Volume 3, Issue 3 Fall 2014

THE ROUNDUP

University of California Cooperative Extension

Livestock, Range, and Natural Resources Newsletter

Kern, Tulare, and Kings Counties

Happy Thanksgiving to All!

I hope this newsletter finds you all doing well with pastures that are beginning to show signs of green!

I have received some great and very interesting questions recently. I enjoy answering questions because I usually don't know the answer, which means I get to go find the answer and learn something new. A wise, experienced Advisor has told me, more than once, that a good Advisor is made. They are shaped and molded by the people they work with and the work they do for those people. Every time I am sent a question, I get a chance to learn and improve. So, please, keep the questions coming!

This newsletter includes one especially interesting question...how many ground squirrels does it take to equal one AUM? I've also included lots of short articles on a variety of topics including the Grazing Regulatory Action Project (GRAP) and an extension on the IRS tax deferments due to the drought.

Thanks everyone!

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UC CE

UCCE Celebrates a Centennial Birthday along with Local Centennial Families

On August 21st, the Kern County UC Cooperative Extension office hosted a dinner to celebrate 100 years of service in Kern County. The event was held at the Ag Pavilion on Belle Terrace, just east of the UCCE office and it was a great success. Attendees included local ranching and farming families, many of whom have been ranching and/or farming in Kern County for more than 100 years! Kern County Supervisor Leticia Perez delivered a short address and, Helene Dillard, the Dean of the College of Agriculture and Engineering Sciences at UC Davis gave a speech celebrating 100 years of service in Kern County. In addition, Mona Carver, Bill Rankin, and Bill Tracy all spoke about the history of UCCE in Kern County and some of the work we have been involved in over the years. By all reports, everyone had a great time and enjoyed their evening. Thank you to all who participated in this event! We were so glad to celebrate with you!

Update on Statewide Grazing Regulatory Action Project (GRAP)

An invitation only listening session was held on November 14 in Sacramento focusing on feedback from academia regarding GRAP. More listening sessions are being planned and are projected to be held in San Luis Obispo, Redding, and Bishop. A representative from the Central Valley Regional Water Quality Board may be presenting more information during the Property Rights and Environmental Management committee meeting at the CCA convention on Friday afternoon.

According to the GRAP factsheet, the goal of GRAP is to "develop regulatory strategies to address water quality impacts from grazing on public and private lands and achieve compliance with water quality standards through implementation of a regulatory program that results in greater efficiency and statewide consistency, while at the same time respecting differences in hydrology, topography, climate, land use, and microeconomics, as well as the cost of compliance for the grazing community. Where grazing is a major source of the impairment, this regulatory strategy could be used to address impairments without the lengthy and costly process of preparing an individual TMDL."

Research Update: Prevalence and Impacts of Genetically Engineered Feedstuffs on Livestock Populations

Van Eenennaam, A.L., and A.E. Young. 2014. Prevalence and impacts of genetically engi neered feedstuffs on livestock populations. Journal of Animal Science. 92:4255-4278

Dr. Alison Van Eenennaam, a UCCE specialist in genetics, recently published the article cited above which focuses on the safety of GE (genetically engineered) animal feed. For this article Alison did a comprehensive review of the scientific literature available regarding GE feedstuffs and the composition of animal products derived from animals fed a GE diet. For clarity, genetic engineering is the deliberate, controlled manipulation of the genes of an organism through the use of biotechnology. The process of genetic engineering is different from traditional breeding techniques and practices. Key points from the article are below:

- "Globally, food-producing animals consume 70 – 90% of genetically engineered (GE) crop biomass"
- "The performance and health of GE-fed animals are comparable with those fed…non-GE crop lines."
- Over 9 billion food animals are produced each year and "more than 95% of these animals consume" GE feedstuffs
- Field data sets that analyzed the health and productivity of over 100 billion animals "did not reveal unfavorable or perturbed trends".
- "Because DNA and protein are normal components of the diet that are digested, there are no detectable or reliably quantifiable traces of GE components in milk, meat, and eggs following consumption of GE feed."

