RANGE BULLETIN

Livestock & Natural Resources Newsletter

In this issue:

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News Briefs

Public Meeting Announcement

The Central Valley Regional Water Quality Control Board will be holding a meeting to discuss nonpoint source pollution permits on federal lands on Thursday, November 30, at the Clovis Veterans Memorial District, 808 4th St, Clovis. The meeting begins at 9:30AM.
For more information, visit **https://www.waterboards.ca.gov/lahontan/water_issues/programs/nps/federal_lands/**
Or **https://www.waterboards.ca.gov/centralvalley/press_room/announcements/2017_0919_nps_forest_notice.pdf**.
Please plan to attend the meeting if you lease or otherwise use federal lands! This is the best opportunity to offer feedback on a permitting process that could impact grazing, timber harvest, stream crossings, and fire management on Forest Service and Bureau of Land Management lands.

In development: ranch economics meeting

UCCE livestock and natural resource advisors in the southern San Joaquin Valley are planning to hold a discussion meeting with the new agricultural and resource economics specialist for UCCE, Tina Saitone, in early 2018. Stay tuned for more details! If you would like to suggest topics for the discussion with Tina, send them to Rebecca Ozeran, Livestock and Natural Resources Advisor in Fresno and Madera.

Wacky Weeds

Fig trees present an unexpected challenge

A landowner called the Extension office with a unique situation: fig trees, whose roots threatened to damage the ranch's water infrastructure. What could be done?

As a livestock and natural resources advisor, I don't expect to get questions about fruit trees such as figs. As it turns out, I recently needed to know just enough about figs to provide information on how to kill them.

Here's the big question: Why and how are we getting figs on rangelands in Fresno County? And why does it matter?

To begin, Fresno County used to have several thousand acres of cultivated figs (nearly 13,000 ac in 1966, but less than 7,500 ac as of 2016), so there are many places in the county where volunteer figs can be seen sprouting, including in newer subdivisions where fig orchards used to be, e.g. the "Fig Garden" region of the city of Fresno. Landowners also may have decided to plant figs on their rural properties as a source of fresh fruit and/or shade, and once established, the figs were able to reproduce and spread. Although fig populations seem to grow slowly in new areas, figs have invaded riparian and other natural areas throughout California's Central Valley – at least as far north as Yolo, Butte, and Tehama Counties – and the trees can be tough to control once established.

Of course, if fig didn't cause any problems where it grew in these natural areas, we wouldn't be talking about it today. Unfortunately, fig is capable of displacing native plants and forming thick clusters of fig where nothing else can grow, often in riparian areas. This is problematic for livestock owners, since grazing animals don't find fully grown fig trees appetizing. This can also be bad news for the biodiversity found in riparian areas, as figs become a monoculture. In addition, fig tree clusters decrease ground cover from litter (fallen leaves, grass stems, etc.) which means the fig-dominated areas have more bare soil than grassy or shrubby areas.

This article continues ▶

Weeds cont'd

Trees also tend to evapotranspire more water than herbaceous plants like grasses, so they can actually take more water from stream systems and cause lower stream water levels. Between the lower water levels and the higher exposed soil, water quality may decline as more soil erodes into the smaller volume of water; the overall concentration of soil particles in the water is much higher than it would have been prior to fig invasion. The murkier, shallower water might pose a threat to the survival of some aquatic animals which require certain water temperature, clarity, or depth. Lastly, there is the threat fig roots pose to water infrastructure (pipelines) as seen by the landowner who contacted me. Figs have a strong root system and can cause damage to belowground infrastructure if it is within their root zone.

All of those consequences should help illustrate why someone might consider fig a weed. When I reached out to the UC Weed Workgroup for advice on this subject, several members provided great information which I will briefly summarize.

Mechanical treatments are impractical, because fig can create new sprouts from cut stumps, stems, and roots. The sprouts would then require a repeat treatment, which is not always feasible. Applying glyphosate (e.g. Roundup) to the leaves is not effective; more effective treatments are cut stump or basal bark applications of various herbicides, including combinations listed in the informative *Weed Control in Natural Areas*. Based on the book, very little is known about the efficacy of many herbicide treatments on fig itself, and treatment recommendations are based on their use in other species. Only triclopyr (e.g. Garlon 4) has been tested explicitly on fig. Triclopyr is particularly effective when applied as a basal bark treatment. Alabama's Cooperative Extension Service created a great resource explaining basal bark treatment, and you can download the document here. The image on the following page also shows an example of basal bark herbicide application.

