University of California Cooperative Extension

Northern California Ranch Update

University of California

Volume 2, Issue 4—October 2008

BOOSTER VACCINES

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Most of us have read vaccines labels and seen directions that say, "Give second dose in 2 weeks" or "Booster vaccination needed in 2-4 weeks". Why do some vaccines carry this label? Why aren't the necessary booster doses standardized? What if I give the vaccine in 6 months when I have the cattle in next time? Why do some vaccines require an annual booster? These are all good questions we address.

How do vaccines work in the first place?
Vaccines work by stimulating the animal's immune system to develop protection against the bacteria, virus, toxin, or other pathogen in question. This is usually done by injecting the animal with a protein (or group of proteins) that has been proven to stimulate a protective immune response. The animal's immune system recognizes these proteins (also called antigens) as being different than their own proteins ("non-self" or foreign proteins) and begins the process of making antibodies (also proteins) to neutralize the foreign material and to stimulate the development of cells that will also help to protect the animal from outside invaders (viruses, bacteria, etc). So the immune response has two major components that are stimulated by vaccines—one is the antibodies that are proteins "floating" around the body waiting to neutralize any invaders and the other are the cells that have been "turned on" to actively "kill" any invaders.

What is the timing of the immune response of the animal?
The first measurable response is an antibody response that occurs at about day 4 after vaccination. This antibody (referred to as IgM) appears relatively quickly (at day 4) and soon begins to decrease in amount. The second antibody response can be measured at 10-14 days after vaccination and this antibody (IgG) stays around for a longer period of time, but also decreases over time. The response of the cellular branch of the immune system is also measurable at about 10-14 days. Therefore, it is apparent that there is a significant lag time from administration of the vaccine to the time the animal has any measurable response (10-14 days for a primary response). Is this first response at day 14 protective? For some vaccines the answer is probably yes! For others it is obviously no! These latter vaccines are the ones that need booster doses for more complete protection.

Who determines if booster doses are necessary and what the label reads in terms of boosters?
The USDA (United States Department of Agriculture) has rules and regulations in place for the licensing of biologic products used for livestock and this includes vaccines. The USDA requires that vaccines be ***safe and effective*** for cattle (safety and efficacy requirements). Additionally, USDA regulates the use of any additives or ingredients that are in the vaccines and what an appropriate withdrawal time (time after vaccination before an animal could be slaughtered for human consumption) would be. Therefore, there may be a withdrawal time on some vaccine labels that must be followed.

The company manufacturing a vaccine must submit data and supporting documents to the USDA that prove that a vaccine is safe and effective for cattle before it can be licensed for sale. The USDA then will determine if the data meets their approval requirements. This will include the need for booster doses if appropriate. Of course the company wants their vaccine to be safe and effective also, so it is in their best interest to recommend booster doses when appropriate. The need for booster doses will therefore, be on the label and should be followed.

Why are vaccines different with regard to boosters?
The short answer is that each vaccine is made from different protein antigens and the animal will respond to each in a unique manner. For some pathogens it is more difficult to isolate antigens that are as effective as other

vaccine products. Also, live vaccines (where the organism is alive and will replicate in the animal without causing disease) tend to stimulate the immune system much more than killed vaccines. Thus, it is particularly important to give booster doses when using killed vaccines if required.

What if I don't give the booster vaccine at the recommended time?

First of all, the vaccine will probably not stimulate an effective immune response in the animal. Put simply, it will not protect the animal from disease or death if they contract the disease in question. You have "wasted" one dose of vaccine by not giving the second recommended dose at the appropriate time and not protected the animal. Additionally, you have given up any legal recourse if the vaccine fails to protect. The label is a legal document and if you do not follow the instructions you are basically on your own with any untoward consequences.

What are other factors that might influence the effect?

There are a number of factors that can have a negative impact on the effectiveness of vaccines—whether they are boosters or primary vaccines.

- Stress: heat, cold, handling, or transportation stress can all decrease the animal's ability to respond to vaccines.
- Age: young and extremely old animals do not respond to vaccines in an optimal manner.
- Nutrition: protein deficiency, selenium deficiency, or copper deficiency all decrease the immune response to vaccination.
- Products used: some vaccines simply work better than others.
- Previous vaccine history: vaccines used in the past may promote a better or worse immune response.
- Handling of vaccines: avoid direct exposure of vaccines to sunlight, excess cold (freezing) or heat (greater than 75ºF) all decrease (or eliminate) the effectiveness of vaccines. Also, do not use alcohol, soap, or disinfectants on syringes or needles used on modified live virus vaccines.
- Parasites: worms, flukes, etc. decrease the animal's immune response; therefore, vaccinating parasitized animals is not particularly cost effective.
- Pregnancy: pregnant cows and heifers have a decreased response to vaccines also.

Where can I get more information?