IRS Extends Drought Tax Deferment Deadline

On September 30, 2014 the IRS announced that it had extended the deadline for drought deferred capital gain tax payments a year in acknowledgement of the continued drought in many areas of the U.S. Eligible California Counties include Inyo, Mono, Kern, Kings, Tulare, and Fresno. For a complete list of eligible counties by state please contact Julie at 661-868-6219 or via email at jafinzel@ucanr.edu.

Ask the Advisor

How many ground squirrels does it take to equal one AUM?

First, let me define an AUM. An AUM, or an Animal Unit Month, is the equivalent of the amount of feed needed to support one cow, with a calf, for one month. The cow is generally assumed to be 1,000 pounds. Most cows are larger than that these days, but the calculations can be adjusted for any weight of animal. For simplicity in this case, I will use a 1,000 pound cow. The amount of feed a cow consumes each day varies throughout the year and is influenced by forage availability, her physiological requirements, and more. In this case, we will assume the cow is eating 2% of her body weight for one month.

1,000 pound cow x 0.02 (% of body weight) = 20 lbs of forage consumed each day
20lbs of forage/day x 30 days = 600 lbs of forage/month

So one AUM is equal to 600 pounds of forage. Now we need to know how much a ground squirrel eats each day. I reviewed a couple of journal articles to determine this and the estimates range from 15 grams per day up to 50 grams per day. I calculated daily ground squirrel forage consumption at three levels: 15 grams/day, 30 grams/day, and 50 grams/day. One pound equals about 453 grams. To keep the calculations simple, I'm going to round down and say that one pound equals 450 grams.

15 grams/day x 30 days = 450 grams/month	450 grams/450 grams = 1 pound
30 grams/day x 30 days = 900 grams/month	900 grams/450 grams = 2 pounds
50 grams/day x 30 days = 1500 grams/month	1500 grams/450 grams = 3.3 pounds

According to the calculations above, a ground squirrel could eat anywhere from 1 to 3.3 pounds of forage each month. I found an estimate in one of the articles I read that 200 ground squirrels eat as much as one 1,000 pound steer. Working off of that estimate, and using the numbers above, we can test that theory.

1 lb of forage/month/squirrel x 200 squirrels = 200 pounds of forage/month
2 lbs of forage/month/squirrel x 200 squirrels = 400 pounds of forage/month
3.3 lbs of forage/month/squirrel x 200 squirrels = 660 pounds of forage/month

As you can see from the numbers above, on the higher end of the estimate, 200 squirrels can consume as much as (or slightly more than) one AU in a month. On the lower end of the estimate it would actually take 600 squirrels to consume as much as one cow does in a month. Just like cows, a ground squirrel's forage requirements change throughout the year based on their physiological needs.

Ask the Advisor, cont…

Both of the articles I read pointed out that the highest competition between cows and squirrels for forage resources occurs in early winter, before rapid spring growth. In other times of the year, squirrels are either dormant (winter), there is an abundance of feed, or squirrels are consuming different types of forage than cows.

One criticism of both of the articles is that neither accounted for the forage destroyed by trampling burrowing, etc. of the squirrels. One of the citations in the literature review of Howard, et al., was that 6 male ground squirrels confined to a half acre enclosure decreased potential forage yield by 529 pounds. That estimate brings to mind another question, what would happen if 6 teenage boys were confined to a half acre for a month? Eek!

References used for this article:

Howard, W.E., K.A. Wagnon, and J.R. Bentley. 1959 Competition between ground squirrels and cattle for range forage. Journal of Range Management. 12:3 110-115

Schitoskey Jr., F. and S.R. Woodmansee. 1978. Energy requirements and diet of the California ground squirrel. Journal of wildlife management. 42:2 378-382

How does Pasture, Range, and Forage Drought Insurance Work?