One member of the workgroup, Dr. Kerri Steenworth of USDA-ARS, referred me to Dr. Katherine Holmes, a restoration ecologist who is currently Assistant Executive Director of Solano County RCD and Chair of Solano County Weed Management Area. Dr. Holmes has investigated riparian and rangeland restoration connected to fig tree invasion in California's Central Valley. When I spoke with Dr. Holmes, she confirmed that triclopyr basal bark treatments have been the most effective in her experience.

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Weeds cont'd


DAVID R. JACKSON

She has never attempted stem injection or cut stump application on figs but hypothesizes that the strong sap flow would likely reduce the effectiveness of injected herbicide, and that the root system of cut and treated stumps may still be able to create new stems. Dr. Holmes suggested coating the basal 6 to 8 inches of the fig trunk with a mixture of 75% Hasten (a surfactant) and 25% Garlon 4 (triclopyr), as long as the tree isn't in or near water. Basal bark treatments require that the tree is still alive for long enough time that the herbicide distributes throughout the tree's vascular system, so you may want to wait until the tree is visibly dying before you begin any mechanical removal.

NOTE: Garlon 4 is not labeled for use in areas where it can get into streams or other surface water, and it may contaminate groundwater if the soil has a shallow water table. Alternative triclopyr-based herbicides may be labeled for use in these areas; always read and follow pesticide labels.

Fig trees are an unusual weed issue I didn't realize we had until this question came up. Fortunately, there seems to be an effective solution available. More research on treating this species as a weed could be valuable, since fig production is in decline in Fresno County and fig invasion may continue in natural areas.

If you have additional questions about weedy fig control in Fresno and Madera Counties, let us know! Contact Rebecca Ozeran, Livestock & Natural Resources Advisor at (559) 241-6564 or Kurt Hembree, Weed Management Farm Advisor at (559) 241-7520 for Fresno and Madera County weeds.

Editor's note: This is not a specific endorsement of Garlon 4 nor does the omission of other specific trade names reflect the view of the author. Refer to your local chemical dealer or manufacturer for specific herbicide products available.

Ask the Advisor

by Julie Finzel and Brad Hanson

I need to spray some weeds in my pasture…when is it safe to let the animals graze again?

This is a fairly common question as this information isn't always easy to locate on product labels. It's important to follow all label guidelines when applying herbicides or pesticides as it is required by law. The safety of post-spray grazing and recommended 'no-graze' times will vary based on the herbicide used and the type of livestock that will be grazing.

Most frequently, the herbicide being applied is a post-emergent broadleaf herbicide, however, there are instances where a post-emergent, non-selective herbicide might be used, or even a pre-emergent broadleaf herbicide. The guidelines for some of the most commonly used herbicides labeled for pasture use are reviewed below. Most grazing restrictions are related to lactating dairy animals and hay harvesting, however, some herbicides do have grazing restrictions for non-lactating dairy animals. In most cases a trade name is provided in addition to the chemical name of the active ingredient. This is not intended to be a guide for how to control weeds in your pasture, rather this is a resource for grazing restrictions post-herbicide application. If you have questions about weed control in your pasture or you are planning to use an herbicide not listed below and you would like more information, please contact your local UC Cooperative Extension Livestock and Range Advisor.

2,4-D. Most labels indicate a 7 day restriction for dairy animals, a 3 day restriction between grazing treated pasture and slaughter of meat animals, and 7 days between application and harvest of grass hay. No restrictions were listed for other classes of animals.

Aminopyralid (Milestone). No restrictions on grazing or hay harvest, however, cut foliage should not be used as a mulch.

Clopyralid (Transline). No restrictions on grazing or hay harvest, however, cut foliage should not be used as mulch.

Dicamba. Restrictions vary based on application rate and formulation, read the label carefully before applying the herbicide to determine which restrictions apply to your product.

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Ask the Advisor cont'd

Dicamba cont'd. Grazing restrictions for lactating dairy animals can be 7-40 days before grazing and 37-70 before hay harvest. No grazing restrictions for non-dairy animals.

Fluroxypyr (Vista XRT). No grazing restrictions for livestock, wait period of 7 days before hay harvest required. There is a 2 day restriction between grazing treated pasture and slaughter of meat animals.

Glyphosate (Roundup). At the rate of 2 qts/acre or less, no waiting period is required for any class of livestock or for hay harvest. Above 2 qts/acre livestock must be removed before application and the waiting period is 8 weeks before grazing or harvesting hay.