The best source of vaccine information is from your cattle veterinarian. They will know which vaccines are the best values for your operation. Additionally, they will know the important diseases on your operation that you need to address and how to match the available vaccines to those needs. □

Seeding Irrigated Pasture in the Sacramento Valley

Josh Davy – UCCE Tehama, Glenn, Colusa

Fall is the perfect time to consider pasture renovations. Some pasture species have limited life spans and others can be damaged during the summer grazing season, thus leaving patches in pastures that need to be seeded before they are naturally filled in with weeds. With cattle moving to rangelands in the fall, these newly planted seedlings can have the entire winter and spring to establish before being hayed or grazed the following summer. Unless warm season grasses (kikuyugrass, dallisgrass, or Bermuda) are used, fall is the best time to consider establishing or over-seeding irrigated pastures with desired forages.

As with any planting decision, the goals and current makeup of a pasture must be considered in selecting the appropriate pasture species. Four key agronomic factors can help in guiding the decision of what species to plant, and the resulting management required from selecting that species. These factors are: hardiness (survivability), production capability, palatability, and forage quality. (Table 1) shows the general characteristics of common perennial grass species according to these four factors. It is important to note that newer breed varieties and management of these grasses have helped in improving them in certain areas. Talk to your seed vendor or Farm Advisor for more information on additional forage types, varieties and seeding rates.

Table 1. General characteristics of common pasture grasses

	Hardiness	Production	Palatability	Quality
Fescue	XXXXX	XXXXX	XX	XX
Dallisgrass	XXXXX	XXX	XXXXX	XX
Perennial Ryegrass	XXX	XXXX	XXXXX	XXXXX
Orchardgrass	XX	XXXX	XXXXX	XXXXX

X = low, XXXXX = high

General description of common perennial pasture grass species.

<u>Fescue</u> – Fescue is a very hardy and highly production forage specie, however, it can be low in quality and palatability, especially when mature. If planted, it is best to be the sole grass planted in the mix to avoid overgrazing of other species. Fescue is often the best choice for horse pastures. Newer varieties have narrowed leafs and stems to help with quality.

<u>Dallisgrass</u> – Dallisgrass is very palatable and productive in the summer months. Once established, it is very hardy and fairly drought resistant, though proper irrigation will maximize production. Dallisgrass can withstand continuous grazing and rapidly reproduces through its

abundant seed production. The disadvantages of dallisgrass are that spring and fall production is very light and forage quality is low (due to fast maturity) compared to other varieties. Seed costs for dallisgrass are generally high as well.

Perennial ryegrass/Orchardgrass – These varieties are very complementary of each other in a planting. Both are high in quality and can be very high in production if properly managed. Perennial ryegrass will dominate in spring and fall, while orchardgrass will dominate during the summer. They are the most desirable planting for a grass hay mix due to their quality and upright growth habit. Ryegrass is hardier than orchardgrass, but both require some type of grazing/cutting and then rest management for maximum production and stand success. The necessary rest period is longer during the warm summer period than dallisgrass. They are the least forgiving varieties in terms of irrigation and grazing management.

Annual Ryegrass - Annual ryegrass is often added to perennial plantings to help pasture establishment or produce winter feed in dallisgrass dominated pastures. Annual ryegrass is fast establishing, but has slightly less quality than most perennial ryegrass varieties. When annual and perennial ryegrasses are mixed and planted in a new seeding, once perennial varieties are established, annual ryegrass will often become a minor component of the mix.

General Clover/Legume Description

Pastures that have clover established can omit its planting when over-seeding to avoid having an excess amount of clover and causing bloat problems. When establishing pastures for beef cattle, use no more than 10 to 20% clover in the mix to avoid bloat problems. Species selection can also help in bloat prevention. The three most common legumes planted for perennial pastures are ladino clover, strawberry clover, and trefoil. Alfalfa is very suited to haying, but does not generally persist in a grazing mix. Red and alsike clovers do better in cooler mountain climates than the Sacramento Valley.

Ladino (white) Clover – Ladino is the most highly productive clover. It reproduces readily with adequate irrigation, produces abundant nitrogen, and can survive moderate continuous grazing. Ladino is the clover most associated with incidences of bloating, so it is necessary to limit its percentage in a mix for beef cattle.

Strawberry Clover – Strawberry clover is less bloat resistant and more tolerate of infrequent irrigation than ladino clover. It tolerates close grazing, but is not as productive as ladino.

Trefoil – Trefoil has lower production, quality and palatability than ladino and often strawberry clovers. Its largest advantage is its reputation for being bloat free. □

Use of Alternative Feedstuffs in the Drought

Glenn Nader, UCCE Farm Advisor – Yuba/Sutter/Butte Counties

One of the advantages of cattle production in the Sacramento Valley is the alternative feeds that are available for cattle. They are usually cheaper than grains and hays in providing energy, protein and bulk filler to a diet. These feeds are sold by food processing plants, commodity brokers or the growers. Challenges in feeding them include:

- Variation in their nutrient value
- Handling requirements,
- Possible nutrient imbalances that can occur from feeding high levels in the diet.