Pasture, Range, and Forage Drought Insurance (PRF) is a federally subsidized drought insurance program administered under the USDA, Risk Management Agency (RMA), and marketed by private insurance companies. In California, PRF is based on 12 x 12 mile precipitation grids that are calculated by a private, third party. The calculations for each grid are made from the nearest three weather stations that meet the required criteria. Precipitation calculations and insurance sales are based on 2 month intervals, for example January to February and March to April. There are a number of options to choose from when purchasing this insurance and your insurance agent can help you decide on the best combination of options for your operation. More information on the program can be found at: http://www.rma.usda.gov/policies/pasturerangeforage/

Insect Pests of Animals : Searchable Pesticide Database

The UC Riverside Veterinary Entomology Extension Laboratory has developed an on-line database of pesticides registered in the State of California for use against arthropod pests of animals. The database can be found at: http://veterinaryentomology.ucr.edu/vet_pesticides.html Website visitors can search by animal commodity for which pest control is needed (e.g. poultry), by type of pest (e.g. poultry mite or house fly), and by application method and formulation. It is expected that animal producers and extension personnel will find this database to be much easier to navigate than the California Department of Pesticide Regulation product search website.

Animal producers may also be interested in other offerings of the ***Insect Pests of Animals*** website (http://veterinaryentomology.ucr.edu/). Visitors can find pest management information for some ectoparasite pests of poultry, cattle, and other animals. We are adding information on additional pests every few months so be sure to check back to see what has changed. We also maintain a Blog (http://veterinaryentomology.ucr.edu/blog/) that producers and extension personnel may be interested to follow. Information shared through the Blog includes recent findings related to pest management in animal facilities or of general relevance to animal producers, extension personnel, and researchers.

Finally, animal producers may be interested in taking a look at the many web links provided in our "other resources" section. In particular, there are links for producers to submit animal management questions to the national eXtension program through their "Ask an Expert" program. Experts from universities, extension offices, private industry, and other relevant organizations are registered with this national eXtension program to answer submitted questions or to provide question writers with guidance to address their questions.

If you have comments about or suggestions for the ***Insect Pests of Animals*** website, please send them to:

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Dwarf Calves—What are they and why do they Happen?

Some purebred producers in the state are seeing dwarf calves. Dwarf calves can be one of three varieties snorter dwarfism, long head dwarfism, and compress dwarfism. Snorter dwarfism causes a short, blocky appearance with deformed bone growth in the nasal passages, which causes difficulty breathing and is inherited via a simple recessive gene. Long-head dwarfism causes small size, but does not affect the nasal passages. Long-head dwarfism is also inherited via a simple recessive gene. Compress dwarfism is inherited as incomplete dominance. An individual with one normal gene and one compress gene has an extremely compressed body conformation. Two compress genes in an individual is usually lethal.

With all this talk about recessive genes (and their converse…dominant genes) a short lesson on genetics seems in order. In the chart below, the capital "D" represents a dominant gene and the small "d" represents a recessive gene. The chart is a basic representation of what happens when two animals are bred and can be read much like a multiplication table. If one parent has the genes "Dd" and the second parent also has the genes "Dd", the potential genetic outcomes are shown below. Each shaded box represents a 25% chance that the offspring of the cross will have that combination of genes. The chart below is a simple representation of how genes interact to create new individuals, not all genetic interaction can be represented so simply.

	D	d
D	DD	Dd
d	Dd	dd

The following is an excerpt from an article written by Dr. Alison VanEenennaam that provides more information on genetic defects as well as a review of some basic genetic concepts.

What is a genetic defect?

Chromosomes inherited from parents determine an animal's genetic make-up. Chromosomes come in pairs, one chromosome from each pair is inherited from an individual's sire and the other chromosome is inherited from its dam. There are many genes in each chromosome. Genes are the basic unit of inheritance and they comprise a distinct sequence of DNA that contains all of the instructions for making a protein. It is possible for the DNA sequence that makes up a gene or "locus" to differ between individuals. These alternative DNA sequences or forms of a gene are called alleles, and they can result in differences in the amount or type of protein being produced by that gene among different individual animals. A single nucleotide polymorphism or SNP (referred to as "snip") is where alleles differ from each other by the sequence of only a single nucleotide base pair. It is important to understand that these differences between individuals occur because of mutations in the DNA sequence and these variations provide the basis for selection

cont. on pg. 8...

Dwarf Calves, cont...

programs and genetic improvement. Mutations are not always associated with decreased fitness, and in fact mutation is the driving force of adaptive evolution. Mutations are a relatively common occurrence, and it has been estimated that the average human carries approximately 1,000 detrimental SNP mutations.