Triclopyr (Garlon). Lactating dairy animals should not be grazed until the next season. Slaughter animals – 3 day restriction. Hay harvest requires a 7-14 day restriction depending on the label. No other grazing restrictions.

IMPORTANT: Instructions, grazing and haying restrictions, and application rates vary from product to product. It is critical to follow label directions for your chosen product precisely in order to be within legal requirements and to ensure the safety of people and livestock exposed to treated areas.

Warning on the Use of Chemicals

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock. Consult the pesticide label to determine active ingredients and signal words.

Pesticides applied in your home and landscape can move and contaminate creeks, lakes, and rivers. Confine chemicals to the property being treated and never allow them to get into drains or creeks. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash or pour pesticides down sink, toilet, or outside drains. Either use the pesticide according to the label until the container is empty, or take unwanted pesticides to a Household Hazardous Waste Collection site.

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Ask the Advisor cont'd

Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

Editor's note: Julie Finzel is a Livestock and Natural Resources Advisor in Kern, Kings, and Tulare Counties. Brad Hanson is a Weed Specialist based at UC Davis.

Opinion: Models Help Us See The Big Picture of Sustainable Agriculture

by Holland C. Dougherty

As human population and per-capita income increase, demand for meat has also increased. At the same time, millions of people worldwide are food insecure, and with the environmental impacts of existing food production systems already under public and regulatory pressure, the big challenges for today's animal scientists are how do we make sure people have access to affordable, nutritious food now while minimizing the environmental impacts, both now and in the future? How do we calculate the impacts of what farmers are already doing, and see how different management strategies affect economics and the environment? These are the questions my work, and that of my colleagues in modeling of sustainable agriculture, are trying to answer.

First off, what is sustainable agriculture? The USDA defines sustainable agriculture as "*an integrated system of plant and animal production practices having a site-specific application that will, over the long term:*

satisfy human food and fiber needs;

enhance environmental quality and the natural resource base upon which the agricultural economy depends;

make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;

This article continues ▶

Opinion cont'd

> *sustain the economic viability of farm operations; and enhance the quality of life for farmers and society as a whole."*

In other words, sustainable agriculture works to feed the current population, while ensuring that future generations benefit from a stable food supply and a healthy environment. Because of their ability to analyze and synthesize large amounts of data from a wide variety of sources, agricultural models are one of the best tools available to scientists interested in sustainability.

To see how we can improve in the future, we need to know how we are doing right now, both on the individual animal level and on the whole-system level. My research, and that of my colleagues, integrates knowledge from both levels to help producers and regulatory agencies understand the impacts of current systems as well as the effects of proposed changes. This saves time and money by informing decisions on how to balance the environmental and economic aspects of agriculture to benefit producers and consumers. Both levels of modeling are necessary to understanding agricultural systems: animal-scale models can predict the performance of the average animal in a herd in a given production system, which helps producers decide how best to achieve their production goals. When that is combined with a larger framework that looks at the whole system, from animal emissions, to fuel used to bring feed to the farm, to energy used to create consumer-ready products, to it allows us to identify and target environmental impact hotspots where money and effort can be best invested.

Animal-scale models exist for many different species of livestock, and a specific type of system-level modeling, life cycle assessment, has been used to study a wide variety of products, such as beef, yogurt, almonds, and even wine! Life cycle assessment is an interesting method because it allows for the assessment of a wide variety of environmental impacts, such as carbon footprints, water use, global warming potential, and air and water pollution. When this is applied to animal agriculture, it allows us to combine animal -level models of resources needed by the animal with the larger impacts of that resource use, and of how wastes and byproducts are handled. This can be done on a national level, but can also be used to study production in a specific region or market chain, such as my current research analyzing the carbon footprint of sheep production in California.

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Opinion cont'd

One of the next big areas to explore with these models is in creating a more holistic assessment of the system being studied, an area where researchers are already making great progress. For example, grass-fed stages of ruminant meat production can contribute significantly to the overall carbon footprint of a product, both because of slower weight gain and because more methane is produced from fiber-rich feeds like native grasses than from higher-starch diets like you would see in a feedlot.

However, ruminants provide many benefits to native rangelands, such as grazing invasive species to prevent their spread and reducing plant matter that could become a fire hazard. Many rangelands cannot produce human-edible plants without high quantities of economically and environmentally expensive inputs, which would destroy the native ecosystems. By producing sheep and cattle, the long-term health of these systems is protected while contributing to the overall food supply, promoting agricultural sustainability.

