouri Extension soil scientist Manjula Nathan.

Trying to improve flower beds and vegetable gardens by adding more fertilizer and topsoil may be a waste of money. It also can be bad for the environment because excess nutrients often leach into water supplies.

A soil test through the University of Missouri’s Soil and Plant Testing Laboratory can save home gardeners money and trouble by revealing just what their soil needs, Nathan says.

A soil test provides information on soil pH, reserved acidity, nutrient levels, and organic matter content, along with fertilizer and lime recommendations based on your plants’ specific needs.

Test your soil every three years on established lawns. If you have a problem with your lawn, test annually, Nathan says. She recommends testing new lawns before they are established. This makes it easier to amend the soil. Also consider testing soil if fertilizers such as phosphate or potash have been used on a regular basis.

The MU Soil and Plant Testing Laboratory provides reliable, unbiased low-cost tests for soil, plant, water, manure, compost and greenhouse media.

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MU beef nutritionist suggests 'feed less, need less' strategy to stretch short hay supply

BY DUANE DAILEY
University Extension

COLUMBIA—As winter feeding season continues, cow herd owners face dwindling hay supplies.

Eric Bailey, University of Missouri beef nutritionist, gives the short answer: "Feed less, need less."

In practice, that takes management decisions and exacting math.

The "need less" part means selling cows. That makes fewer mouths to feed. Selling some cows may be beneficial as it puts stocking rate in synch with carrying capacity of the farm. If a cow isn't carrying a calf, she shouldn't still be in the herd. Pregnancy checks are a starting point.

Cows with bad attitudes or poor production should go down the road. Again, it's fewer mouths to feed. "No cow should be given a second chance," Bailey says.

If she fails to conceive in your farming system, she'll likely fail on retry. Keeping bad cows builds a mediocre herd.

In his MU Extension talks to farmers, the nutrition specialist goes beyond talking

vitamins and minerals. He tells management tips that cut costs. He urges dealing with big problems first. Profits are the point of feeding cows.

In hay feeding, match amount fed to the body needs of the cow. Here's where match-ups become important. Is it an 800-pound bale or a 1,200-pound bale?

Rations are based on the body weight of a cow. General rule: Hay needed is 3 percent of body weight per day. In an example, Bailey uses a 1,000-pound bale and a 1,400-pound cow. With easy math, rounded off, each cow needs 40 pounds of hay a day. That lets one bale feed 22 cows. But not all hay is the same quality. Hay testing allows fine-tuning needs.

A mid-gestation cow needs a ration of 55 percent TDN (total digestible nutrients). A cow that calved and nurses a calf needs 65 percent TDN. That mid-gestation cow needs only 7 percent crude protein. The lactating cow needs 11 percent CP.

Then there's hay waste to calculate. Feeding requires precision to stretch hay supplies.

Some tips: Roll out only a day's worth

See **Feed less** on Page 7B



WITH THREE hours of access, a cow wastes 6 pounds of hay a day. Given 24 hours, she wastes nearly 14 pounds a day.

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Feed less • from page 6B

of hay at a time. Then cut hours of access to that hay. With three hours of access, a cow wastes 6 pounds of hay a day. Given 24 hours, she wastes nearly 14 pounds a day.

Feeding less hay may take buying and feeding supplement. Needed feed can be made in part by plentiful low-cost byproduct feeds. Those are feeds left in making biofuels, whether ethanol or soy oil. A ration fed at 1 percent of body weight can be half grain (such as corn) and half byproduct.

Before he came to Missouri, Bailey used the MU Extension weekly byproduct feed report published on the MU AgEBB (Ag Extension Bulletin Board) website. Look it up on the web and subscribe.

Feeding management starts with knowing how many days of hay are left. Then herd owners must know what it takes to maintain different animals in the herd.

Counting cows doesn't provide an answer on how much hay will be needed. Feeding is based on body weight of animals.

Bailey, who came to Missouri after working in the Southwest, grew up on a New Mexico ranch.

