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Euthanasia (Humane Killing) of Cattle with a Firearm

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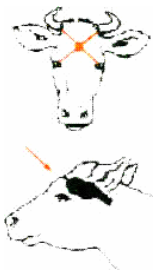
Personnel who routinely work with livestock or transport cattle should be trained to carry out emergency euthanasia. Protocols for routine and emergency euthanasia should be developed for different ages of cattle.

Selecting the correct firearm is important. A .22 caliber hollow or soft point bullet is sufficient for young animals; however, larger mature cattle require at least a .22 magnum solid point bullet or preferably a 9 mm or .357 caliber bullet. The point of entry in cattle should be in the center of the forehead, at the intersection of two lines drawn from the inside corner of the eye to the base of the opposite horn (slightly above the ear in polled cattle)– not between the eyes. The firearm should be held perpendicular to the skull and within 2-10 inches from the point of intended impact. Do not place the firearm directly against the head.



If performed properly, gunshot induces instantaneous unconsciousness, is inexpensive, and does not require very close contact with the animal. Operators should be aware that there is potential for ricochet with the use of firearms, and some laws or regulations may prohibit the discharge of firearms in certain locations.

Confirmation of death is crucial. Operator safety is an important consideration when confirming death, since the animal may make unexpected body and limb movements. The lack of a heart beat, respiration, and corneal (eye) reflex can be used to evaluate unconsciousness. Death is confirmed by the lack of a heart beat and respiration for a period of more than five minutes. Additional euthanasia procedures should be initiated if there is evidence of responding vital signs.

Local county regulations govern carcass disposal. To determine who the appropriate contact is in your county, contact either the UCCE office, agricultural commissioner or county environmental health office.

More information on humane euthanasia of cattle can be found online at: http://www.aabp.org/resources/euth.asp

Livestock Compensation Program

Joe Gassaway, County Executive Director
USDA Farm Service Agency

The USDA Farm Service Agency is currently accepting applications for the Livestock Compensation Program in most California Counties. This program is designed to help compensate livestock owners for some of their increased costs that were incurred due to natural disasters in 2005, 2006 or 2007.

Key Eligibility Issues:
- Livestock must have been in an eligible county on the start date of an eligible Secretarial Disaster Declaration. (Shasta is 12/17/2005 or 1/1/2006 or 1/1/2007, dates vary by county.)
- Non-Irrigated grazing lands in the same county were impacted by the eligible disaster condition.
- Livestock were part of a commercial livestock operation.
-Must select a single year for benefits, in Shasta you may select either 2006 or 2007.

Items to bring to your appointment:
- Deed, leases, and parcel maps for all non-irrigated grazing land in your operation for this county.
- Livestock inventory as of the start date of the eligible disaster condition.
- Entity documentation for your partnership, corporation, LLC or trust.

Call your FSA office for an appointment:

Shasta 530-226-2568
Lassen 530-257-4127
Tehama 530-527-3013
Glenn 530-934-4669
Siskiyou 530-842-6123
Trinity 530-226-2568
Modoc 530-233-4391
Butte 530-534-0112
Sutter/Yuba 530-671-0850

Summary of Selenium, Copper and Zinc Status for Beef Cattle in Northern California

Larry Forero, Livestock Farm Advisor UCCE Shasta, Dan Drake, Livestock Farm Advisor UCCE Siskiyou, and Glenn Nader, Livestock Farm Advisor UCCE Sutter-Yuba [1]

Many ranchers are asking what they should provide in the way of minerals for their animals. The best way to know what to supplement is to work with your veterinarian to test your animals. This article summarizes what is known about these minerals in California and includes summary data by county.

Selenium

Selenium (Se) was identified as an essential nutrient for beef cattle in the late 1950's. Prior interest in Se concerned cattle receiving too much Se. In the last thirty years more problems with Se deficiency, than excess, have been identified worldwide. Both problems tend to be regional or localized conditions. Deficiencies or excesses occur when cattle diets are composed only of Se deficient or excess feeds. This is common when cattle are on a single source of feed, such as hay from a deficient source or pasture irrigated with excess Se in the water and/or soil. Se deficiency is frequently observed on soils of volcanic origin. Se deficiency should always be suspected on volcanic soils.