Models are an important part of sustainability research, allowing researchers to combine large amounts of data to predict not only the impacts of current systems, but to allow us to build a better future by identifying which production and management strategies are most likely to be effective. By combining animal-scale models to predict the impact of changes for the average animal in a herd with system-level models to see the large-scale impacts of these changes, producers and regulators can work together to protect the environment while still producing a stable, sustainable food supply.

Photo Credit (cattle photo) Dr. Ken Tate, UC Rangelands
Photo Credit (sheep photo) Dan Macon, UC Cooperative Extension

Editor's note: Holland Dougherty is a PhD student at UC Davis.

Review article: protein supplementation strategies to improve ranch profitability

by Matthew Shapero

Your cows will usually need some degree of protein supplementation to carry them through the dry season here on the Central Coast [and Central Valley]. In one common practice, you're putting out protein tubs or liquid supplements starting in the summer when the grasses begin to dry and transitioning to hay in the fall and winter when what green feed that does come up is washy.

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Protein cont'd

Of course, both of these strategies are meant to compensate for the lower than sufficient levels of crude protein (CP) available in the annual grasses that we find on our region's rangelands from summer through winter.

It is assumed that this protein supplementation improves herd productivity by **improving reproductive efficiency and increasing calf growth**. The existing scientific literature, however, is surprisingly unclear about exactly how supplementation benefits mother cows or their calves. In an effort to clarify the mechanisms behind supplementation, researchers out of UC Davis conducted a five-year study that examined typical ranch supplementation practices and how they affected cattle grazing on Mediterranean-influenced California rangelands. More specifically, the researchers were interested in the long-term effects of both supplementation and stocking rate on **pregnancy rate, calving interval, birth weight, weaning weight, live weight, body condition, and backfat**—factors that fundamentally drive ranch profitability. From my discussions with you out on your ranches thus far, it seems as though pregnancy rate and calving interval in particular have been seriously impacted by the recent multi-year drought.

The experiment was conducted at one of the two research ranches that the University of California system operates—Sierra Foothill Research and Extension Center. The facility is a 6,000-acre working ranch in the Sierra Nevada foothills east of Sacramento. There, the researchers separated 260 British breed cows into three treatment groups: control, standard supplementation, and strategic supplementation. Each treatment group was then separated into high stocking rate and moderate stocking rate groups (see Box 1). The control group received no supplementation at all. The standard supplementation group was designed to mimic common supplementation practiced on California range by supplying protein when the available standing forage was inadequate to maintain body condition. Cows in this group had access to protein tubs from approximately mid-August until mid-November (average intake 2.7 pounds/day, 35% CP) at which point they were fed alfalfa hay until late February (average intake 6.95 pounds/day, 12% CP). And cows in the strategic supplementation group were examined periodically; those with a body condition score (one to nine scale, nine being fat) greater than 5.5 were placed with the control group (no supplementation) and cows with a body condition score less than 5.5 were placed with the standard supplementation group.

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Box 1. Stocking Rates

In the UC Davis study, the **heavy** stocking rate equated to 1 cow/acre; cows were moved when they had grazed the pasture down to 645-825 pounds/acre of residual dry matter (RDM). In the **moderate** group, cows were stocked at 0.75 cows/acre and were moved once they had grazed down to 825 pounds/acre RDM. **RDM** is old plant material left standing or on the ground at the beginning of a new growing season (measured in October). It indicates the combined effects of the previous season's forage production and consumption by grazing animals. See the UC publication "California Guidelines for Residual Dry Matter (RDM) Management on Coastal and Foothill Annual Rangelands" for an explanation of how long-term management of RDM can affect range health.

Protein cont'd

The basic idea behind the strategic supplementation group was to see if cows that maintained good body condition throughout the production year could adequately breed back and raise a healthy calf without supplementation. If they did, ranchers could save a considerable amount per animal on the direct costs of supplementation.