Roughages

During droughts or when dry matter is limited, rice or wheat straw and corn stover have been supplemented. A survey of over 70 rice straws stacks found that they vary greatly in protein (2 to 7%) and Acid Detergent Fiber (ADF) 44 to 55%. Given this variation it is important the straw be tested by a laboratory before purchase. It is recommended that before purchasing either of these products that a laboratory analysis should be conducted for crude protein and ADF, which is used to predict TDN. This allows the producer to select a product of the higher nutrient value. A recommendation for acceptable rice straws for beef operations is a protein of 4.5% or higher and an ADF of 50% or lower. Producers have generally placed large bales out on the rangeland and cut most of the strings leaving 3 or 4 and allowing the cattle to consume as needed. If you are interested in feeding rice straw, a web site has been designed by the California Rice Commission to market rice straw at http://www.ricestrawmarket.org/ Rice straw producers no longer bale straw in anticipation of sales. Most will take orders from July to October and bale during the harvest (August through October).

Due to the increase of corn production in Northern California, the remaining corn plants after harvest, (corn stover) is now available. It is important that the pickup on the baler be raised above the corn row beds, and that field flail chopping and raking is done correctly, as some bales have contained 5 to 8 percent dirt when it is done incorrectly. Chopping of the stalks is important, as it will make it more palatable for cattle. Producers have reported increased waste when they placed the big bales of corn stover on the range or in the feed pen and cut the twine like has been done with rice straw. Improved utilization has been reported when fed in bunks or hay feeders. An Oregon State University study on corn stover is reported below and illustrates the variability of that product and also some higher nitrate levels. Again, laboratory testing before purchase will make sure that the stover is of the higher quality and not a problem for nitrates.

Corn Stover Analysis Results

	DM	CP	TDN	NO3-N
1	85.8	3.7	53.4	
2	82.1	4.5	52.5	1270
3	84.6	5.1	54.3	1560
4	77.8	5.2	49.8	750
5	84.8	3.9	55.2	705
Average	**83.02**	**4.48**	**53.04**	**1071**

All results are reported on a Dry 100% Matter basis.

Wheat straw availability has also increased with the price of wheat. Many fields have been baled in anticipation of the need during the drought. The only concerns of the producers have been the large stem size of some varieties and decreased consumption. Most have been purchasing wheat straw direct from baling contractors or hay brokers.

Average Values (%)	Dry Matter	Crude Protein	TDN	Crude Fiber	Ash Roughages
Rice Straw	91	4.5	41	35.1	16.6
Corn Stover	90	5.9	50	37.1	5.8
Wheat Straw	90	3.6	41	41.5	7.2

All results are reported on a Dry 100% Matter basis.

Source –By-Products and Unusual Feedstuffs in Livestock Rations. Western Regional Extension Publication No. 39, October 1980. 22 pages.

On average, the corn stover provides the highest protein and TDN levels. Getting the cattle to eat the stalks is the key to making this higher value feed equal to other alternatives. The chopping and handling costs may negate the higher value of the feed. Wheat has the higher crude fiber levels. The high rice straw ash level (made up around 11 percent silica) lowers the digestibility. The true analysis should be based on laboratory values of different roughage sources that are available to your operation. Freight will also greatly impact the delivered price and the sources closest to your operation, or those that can be on a back haul, may be more economical.

Concentrated Energy Sources

The increase in the price of corn and all grains has increased all the feed costs. Rice bran historically has been popular as an energy feed due to its fat content. It also contains protein, B vitamins and very high levels (1.8%) of phosphorus in a form that is readily available to the animal. Feeding levels should not exceed 20% of the ration. The high amount of unsaturated fats lowers the cellulose digestion and impacts fat metabolism and absorption. Animals that are fed too much rice bran will go off feed or can get scours.

Almond hulls are a good source of energy, but are low in protein. They can be fed in troughs, or a hot wire can be placed on the edge of the stack and moved as the cattle consume the hulls. There is some waste of the product with this approach, but it saves labor. The major problem with purchase of hulls is that some processors sell loads of hulls that also contain low nutrient contaminates of shell or twigs. It is prudent to get a purity percent when obtaining price quotes on almond hulls. A limited supply of walnut and almond meal is now available from the production of oil products. Walnut meal that is high in protein has been reported to stop the cycling of breeding cows.

As consumption of vegetable oils increases, more oil seed meal is available. The effectiveness of the processing plant to extract the oil from the seed will vary the energy value. Safflower is the most common in Northern California. Seed screening are produced from the cleaning of seed crops. Pigweed seed can be a major component of screenings and although the green plant stocks are high in nitrates the seeds are not; so there is no risk of nitrate poisoning. Screening values vary greatly due to the variation of the seed crop that is screened and the weeds present. Bean processors will have tested lots that are rejected for human consumption and then are sold to livestock operations. Beans work best for sheep and need to be cracked or softened to facilitate consumption by cattle. The production of fruit juices (pear and prune) provides a wet pomace. The percent moisture will vary with the processor and the fruit. Due to the moist content of the pumice, it needs to be fed within a week of production at the plant.