Se does cross the placenta and newborn calves will have higher Se levels than their dams. Calves from Se deficient cows or Se marginal cows become deficient fairly soon (before 5 months of age). This is because Se is not efficiently transferred through the milk. Cattle can become Se deficient in 30 to 45 days following Se supplementation by injection or changing to Se deficient feeds.

A sign of Se deficiency in beef cattle is a disease that affects the heart muscle that results in a condition commonly called white muscle disease. In this disease, white sections are observed in heart muscle. Rough hair coats, general “ill thrift” as well as lameness and/or death can also occur with Se deficiency. Reduced feed efficiency has also been identified with inadequate Se. Due to effective diagnostic and supplementation methods, Se deficiency can be identified and economically corrected. Test by collecting whole blood and analyzing for selenium. Table A outlines threshold values for deficient, marginal and adequate levels (herd averages).

	Blood Level	Symptoms
Deficient	<0.05 ppm	White muscle disease, retained placenta, poor gain, reduced feed efficiency, poor immune response, scours
Marginal	0.05-0.08 ppm	
Normal	>0.08 ppm	

Long-term whole blood Se levels of 2.0 ppm have not been excessive but due to possible antagonisms with other trace minerals, whole blood Se levels are ideally not above 0.40 ppm.

Cattle should be supplemented when blood Se levels are below 0.08 ppm. Selenium supplementation option includes injectible selenium (Bo-Se or MuSe are some tradenames), mineral mix (various suppliers) and bolus (CCA). If you are using a mineral mix, annually review the label to make sure the product formulation is appropriate for your situation. Work with your veterinarian to develop the best program for your operation. Potential harm to wildlife and the environment will be avoided by using all Se products according to label directions.

Copper

Copper (Cu) is a trace mineral required in the diet of beef cattle and is the second most common cattle mineral deficiency worldwide. Because Cu is involved in numerous roles in the body, a variety of symptoms occur when Cu is low in the diet. The classic example is lack of color in normally colored livestock: "bleached-out" Herefords and gray color in black cattle. Cattle may have inadequate levels of Cu without these classic symptoms. Bone fractures and/or weak bones may be seen with low dietary Cu. Delayed shedding-off of winter hair coat has been reported in Cu-deficient cattle. A distinct diarrhea may indicate high molybdenum levels, which makes Cu less available and thus deficient when dietary Cu levels are adequate. Due to Cu's essential role in numerous body functions, supplementation efforts for Cu deficient cattle are usually beneficial.

Diets low in Cu result in cattle with primary Cu deficiency. When molybdenum or sulfur levels are high, they impair Cu absorption and will result in secondary Cu deficiency in cattle even when forage Cu levels appear adequate. Primary Cu deficiency can cause infertility and/or diarrhea syndromes. Secondary Cu deficiency can also cause infertility or diarrhea; however, infertility due to secondary Cu deficiency (excess molybdenum and/or sulfur) may not respond to Cu supplementation.
Copper intake should be 5 to 8 times molybendum intake, but should not exceed 50 ppm of the total diet. When sulfur concentration of the diet exceeds 0.2 percent, Cu should be increased in the diet. Water, usually well water or hot springs water, may have substantial amounts of sulfur that reduce availability of Cu. Copper deficiency is usually seen on severely leached soils and on alkaline soils due to high molybdenum causing reduced Cu availability. Water from alkaline soils is more commonly high in sulfur, which may add to interference.

Copper levels can be determined using either blood serum or liver biopsy. Liver biopsy of a live animal needs to performed by a veterinarian. Serum Cu levels are not able to accurately predict Cu levels in the liver nor overall status, articularly deficiency. Table B outlines normal Cu levels.

Table B. Adequate levels of Cu for both serum and biopsy assays (herd average)

Serum	0.80-1.5 ppm
Liver Biopsy	100 ppm (dry)

Diets containing 4 to 10 ppm Cu are usually adequate. High dietary molybdenum (5 to 6 ppm dietary molybdenum) or high sulfate levels will decrease Cu absorption or availability and necessitate higher dietary Cu levels. In some cases of high molybdenum, serum Cu levels will be normal but Cu deficiency occurs. In those cases, additional cooper supplementation is required to overcome inference by high molybdenum levels.