With that background, he says Missourians have great resources for beef cow herds. Plentiful grass and hay grow here. Supplements are plentiful and low-cost.

Last year an ag drought reduced grass growth and fall stockpiles. While hay may be short, feed is plentiful.

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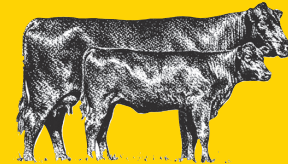
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The secret ingredients of clover: biochanina and isoflavonoids

BY MICHAEL FLYTHE, GLEN AIKEN AND ISABELLE KAGAN
USDA-ARS Forage-Animal Production Research Unit

Functional Feeds

It is well known that the value of clover is in nitrogen. Clovers fix their own nitrogen so that an input of nitrate fertilizer is not required. Furthermore, they are rich in protein-nitrogen, and can be used to meet the protein requirements of ruminants. Clovers also contain a class of chemicals called isoflavones, and we have recently discovered evidence that the isoflavones positively influence the way that ruminants digest protein.

Many members of the legume family (Fabaceae) produce natural products called isoflavones. They are well known for being biologically active because they are chemically similar to the hormones called estrogens. Most of the older research on isoflavones has been about the negative effects on reproduction in specific circumstances. For example, a large proportion of

red clover in the diet has interfered with the estrous cycle in sheep, and reduced lambing rates, in some cases. This same estrogenic property has been exploited in red clover supplements that reduce the symptoms of menopause in humans. Soy isoflavones are also of interest in human medicine. There is evidence that hypertension can be reduced by the isoflavones in soy-based foods.

Human nutritionists call foods with medicinal value, like soy, “functional foods”. We can borrow that term to consider whether legume forages, such as red clover, have value as “functional feeds”. Cattle often receive drugs of different types at different stages of the production system. Vaccines and anthelmintics are given to young calves, while steroid implants, beta-agonists and antibiotics can be used in backgrounding and finishing. These drugs have revolutionized modern production systems, but they have been criticized. The use of antibiotics for growth promotion has been especially criticized because of possible contributions to antibiotic resistance in bacteria. Therefore,

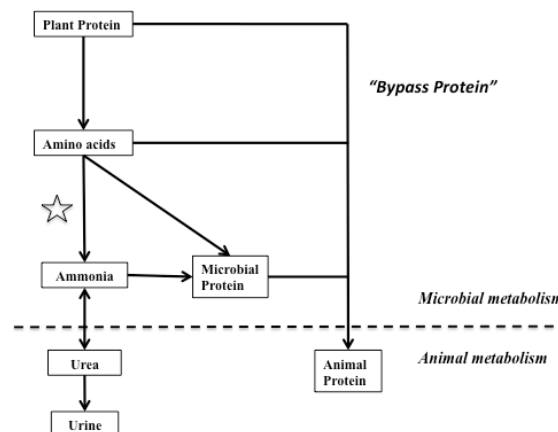


FIGURE 1. Protein Metabolism in the Rumen. The steps carried out by the ruminant animal are below the dotted line. The steps carried out by the rumen microorganisms are above the dotted line. The star shows the activity of the Hyper Ammonia-producing Bacteria (HAB), which are inhibited by both antibiotic growth promoters and by the red clover isoflavone, biochanin A.

we explored the idea that red clover could be used as a functional feed to achieve the same benefit as antibiotic growth promoters. **Antimicrobial Growth Promoters and a Plant-Based Antimicrobial**

To evaluate chemicals from clover as antimicrobials, we first need to understand how antibiotic growth promoters work. Chemicals like tylosin, lasalocid and monensin are antibiotics, that is, they are made by micro-

organisms to kill other microorganisms. The rumen is densely populated with many types of bacteria and other microorganisms. Some bacteria, like those that break down fiber, are very important to the animal. Others carry out wasteful processes, such as methane production and protein degradation. The steps in rumen protein degradation are shown in Figure 1. Plant protein is consumed; it is broken down into amino acids by one group of microorganisms; then another converts the amino acids into ammonia. Some of the ammonia gets recaptured into microbial protein by beneficial bacteria, but much of it is transported into the blood and is lost in the urine. Protein and amino acids that survive the rumen are called “bypass protein”, and can be absorbed by the animal in the lower digestive tract. A group of rumen bacteria called the Hyper Ammonia-producing Bacteria (HAB) convert most of the feed amino acids into ammonia. Antibiotics like