Protein Sources

Tomato pomace can be obtained from processors. Cattle producers that are close to the plants can obtain the pomace in the high moisture form and ensile it. Most feed the dried product. In one study the protein value varied from 12% to 27%. The high acidity can limit the amount fed in a ration to maintain a normal rumen pH. Many limit it to no more than 20% of the diet. Dried poultry litter nutrient values vary with the bedding material used in boiler operation. It is important the material is composted correctly by the chicken operation. Limited cotton production in the north part of the state has provided some whole cottonseed. It is also high in energy and is very palatable and can be fed up to 8 pounds per cow with good results.

Average Values (%)	Dry Matter	Crude Protein	TDN	Crude Fiber	Ash
Rice Bran	91	14	76	12	14.8
Almond hulls	91	4.2	54	17	6.6
Walnut meal	93	17.1	67	27	4.9
Prune pomace	18	14.6	76	--	3.3
Pear pomace	22	6.3	76	--	1.8
Safflower meal	92	23.9	55	34	4.3
Clover screenings	88	33.1	68	13.1	13
Pinto beans	90	25.2	83	4.5	4.8
Protein Sources					
Tomato pomace, dried	92	23.9	73	26.3	3.5
Dried Poultry litter	76	19.4	37	21	--
Cottonseed	93	24.9	98	18	3.9

Source *–By-Products and Unusual Feedstuffs in Livestock Rations. Western Regional Extension Publication No. 39, October 1980. 22 pages.* □

Smaller Cows or Fewer Cows?

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A hot topic among beef producers is methods to reduce feed demands and costs. Cost of feed has risen dramatically, drought has reduced feed supply as well as restricted irrigation water supply, and generally land for cattle feed has shrunken over the years. Some producers desire increased amounts of forage for their weaned calves to increase their selling weights in response to predicted demand for heavier in-weights for feedlots. One approach to creating more feed for weaned calves, when feed is restricted, is to reduce feed demands for cows. Others want more forage to convert into hay for the high hay market. Whatever the reason, with current conditions, a reasonable response by beef producers is to consider reducing herd size so less feed is required, or raising smaller cows that require less feed. Each option has different outcomes and consequences. We have made some comparisons of those options to demonstrate the differences.

For our comparisons, we use a herd of 100 cows and only a small difference between cow size; mature weights of 1,100 or 1,200 pounds. We are not suggesting that 1,100 or 1,200 pounds is the ideal cow size. We are looking at a difference in size, in this example 100 pounds. Producers may want to weigh a few cows to determine their actual weight. We are only comparing cow size, so in this example milk production is the same for all the cows. Cows of 1,100 pounds mature weight will consume between 70 and 100 pounds less dry matter feed each month (NRC, 2000) than 1,200 pound cows of equal milk production (Figure 1). *(See figure 1 on page 7).* Annually the smaller cow will consume about 1,192 pounds less of hay equivalent feed. The required quality of the feed is the same since they both produce the same amount of milk. The amount of feed consumed varies due to their size differences.

The cost of feed varies throughout the year depending on source but for this example we can estimate the annual average cost at the hay equivalent of $80 per ton (this would be a mixture of pasture and supplement). Therefore the 1,100 pound cow will consume about 1,192 pounds less feed, costing $48 less, e.g. ($80/2000) X 1,190= $47.69 (Table 1). *(See Table 1 on Page 7).* For a herd size of 100, the smaller cows require about 60 tons less hay equivalent feed and at $80/ton basis about $4,768 dollars less in feed. Specific dollar values will vary.

If instead of reducing cow size we wanted to reduce the ***herd*** size (keeping the same size cows), but we wanted to reduce the feed level to the same feed level as smaller cows, we would need to reduce to about 88 cows (88.42 cows). A herd size of about 88 head of 1,200 pound cows would require about the same amount of feed as 100 cows of 1,100 pound (Table 1).

Perhaps the first and most obvious consequence of this type of change would be lighter weaning weights or fewer calves sold. Smaller cows with similar milk production and muscling to heavier cows will generally be smaller frame size and wean a smaller calf. This can be estimated (NRC, 2000) and for our purposes steers calves at 9 months of age are estimated weighing 655 for 1,100 pound cows and 682 for 1,200 pound cows are used. The difference is 27 pounds. We can calculate the weight of sale calves and income based on a 90 percent calf crop and $1.10 per pound sale price, 50 percent heifers at 5 cents discount, 50 pound lighter weaning weight for heifers and 15 percent replacement heifer retention rate. Based on these estimates changing to smaller cows shows an increase in income over feed cost of about $2,348, while changing to a smaller herd is almost the opposite with a reduction of about $2,000 annually (Table 1).

The most sensitive value in this example is the estimated weaning weight of the calves. If the difference in weaning weight of calves between the smaller and larger cows was about 50 pounds instead of 27 (as used in the example), then smaller cows would be about equal in economic returns.