Both Cu and zinc status in serum and liver has been found to vary among cattle breeds. Limousin cattle have been found to have higher liver Cu levels than other breeds, and Cu deficiency occurs more frequently in Simmental and Charolais cattle compared to other breeds.

Precautions

Excess Cu can be harmful. Cattle have a range of acceptable Cu levels. Salt mixes containing up to 0.7 percent Cu have been fed without apparent problems. However, sheep cannot tolerate high levels of Cu and have a much smaller range of tolerable Cu levels. Sheep exposed to Cu levels for cattle may develop Cu toxicity. Therefore, Cu supplemented salt for cattle should not be made available to sheep. Copper sulfate (bluestone) can also be harmful to fish at high concentrations. Undiluted Cu sulfate should therefore be protected from mixing with water or entering water supporting fish.

Zinc

Zinc (Zn) is an essential trace mineral for cattle. Only small amounts are stored in the body so diets that are deficient in Zn will rapidly lead to deficiency. Inadequate Zn results in reduced weight gains, slower wound healing, increased foot problems and impaired reproduction in bulls and cows. Other signs of deficiency may include listlessness, itching (especially on the neck, head and legs), vision impairment and excessive salivation. Some feeding trials have also reported improved udder health and carcass characteristics. Deficiencies are difficult to detect in early stages or milder forms.

Zn levels can be determined using either blood serum or liver biopsy. Liver biopsy of a live animal needs to performed by a veterinarian. Table C outlines normal levels found using both methods.

Table C. Adequate levels of Zn for both Serum and Biopsy Assays (herd averages)

Serum	0.80-1.4 ppm
Liver Biopsy	35-100 ppm (wet)

Excessive supplements with Zn have been found to lower copper (Cu) status. Thus, whenever Zn is supplemented, Cu status should be monitored. If Cu levels are marginal before Zn supplementation, it is possible that Cu will become limiting, leading to a need to supplement Cu.

Precautions

Excess Zn can be harmful. Care must be taken to avoid excess Zn consumption by cattle or other animals.

Below is a portion of information put together by UC Livestock Farm Advisor, Dan Drake and UC Extension Veterinarian, John Maas. These values are based on UC field research projects and animal submissions to the Diagnostic Laboratory at the UCD Vet School. Detailed information on these minerals for all of California can be found at the following website: http://animalscience.ucdavis.edu/Projects/MineralProject/

County	Selenium (ppm)	Copper (ppm)	Zinc (ppm)
Butte	0.032-Defecient	0.069-Marginal	0.70-Marginal
Colusa	0.087-Adequate	0.0809-Adequate	Limited Data
Glenn	0.059-Marginal	0.045-Marginal	1.31-Adequate
Lassen*	Variable-Test	Variable-Test	1.32-Adequate
Modoc**	0.042 Deficient	Variable-Test	2.24-Adequate
Shasta	0.04-Deficient	0.078-Marginal	Variable-Test
Siskiyou***	0.04-Deficient	Variable-Test	Variable-Test
Sutter	0.032-Deficent	0.78-Adequate	1.42-Adequate
Tehama	0.049-Deficient	0.861-Adequate	Variable-Test
Trinity****	0.080-Adequate	0.486-Marginal-Test	Limited Data
Yuba	0.039 Deficient	0.69-Marginal-Test	Limited Data

*Selenium in Honey Lake Valley is deficient; Big Valley/Pitville areas are variable, east County generally adequate-if in question, test
**Tulelake is deficient in Selenium
***With the exception of one location in Butte Valley, Siskiyou County is considered Selenium deficient
****Some locations in Trinity County have tested deficient in Selenium

1. Adapted from Drake, Maas, Oltjen, and Smith—*Trace Minerals for California Beef Cattle,* California Mineral Website

Managing Tree of Heaven in Pasture

Joe DiTomaso, Vegetable Crops/Weed Science, UC Davis and
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Tree-of-heaven (*Ailanthus altissima*) is an invasive ornamental tree that can limit livestock access to forage and reduce pasture production. It is native to central China and was brought to California by Chinese workers during the gold rush.