See **Clover** on Page 10B

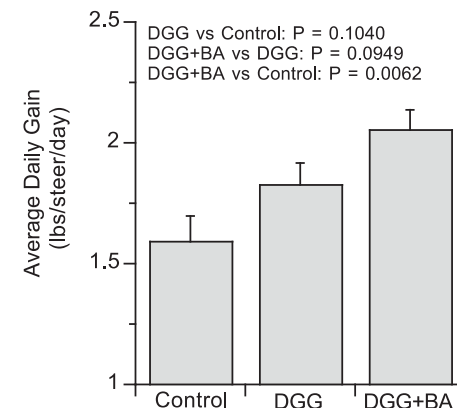


FIGURE 2. Effect of biochanin A (red clover isoflavone) on average daily gain of steers on pasture. There was no effect of season, and the trials were analyzed together. The error bars show standard error. Control is pasture only. DGG is pasture supplemented with dry distiller's grains. DGG+BA is pasture supplemented with dry distiller's grains and biochanin A.

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Clover • from page 8B

monensin kill HAB, which increases bypass protein, feed efficiency and weight gain.

We began by extracting a mixture of isoflavones and similar natural products from red clover (cultivar Kenland). The extract was added to pure cultures of rumen HAB. It was determined that the extract could prevent the growth and ammonia production by the HAB. This result indicated that red clover contained at least one compound that had the desired antimicrobial property. The natural products in the extract were chemically separated and screened for activity using the pure HAB culture. The compound that prevented growth of the HAB was identified as an isoflavone called biochanin A.

Next we tested both the red clover extract and pure biochanin A on natural rumen bacteria. Instead of using a pure HAB culture, rumen fluid was collected from fistulated goats. When the bacteria from the rumen fluid were fed amino acids, ammonia was produced. Either the clover extract or biochanin A decreased ammonia production. These results showed that the antimicrobial had the desired effect on a natural mix of rumen bacteria, not just a pure culture, and that biochanin A was the active component.

Field Testing Biochanin A as a Growth Promoter

Once it was determined that the red clover isoflavone, biochanin A, could reduce ammonia production from rumen bacteria by killing the same bacteria as antibiotic growth promoters, then the next step was to test its ability to promote growth. Two feeding trials were carried out (spring and fall 2015). In each trial, 48 Angus cross steers were put on pasture (clover-free, novel endophyte fescue) in one of three groups: pasture only, pasture plus dry distillers' grains or pasture plus dry distillers' grains with added biochanin A. The biochanin A was given at 7 g/head/day, which would be equivalent to the amount of biochanin A in a diet that was approximately 1/3 red clover. The average daily gains were calculated the end of the 63- and 61- day trials (Figure 2). In both cases, the addition of biochanin A

improved average daily gain.

The Unexpected Bonus: Clover Isoflavones to Treat Fescue Toxicosis

The results of the feeding trials can be explained solely by the effect of biochanin A on the activity of rumen bacteria. However, the effects of the isoflavone on the physiology of the animal itself must also be studied. As previously mentioned, the isoflavones are estrogenic, which could affect ruminants in a number of ways. A survey of research done on humans and non-ruminant animals revealed that isoflavones were also used to treat hypertension. Previous researchers showed that biochanin A could dilate a blood vessel (the aorta) in rats. This made us consider the common wisdom about clovers in tall fescue pastures. Fescue toxicosis is caused by toxic alkaloids produced by a fungus that lives in the grass. The alkaloids cause the blood vessels to constrict, which causes many of the negative health effects associated with tall fescue. It has long been held that clovers in the pasture can "dilute" the concentration of alkaloids in the diet; that is, the animals will consume less tall fescue because they also have clover. However, if isoflavones could relax blood vessels in ruminants, then clover might directly counteract blood vessel constriction by fescue alkaloids.