The results from the study are complex. With so many production variables (supplementation regime, age of cow, stocking rate), it was a difficult task to tease apart all the effects on pregnancy rate, calving interval, birth weight, weaning weight (205-day weight), live weight, body condition, and backfat. But let me share with you some key findings:

Pregnancy rates: fall-calving cows without supplementation maintained their ability to re-breed so long as forage supply was adequate (i.e. under moderate stocking); however, if forage supply was low (i.e. under heavy stocking or drought) supplementation was required. **On good forage years or in pastures that are conservatively stocked, protein supplementation is not required to maintain pregnancy rates in your mother cows.**

Calving interval: both the standard and strategic supplementation program served to decrease the calving interval (by 5 and 4 days, respectively); **making a protein supplement available to your cows with low body condition, you can significantly shorten the calving interval in your herd.**

Weaning weight: the effect of supplementation on weaning weight was unclear; stocking rate, however, significantly affected 205-day calf weights. **Conservative stocking, more so than a supplementation program, ensures high weaning weights in your calves.**

Adequate reproduction (pregnancy rates) and weaning weights are the two most important factors in determining profitability in the cow-calf operation. This UC Davis study shows that nutrition modification can be used to alter herd performance, and hence ranch economics (see Box 2). Here are some key take-aways:

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Protein cont'd

It is critical to supplement your cows with protein to maintain pregnancy rates when forage is limited (low rainfall year or heavy stocking rates). There is no difference in pregnancy rates between cows that have sufficient forage and those that are supplemented (i.e. when it comes to pregnancy rates, you can compensate in low forage years with a protein supplementation).

Cows supplemented based upon body condition ("strategic" supplementation) had similar calving intervals and gave birth to calves with similar 205-day weights as cows that were supplemented based upon forage quality or quantity (standard supplementation).

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Box 2. The Economics of Strategic Supplementation

How much you'll save transitioning to a strategic supplementation program depends on the current market price for the different forms of crude protein. When compared to standard supplementation, the UC Davis study found that strategic supplementation resulted in 18.5%, 54.2%, 96.6% of animals being supplemented from August to calving (mid-October), calving to breeding (Dec 1), and breeding to late February, respectively.

Using average daily intakes from the UC Davis study and pulling prices from a 2008 UC Cooperative Extension cost-study analysis, "Sample Costs for Beef Cattle," a hypothetical 40-cow cow-calf herd on the Central Coast would have the following costs, assuming protein tubs are $0.50/lb. and alfalfa hay is $0.10/lb.:

With standard supplementation, your herd is consuming:

6,480 pounds of block from mid-August to calving (162 lbs./cow) = $3,240
3,240 pounds of block and 4,170 pounds of hay from calving to breeding (Dec 1) = $2,037
and 25,020 pounds of hay from breeding to the end of February = $2,502

Total $7,599

With strategic supplementation, you herd would be consuming:

$3,240 (6,480 lbs of block) x 0.185 (the percent of cows being supplemented) = $599
$2,037 (3,240 lbs of block and 4,170 lbs of hay) x 0.542 = $1,104
$2,502 (25,020 lbs of hay) x 0.966 = $2,417

Total $4,120

Strategic supplementation would save you $3,479, which would be the equivalent of four extra 500-pound steer calves sold at auction this month.

Protein cont'd

In other words, strategic supplementation achieves similar production results and yet leads to fewer cows who need protein supplement (for example, between August and calving in late October, only 19% of cows required supplementation based upon body condition). This new supplementation program provides a method to decrease production costs while maintaining herd performance. With that said, sorting and separating mother cows based upon body condition and running them in different supplementation regimes presents some logistical difficulties. This program will only work if you have sufficient pastures and/or time to manage your breeding herds separately.

When it comes to ranch profitability, there is always a crucial tradeoff between how many cows you run per acre, their rate of successful pregnancy, calf weights at weaning, and protecting the range resource. You may find that running cows at more moderate stocking rates without supplementation and producing calves with higher weaning weights ends up being less profitable than running cows at elevated stocking rates, paying for supplementation, and producing more calves (per acre) that may have lower weaning weights. I would encourage you to experiment with the findings from this study and incorporate the practices that fit best your production system.

If you would like to read the original research article, I would be happy to provide it. Send me an email [mkshapero@ucanr.edu] or come by the office in Ventura. Here is the article's citation: Renquist, B. J., Oltjen, J. W., Sainz, R. D., Connor, J. M., & Calvert, C. C. (2005). Effects of supplementation and stocking rate on body condition and production parameters of multiparous beef cows. Animal Science, 81(03), 403-411.

Editor's note: Before you make any major changes to the diet of any of your animals, be sure to consult your veterinarian. Matthew Shapero is a Livestock and Natural Resources Advisor in Ventura and Santa Barbara Counties.

If you would like to see a particular topic in this newsletter, let us know! Contact Rebecca Ozeran with your suggestions.

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http://ucanr.edu/2017needs

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