This invasive plant reproduces by seed as well as sprouts from both the stump and the root. These root sprouts create dense thickets that displace vegetation and can make some sites inaccessible to both livestock and wildlife.

Understanding the biology of tree-of-heaven will help you better manage this pest:

1. Prolific see producer—a single tree can produce over a million seeds. These seeds are readily spread by wind and wildlife. They have a high germination rate but generally are only viable for a year. However, the plants are dioecious, which means that many are male and produce no seed.
2. The plant stump sprouts following cutting.
3. Tree-of-heaven will readily root sprout.

The standard "toolbox" for managing any weed pest typically includes burning, mechanical, grazing, and herbicides.

The tools available to help manage tree-of-heaven include:

1. Burning
   A. Burning tree-of-heaven can reduce canopy short term. It is not a good long-term strategy because this plant responds vigorously to fire by re-sprouting.
2. Mechanical
   A. Tree-of-heaven can be controlled by REPEATED hand pulling. Young seedlings should be pulled after a rain when the soil is loose. This will allow removal of the root system. Any root that is left in the ground could result in re-sprouting. This technique is only effective on young plants that have not developed an extensive root system.
   B. Hand digging is slow and painstaking and requires that the entire root be removed. Any portion of a root that is broken off may re-sprout and spread the pest by means of root fragmentation.
   C. Mowing is not effective because it stimulates formation of suckers from stem base and lateral roots.
   D. Cutting above ground portions of the plants can result in vigorous stump and root suckering if not followed up with herbicide treatment.
3. Biological Control
   A. There are no biological control methods available in the United States.
4. Grazing
   A. The heavy browsing of tree-of-heaven by livestock and wildlife may result in some reduction of this pest, but it would be expected to rapidly recover.
5. Herbicide
   A. Common herbicide products that are effective in the management of tree-of-heaven include glyphosate (Round-up), triclopyr (Garlong 4 or Garlong 3A), and imazapyr (Habitat, Arsenal, Stalker). Imazapyr is not registered for use by homeowners.

These products behave differently and it is important to apply the product at the right time and at the appropriate rate and technique. Table A summarizes rate and timing for foliar applications:

Foliar

Product	Rate	Water	Timing	Application
Glyphosate (Round-up)	1-1.5%	0.1-2 Oz/gallon of water	Spring or summer	Spray foliage to wet
Triclopyr (Garlon 4 or 3A)	1%	1.25 oz/gallon of water for Garlon 3A, use in 5% Hasten oil for Garlon 4	Spring or summer	"

Tree of heaven is probably most effectively controlled using basal or stump treatment. For basal treatment of smaller trees spray all the bark around the tree from ground level to about 12-20 inches above ground. For larger trees, the stem needs to have the bark removed prior to spraying. Applying herbicide directly to a cut stump is probably the most effective method.

Stumps/Basal treatment

Product	Rate	Carrier	Timing	Basal	Stump
Imazapyr (Habitat, Arsenal, Stalker)	20%	26 Oz/gallon of water or Hasten oil depending on herbicide formulation	Summer or Fall	Not as effective as triclopyr	Apply to freshly cut stump immediately
Triclopyr (Garlon 4)	20%	26 oz/gallon of water	Summer or Fall	Spray bark 12-20 inches from ground	Not as effective as imazapyr

A third method to manage tree-of-heaven is stem injection. The stem injection technique (also known as back-and-squirt) consists of making downward angled 1.5-3 inch hatchet mark (hack) in the bark 1 to 1.5 feet above the soil surface, then injecting 1 ml of undiluted imazapyr based on herbicide (Habitat, Arsenal, Stalker) into the mark. The standard rate is one hack and herbicide treatment for every 3 inches in trunk diameter. Using this recommendation, a tree with a 6 inch diameter will require two "jack and squirt" treatments.