The smaller herd size with the same size cow ***would*** be a reduction in income over feed costs but income would decline more than the reduction in feed costs. The smaller herd size is probably not as deleterious as shown here because other costs that are "per head based" would likely decline and could account for the roughly $20 per head difference.

Based on these estimates it would appear that smaller cows offer some potential for reducing feed costs while not significantly lowering income. There are some other un-intended consequences and additional alternatives.

Mature cows of 1,200 pound size generally have finished steers calves of about 1,180 pounds. If the dressing percent is 61 percent then the carcass weights would be about 720 pounds. This is a desirable carcass weight. Cows of about 1,100 pounds would be expected to produce steer calves finished at 1,050 pounds and a carcass weight of 640, which is on the light side. There could be price discounting, which could easily wipe-out any feed cost savings: the proverbial rock and a hard place.

There is a relatively simple solution to this dilemma: a way to have reduced feed costs while still producing ideal size market animals. It is much simpler than recording data for age and source verification. Breed the mature cows to a larger frame size bull to produce intermediate frame size calves that will have the desired carcass weight. Producers could also use EPDs for growth and carcass traits to select bulls for growth and larger carcass traits for this specific breeding scheme (terminal sires). Another alternative might be to use a different bull breed for these terminal crosses. For example, Charolais bulls on adult English-breed type cows. Always sell all of these calves, steers and heifers. Only use the growth-type (larger frame size) bulls on mature cows that have grown out to avoid calving problems and ***don't use much larger*** bulls. Note that feed use will be slightly higher for these cows (stimulated to produce more milk by larger calves), and actual forage intake by the larger calves before weaning. Use younger females to develop replacement heifers. These will be bred to bulls to produce replacements that grow into adults with mature size of 1,100 pounds.

Producers often don't have control over feed costs nor the desired carcass weight. But they do have control over breeding decisions. There are good cattle in all breeds of varying mature size. Using this type of system, called terminal sires, requires discipline, self-confidence, and long range planning. But it is something that can pro-actively be accomplished. In many cases younger females are already being bred to different bulls than mature adults. A terminal sire system would just make those breeding plans more specific. From this example, smaller cows clearly reduce feed costs, but may have reductions in sales that wipe-out any gains. A terminal sire program could allow smaller cows, for feed savings while still for most of the herd, production of highly desired calves.

The root of the feed cost issue is animal maintenance expenditures. Some produces have attempted to select for improved cow efficiency by comparing the cows output (the calf weight) to her own weight. Her own weight reflecting the amount of feed required. This ratio has been shown to be no better than selecting for weaning weight alone for improving efficiency.

Actual feed intake and feed efficiency has been examined in more detail with the advent of computer assisted feeding stations. Research has shown that a series of measurements can be made to calculate a residual feed intake, (RFI). This value is defined as the actual feed intake minus the expected feed intake and may be a better value than feed to gain ratio or conversion. RFI is more independent of growth rate, size and maturity of the animals. Australia and Canada have been using RFI, while it is just beginning to be used in the U.S. In the coming years, there may be opportunities to improve efficiency by selection using RFI. RFI could be used in conjunction with smaller cows to find those animals that are inherently more efficient in the use of nutrients.

Historically, when feed conditions are not limiting, larger cow mature size has generally been more profitable. More recently conditions have changed and feed conditions seem to be trending more and more towards limitations that may be conducive to smaller cow size. This must be balanced with the demands from others in the beef production chain that tend to favor larger carcasses. During tough times producers can also take a good look at problem cows. It is always a good time to remove cows that may have at best only a hope of raising a calf or that favorite cow that needed to be shipped 2 years ago.