Two experiments were conducted with goats to explore the interaction of fescue alkaloids and clover isoflavones. In the first experiment, six goats were administered toxic tall fescue seed and red clover extract together for 4 days. The carotid artery, in the throat, and left recurrent interosseous artery, in the forelimb, were observed with ultrasonography. The luminal areas (size of cross-section of the vessel) were not different from goats receiving only orchardgrass hay. Then the red clover extract was taken away, and the goats only received fescue seed. The blood vessels constricted within 48 hours. In the second experiment, the goats received only fescue seed initially, and the vessels were very constricted. When the goats began receiving red clover extract with the fescue seed, the vessels began to

See **Clover** on Page 11B

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MU Extension to host ReproGene in Cuba

University of Missouri Extension will hold a ReproGene conference March 26. This event is designed to help beef producers better understand and utilize technologies related to reproductive management and genetics to improve farm profits.

The ReproGene conference will be led by MU Extension Beef Specialists Dr. David Patterson and Dr. Jared Decker. Topics of the conference will include an overview of Artificial Insemination Synchronization Protocols for Heifers and Cows, Split-Time Artificial Insemination and Use of Sex-Sorted Semen,

Basics of EPD and Genomic Predictions, and How to Use Genetic and Genomic Predictions for Increased Profitability.

The program will begin at 4:30 p.m., include a beef dinner and conclude by 9 p.m. Location of the event is the Recklein Auditorium, at 202 N. Smith St. in Cuba.

Early registration fee is \$20 per person, with registration required by March 19. Registration fee at the door is \$25 per person. To register, or for more details, contact Ted Cunningham, MU Extension Livestock Specialist at 573-729-3196.

Online herbicide applicator training

Online training on synthetic auxin herbicides (dicamba and 2,4-D products) is now available, says University of Missouri Extension weed scientist Kevin Bradley.

Bradley and MU researcher Mandy Bish teach the online, self-paced class. For more information, go to extension2.missouri.edu/synthetic-auxin-herbicide-applicator-training-program.

The Missouri Department of Agriculture (MDA) requires certified applicators to complete online or in-person training before buying or using dicamba. MDA designated MU Extension as the sole source for dicamba training. Only certified applicators may purchase or apply dicamba. Visit agriculture.mo.gov/dicamba to learn more about Missouri's requirements.

Clover • from page 10B

open up and were normal by 5 days of treatment. These results demonstrate that clover isoflavones can counteract the toxic effect of tall fescue on blood vessels.

Conclusions

These results may explain many of the benefits seen in animals grazing clovers. It is well known that clovers fix their own nitrogen and convert the nitrogen to valuable protein for grazing ruminants. Now there are reasons to believe that the isoflavones in clover also improve utilization of the protein and promote weight gain by influencing rumen bacteria in a manner similar to antibiotic growth promoters. The discovery that clover isoflavones can counteract at

least one of the negative effects of toxic tall fescue gives us another reason to maintain clovers in the regions where this forage grass is prevalent. Isoflavones are estrogenic, which means that they have to be carefully used. For example, different feeding levels might be recommended for backgrounding and finishing beef versus pre-weaning or in dairy production. There are also special considerations for sheep, which are believed to be particularly sensitive to reproductive effects of plant estrogens. Clearly, more research is needed on the biologically active chemicals made by forage legumes, as well as how to best utilize them as "functional feed" in each industry supported by forage. However, the above results indicate that this research is well worth pursuing.

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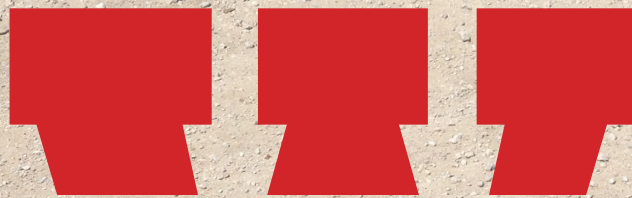
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