Stem Injection Method

Product	Rate	Carrier	Timing	Stem Injection
Imazapyr (Habitat, Arsenal, Stalker)	undiluted	N/A	Summer or Fall	Apply 1 ml of undiluted product per hatchet mark immediately

When herbicides are used, it is critical to read and follow all label instructions—understanding the label improves efficacy and assures the product is being applied safely. Some products require a restricted materials permit where others only require an operator ID. If you have any questions about this—call your local agriculture commissioner's office.

Table B summarizes the products outlined above.

Product	Operator ID	Restricted Materials Permit	Notice of Intent	Use Report
Round-up	Yes	No	No	Yes
Garlon	Yes	No	No	Yes
Habitat, Arsenal, Stalker	Yes	Yes <u>NO, labeled for ag use only</u>	Yes No	Yes

If you are considering managing tree-of-heaven take some time to review and think about the following:

1. Think carefully about the goals for your property/operation.
2. Control and management of this pest requires persistence—be sure you commit the time it takes.
3. Try to work on projects with measurable objectives that move you along towards your goal.
4. Remember the rules—check with your agricultural commissioner locally to make sure you understand the process for obtaining permits, operator ID and submission of reports.

Sire Selection – Determining Goals and Beginning Preparation for Purchases

Dan Drake, Livestock Farm Advisor UCCE Siskiyou
Josh Davy, Livestock & Natural Resources Representative, Glenn, Colusa, & Tehama Counties
Larry Forero, Livestock Farm Advisor UCCE Shasta

Every bull purchase provides an opportunity for improvement in marketable calves and future replacement heifers. The key is determining what improvements are most important. By finding the most crucial needs for improvement in a particular herd you are, in effect, setting sire selection goals. Identifying the most crucial needs also allows you to focus your selection on fewer traits.

Data collection by the purebred industry allows for the manipulation of an ever-increasing number of economically important traits through bull purchases. Single trait selection is usually frowned upon, as there may be deleterious consequences on numerous other traits. However, if a large number of traits are in the selection process, genetic progress is slow. As a practical guideline most selection should be done on at least three traits. While this is somewhat arbitrary, the point is that progress can be made on several traits that are of utmost importance.

Essentially, a balance between the environment that cattle are run, the marketing scheme and reproductive performance will ultimately decide the traits and the level of each trait and, consequently, what sire is selected. The environment cattle are in dictates feed availability, the most important input cost. Multiple factors influence the nutrition requirements for cow maintenance but the most influential are mature body size and milk production. Feed requirements going towards body maintenance are a year-round consideration, whereas feed for milk is seasonal. If lactation occurs at a time of year with reduced or limited feed resources, milk potential should be carefully evaluated to make sure it is not too high for the feed resources. Knowing environmental constraints is thus critical to determine appropriate production levels in your cattle. This is critical because many factors, but most importantly reproduction, are contingent upon cattle maintaining adequate body condition. Use EPDs for mature weight and milk production to determine the appropriate level for your environmental conditions.

Most marketing systems are still selling pounds of beef (i.e. heavier calves bring more money), so weaning and/or yearling weight is important. For this reason, sensible goals for growth (weaning and yearling weight EPDs) will always be of concern. Nevertheless, what if calves are retained through harvest or sold directly to feeders? While on feed, smaller framed cattle will reach maturity earlier and begin to accumulate back fat earlier, essentially finishing faster. Earlier finishing dates mean less time on feed and reduced feed costs. With higher costs for grain, this could be important. A quandary is processors have more efficiency with carcasses of about 740 pounds (a live weight of about 1200 pounds). This is a frame score of 6. Mature cows of frame score 6 weigh about 1250 pounds. With frame score 6 cows, ideal bulls would also be a 6 frame score. Additionally, some breeds and even individual cattle are more prone to deposition of internal fat, which leads to higher quality grades and possibly premiums for some marketers. Determining a marketing plan or eventual goal in marketing calves will determine where market end points are and the demand at those end points. For this goal, try to think down the road.

Retaining heifers adds other criteria in terms of reproductive performance and mothering ability. For example, a terminal crossbreeding program can add size to calves to market, but if heifers from the terminal sires are retained the result can be added frame to the cowherd. Additionally, factors such as calving ease must be considered as dystocia can devastate calving intervals and greatly increase labor. Besides culling cows that don't perform to herd standards and bringing in outside cattle, breeding for desirable replacement heifers is one of the only means of moving an entire cowherd in the direction of choice.