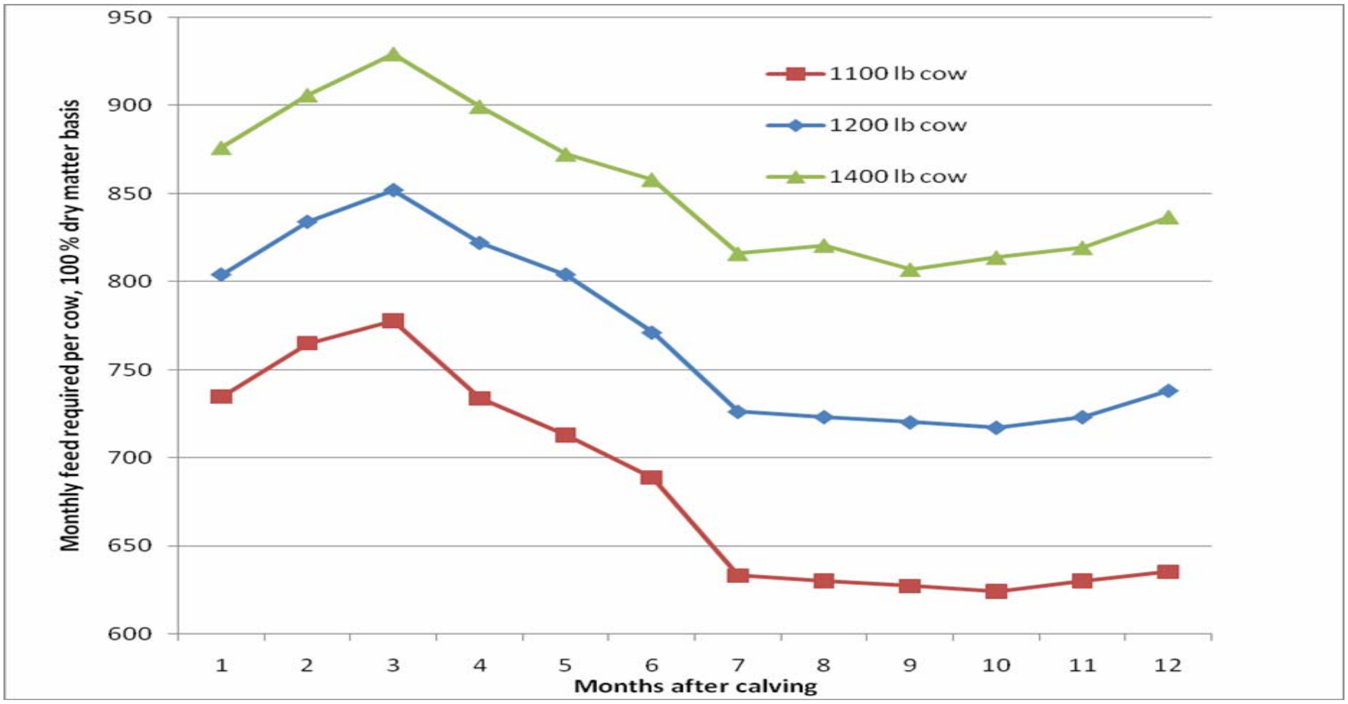
Performance Advantage of Wintering Fall Calving Mountain Cattle in the Sacramento Valley

Larry Forero, Jim Oltjen, and Steve Blank

Many producers ship cattle from the mountainous regions of California and Oregon to the low elevation valley, coastal or foothill ranges to take advantage of the annual forages produced in these areas during the winter and spring. While shipping cattle to the valley region of California results in trucking expense, producers hope to avoid severe weather and feeding costly hay through the winter and the resulting hay savings will offset the costs of renting additional pasture, shipping and related expenses. The economics of these two management choices is relatively simple if only replacement feed is considered. It is merely a function of adding up the costs of the two alternatives and making a rationale decision.

(*Continued on page 8)*

(Figure 1)



(Table 1)	1,100 pound cow, 100 head	1,200 pound cow, 100 head	1,200 pound cow, 88.42 head	Difference between 1,100 & 1,200	Difference between 1,200 cows; 100 or 88 head
Total annual feed dry matter basis, lbs./cow	8,191	9,264	9,264	-1073	
Total annual feed on hay equivalent basis, lbs./cow	9,101	10,293	10,293	-1192	
Total annual feed cost/cow @ $80 basis	$ 364	$ 412	$ 412	$ (47.69)	
Feed required for the herd (hay equivalent basis)	910,111	1,029,333	910,137	-119,222	-119,197
Feed costs for the herd (size as indicated)	$ 36,404	$ 41,173	$ 36,405	$ (4,769)	$ (4,768)
Estimated 9 month weaning wt of steers, lbs/hd	655	682	682	-27	0
Number of steers sold	45	45	39.78	0	-5.2
Number of heifers sold	38.25	38.25	33.82	0	-4.4
Total $ from steers	$ 32,423	$ 33,759	$ 29,850	$ (1,337)	$ (3,909)
Total $ from heifers	$ 24,298	$ 25,383	$ 22,443	$ (1,084)	$ (2,939)
Total calf sales	$ 56,721	$ 59,142	$ 52,293	$ (2,421)	$ (6,849)
Total sales minus feed costs	$ 20,316	$ 17,968	$ 15,888	$ 2,348	$ (2,081)

This approach assumes the performance of the calves is equal (i.e., there is no difference in weight at weaning). This project attempts to ascertain and document any differences in economics and weaning weights for cattle shipped to the valley when compared to their cohorts remaining in the mountains. This project was initiated in the fall of 2004 and is entering its fifth year. This report covers the weight differences; the economics associated with these two options will be shared in a future newsletter.

Approximately 60 head of fall calving cows from eastern Shasta County were randomly assigned to treatment (shipped to the valley) and control (wintered in the mountains) groups annually. Cattle were stratified by age and body condition. The cattle are summered on a USFS permit and spend the late fall on privately-owned pasture in the mountains. The control cattle remained in the mountains over the winter and were fed a mixture of raised and purchased hay (approximately 2/12 tons per cow). Treatment cattle were shipped to the valley in the late fall and were not provided any supplemental feed with the exception of 2006 when approximately two tons of long hay was fed (approximately 5 pounds per day for 14 days for a total of 70 pounds per head). Both groups were provided mineral free choice and managed under the same animal health plan. When valley-wintered pairs returned to the mountains, the calves were weaned and the groups were reunited until shipped. The approximate operational calendar is outlined in (Table A).