A genetic defect is basically a mutation that results in an allele with an undesirable phenotype. Some mutations result in gross hereditary defects such as abnormalities in skeleton, body form, and body functions. Others as associated with a phenotype that may be advantageous in some situations and disadvantageous in others (e.g. presence or absence of horns). Homozygous is a term used to refer to an animal carrying two identical alleles of a gene, and heterozygous is a term used to describe an animal carrying two different alleles of a gene, one inherited from each of its parents. Alleles can be recessive, meaning that an animal must inherit the same allele from both parents (i.e. be homozygous) before there is an effect, additive meaning that the effect is proportional to the number of alleles inherited by the animal (i.e. carrying two copies of a particular allele produces double the effect of carrying one copy), or dominant meaning that the inheritance of a single dominant allele can completely mask the expression of the allele inherited from the other parent. Coat color is an example of trait with complete dominance where black coat color (BB) is completely dominant to red coat color (bb). Crossing a homozygous dominant "BB" black bull to a homozygous recessive "bb" red cow will result in all heterozygous black "Bb" offspring.

Many genetic defects are recessive, and the reason for this is that mutant alleles often render the resulting protein nonfunctional. In many cases if an individual inherits a functioning allele of a gene from one parent, there is no phenotype associated with inheriting the nonfunctional mutant allele from the other parent. As such a heterozygous "Aa" animal, or carrier, appears normal. It is only when two carriers mate that they have the possibility of producing offspring that have by chance inherited both of the non-functional alleles from their parent.

Genotyping refers to the process of using laboratory methods to determine which alleles an individual animal carries, usually at one particular gene or "locus" in the genome. The genotype identifies which alleles an animal carries. The DNA lab will need to receive a sample of DNA from the animal you wish to test. Because all cells contain DNA, it is possible to genotype many different tissue types. Laboratories may differ in their preferred sample type. Typical samples include blood vials or cards, semen, and tail hair samples. It is important that tail hair samples include the roots – ideally 30-50 hairs with intact roots. There are videos on sampling DNA from cattle tail hair at https://www.youtube.com/watch?v=P3G-TYD5Uo8; and using an FTA blood card at https://

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Antibiotic Resistance Update: FDA finds positive and negative resistance trends

In August, the Food and Drug Administration (FDA) released its 2011 National Antimicrobial Resistance Monitoring System (NARMS) Executive Report. The report focuses on resistance to antibiotics that are considered important in human medicine as well as multi-drug resistance, which is describe as resistance to three or more classes of antibiotics. Under the NARMS program bacteria samples are collected from humans, food producing animals, and retail meat sources, and then tested for resistance to a variety of antibiotics. NARMS establishes trends in antimicrobial resistance among foodborne bacteria. Key findings from the NARMS report include:

- 85% of non-typhoidal Salmonella collected from humans had no resistance to any of the antibiotics tested
- In people, the five drug resistance patterns have declined to 19.5% in 2011 from a peak of 35.1% in 1997
- During its 16 year history, NARMS has found Salmonella resistance to ciprofloxacin, an antibiotic commonly used to treat Salmonella infections, to be very low
- Multi-drug resistance in Salmonella was the lowest since NARMS testing began
- Campylobacter resistance to ciprofloxacin, an antibiotic in the fluoroquinolone class, increased slightly in humans since 2005
- Resistance to third generation cephalosporins, an important drug class for treating Salmonella infections, rose in turkeys from 2008 through 2011, and in cattle between 2009 and 2011. In April 2012, the FDA prohibited certain uses of cephalosporin drugs in cattle, swine, chickens, and turkeys

Dwarf Calves, cont...

www.youtube.com/watch?v=490nI9ExR8c. If you are sampling DNA from a deceased animal call the testing laboratory to determine the best protocol. It is important to get a good quality sample to ensure the DNA test will be able to generate results. The cost of testing varies depending upon the company and how many tests are performed but ranges from $10-40/test; with an average of ~$25/test. Irrespective of carrier animals in its pedigree, an animal that has been tested and found to be a non-carrier did not inherit the mutant allele and will not transmit the genetic defect to its progeny.

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