There is so much variety in environments, marketing schemes and desired reproductive performance; no single breed is perfect for all situations. In the recent past marketing incentives have heavily influenced breeders towards the Angus breed. The value of crossbreeding has been shown since the 1940s, and with well-managed systems the cattle can retain a preponderance of Angus looks and genetics, capturing market advantages, and crossbreeding heterosis benefits.

Once the goals for a potential sire are identified, determine the appropriate EPD values. Most people are aware of their

weaning or sale weights but that does little to help in determining appropriate EPD values. Similarly, weaning or yearling weights of a potential herd sire don't translate well into anticipated weights of your calves. Some people will compare the EPD values of a potential sale bull with breed averages. While this can accurately compare the bull to average for the breed, your specific herd may be above or below average, but you don't know based on your sale weights. You can also compare the EPD values of different bulls to determine how each would impact your calves but this is limited to comparing between those bulls, their calves might be heavier or lighter when used in your herd.

A simple method to set appropriate EPD values for potential sire purchases is to determine the EPDs of your current sires. If you take the average EPD values for your current herd sires you will have a relatively accurate level to judge potential new herd sires. (If you retain replacement heifers, then the cowherd will also tend to reflect these same relative EPD levels.) Knowing the EPD values for your current herd sires you can more easily evaluate the change in potential new herd sires by comparing their EPD values to your average herd EPD values. Remember, if mature weight and milk levels are higher in the "new" sires and replacements are kept, increased feed resources will be required.

Purchases of young bulls is problematic due to limited accuracy of their EPDs. Accuracies are often ignored. There is an old saying, "if you have to buy a bad bull, buy a big one." A modern saying might be, "if you have to buy a low accuracy bull, don't spend much." Why spend a lot of money on pedigree or a promise, when the accuracy is low. The exception might be the extremely high (or low depending on trait) EPD with a low accuracy. With more data collection, it is likely that the EPD will drop, but if it starts extremely high, it will *likely* still be relatively high after it is recalculated with more data.

A complete review of sire selection can be found in the publication "Beef Sire Selection Manual" produced by the National Beef Cattle Evaluation Consortium. This can be located in its entirety at http://ucanr.org/siremanual, and some Cooperative Extension office may have printed copies. As a short refresher, here are a few points to consider:

Remember that EPDs cannot be compared across breeds. This means the +25 for weaning weight on a Hereford bull cannot be compared to the +18 weaning weight on an Angus bull. EPDs CAN BE COMPARED WITHIN BREED ONLY.

Special calculations can be done to convert EPDs from one breed to another. See a specialist or someone highly experienced in these calculations.

Many sale catalogs list the EPDs of the bulls they are offering for sale. This information is most useful if you know the EPD values of your current herd sires for comparison.

Make sure you look at the accuracy of the EPD. Accuracies of less than 0.20 indicate the EPD value may change significantly. Accuracies will improve as more data is collected on the young sire either through his calves or his relatives. When you look through some sale catalogs, you will see the notation "I" before the EPD. This is an "Interim" EPD that notifies the buyer that there is not a lot of data behind the current EPD.

Make sure you know what you are selecting for. Keep the list of traits relatively small. For example, calving ease, weaning weight and marbling. Think long-term unless you are using terminal sires. "Simple" breeding systems that retain replacement heifers require relatively middle of the road selection standards and consistency. More milk means more feed.

Even if you are not retaining ownership or involved in an alliance, carcass attributes may be important through tracking of your calves' carcasses by buyers.

EPDs have been extremely successful predicting genetic merit. Always couple the genetic potential of the sale animal with conformation and health evaluations. Structural soundness is essential for longevity. Set up a quarantine period for new purchases before introduction to the herd.

Seedstock producers attempt to bring their best animals to sale, but what is best for one producer is not best for all. Do your homework before the sale, as it is likely only a few of those offered are right for you. Know which ones fit your genetic

Congratulations to
Recipient of the Ron Knight Scholarship—Nicki Humphrey, Myriah Jordan, Brianna Johnson, Russel Pitter
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