(Table A-Operational Calendar)

Cattle Shipped to Valley (Treatment cattle only)	Early December
Cattle Worked (vaccinated, wormed)	Early April
Cattle Shipped back to the Mountains	Mid-Late May
Calves weighed (weaning)	Early June
Calves weighed (yearling)	Late Sept-early Oct.

The average steer (Figure A) and heifer (Figure B) weaning and yearling weights are shown. (See page 9)

As expected weaning weights varied ($P<0.05$) between years and heifers were lighter ($P<0.05$) than steers. When year and sex effects were statistically removed valley-wintered calves had weaning weights 60 pound heavier ($P<0.05$) than mountain-wintered calves. Due to year-to-year variation, the average weight at weaning of the calves wintered in the valley ranged from 18 to 118 pounds per head more than those wintered at home in the mountains.

The yearling weights of the valley-wintered calves retained some of the weight advantage from weaning and finished the yearling phase weighing 50 lbs higher ($P<0.05$) than their mountain-wintered cohorts. The weaning to yearling only gain of the mountain-wintered cattle was more ($P<0.05$), but it was not enough to offset the weaning weight advantage held by the valley-wintered cattle as yearlings.

Conclusion:
Our data indicates under the management systems and conditions for this trial, that fall-born calves wintered in the valley will weigh about 60 pounds more at weaning and retain most of that advantage through the yearling phase with a weight advantage of about 50 pounds. The challenge producers face is the economics (addressed in the next issue) and the reality that winter pasture is difficult to find and terms typically favor the landlord—many leased winter ranches have poor fences and facilities and are rented on a year-to-year basis. Many producers have left dry feed at the end of spring to bring cattle back to in the fall only to find their lease was not renewed for the next year.

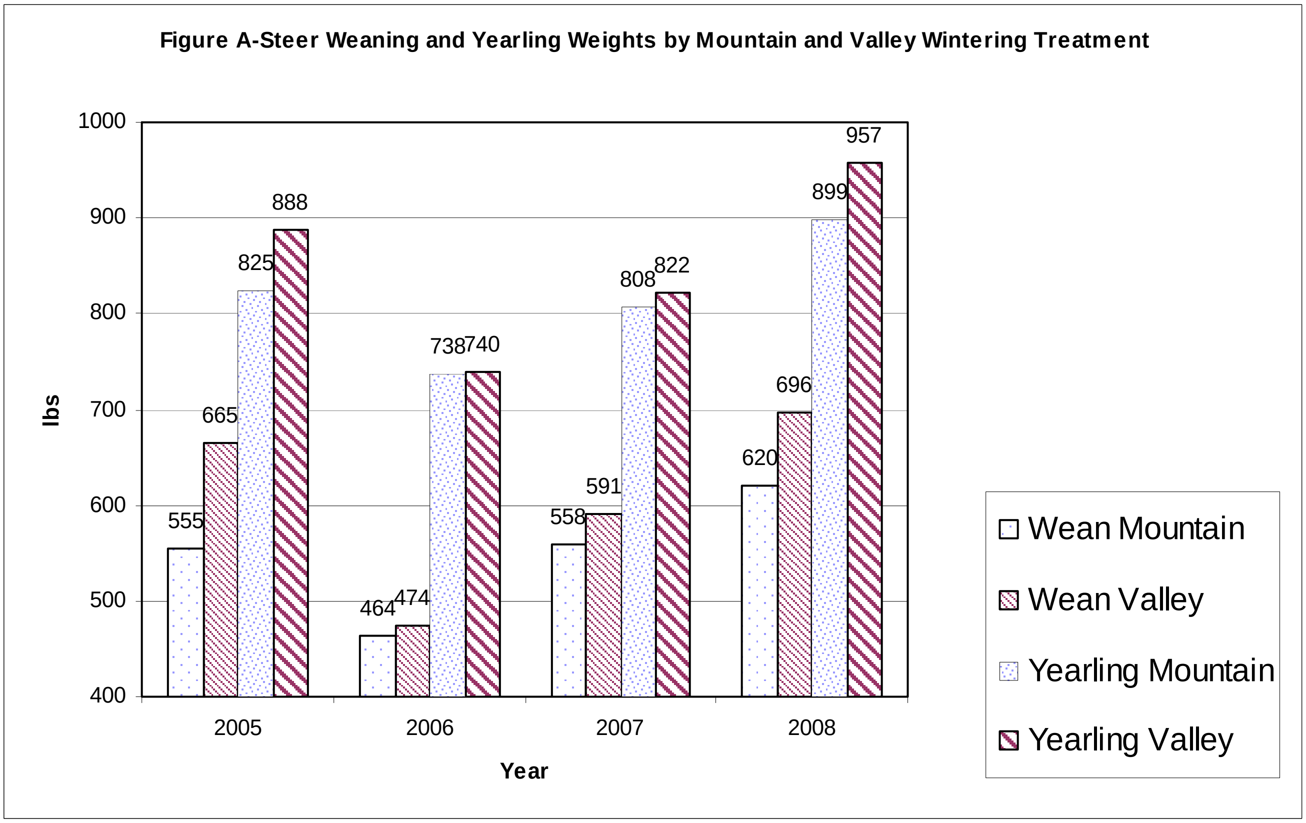


Figure A-Steer Weaning and Yearling Weights by Mountain and Valley Wintering Treatment
1000
900
800
700
600
500
400
lbs
555
665
825
888
464
474
738
740
558
591
808
822
620
696
899
957
2005
2006
2007
2008
Year
Wean Mountain
Wean Valley
Yearling Mountain
Yearling Valley

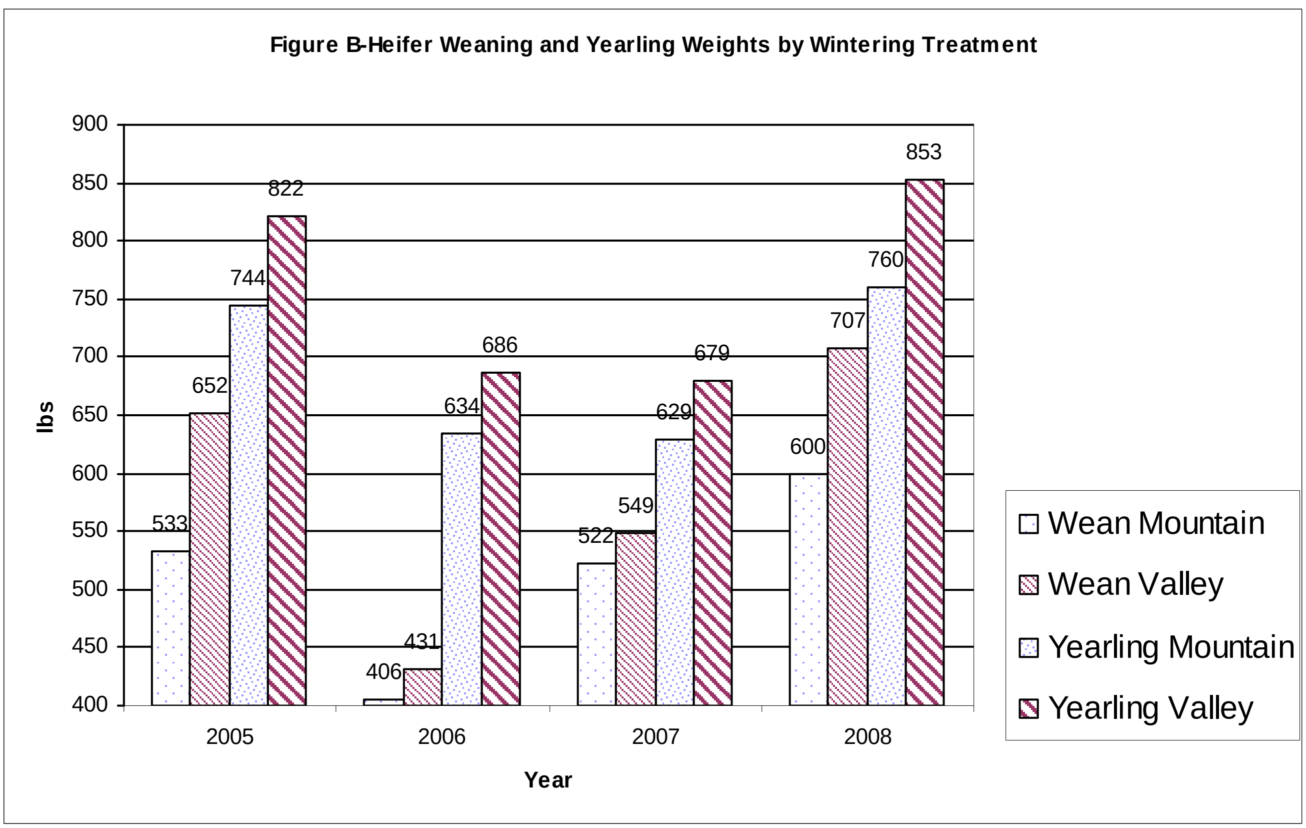


Figure B-Heifer Weaning and Yearling Weights by Wintering Treatment
900
850
800
750
700
650
600
550
500
450
400
lbs
533
652
744
822
406
431
634
686
522
549
629
679
600
707
760
853
2005
2006
2007
2008
Year
Wean Mountain
Wean Valley
Yearling Mountain
Yearling Valley

University of California
Cooperative Extension
Shasta County
1851 Hartnell Avenue

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This newsletter contains articles written by University of California Farm Advisors, Specialists, and Program Representatives. Our aim is to provide the ranching community in the Sacramento Valley with science based information. We welcome your feedback and encourage you to call or email us.

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