Northern California Ranch Update

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REPRODUCTIVE HERD HEALTH

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High energy costs coupled with high grain costs and the nationwide economic picture make the cattle market tough to figure out. Now is the time to evaluate the reproductive efficiency of your cow herd. Dry, open and late cows aren't carrying their weight. Selling more pounds of calves is definitely a good idea, but the average producer doesn't necessarily need to increase the number of cows in the herd.

Repeatedly, research has indicated the three most important factors determining profitability in cow/calf operations are: (1) cost of production, (2) reproductive rate, and (3) weaning weight of calves. This research enforces our common sense view of cow/calf profitability. If the cost of production is very low, then almost anything sold is at a profit; on the other hand if it costs $800 per year to run a cow, then making a profit will be a rare event. The third most important factor is weaning weight and again its importance is obvious. Weaning weight is a function of genetics and feed conditions and it is important to match your genetics with your particular ranch conditions; however, a poor feed year will result in lower weaning weights no matter what we do. The second most important factor is reproductive rate and while genetic selection is important here—the reproductive management of the herd is more important and we will focus on some of the practical things you can do to maximize the reproductive rate in a cow/calf herd.

What is the reproductive rate?

The most honest way to calculate the reproductive rate is to look at % calf crop weaned—this is the primary product we sell. This rate is the % calf crop per cow (or herd) exposed to breeding (bull and/or AI).

$$\text{\% Net calf crop} = \frac{\text{Number of calves weaned}}{\text{Number of cows exposed to breeding}} \times 100$$

So if you started with 200 cows exposed to the bulls and weaned 160 calves, that would be an 80% calf crop. By the way, this is better than the national average of about 71%. If those weaned calves averaged 500 pounds each, then the average for the original 200 cows exposed would be 400 pounds of calf per cow exposed. Let's say you increased your net calf crop to 88% (176 calves) and they still weaned at 500 pounds, then your new average per cow is 440 pounds/cow exposed. At $1.00 per pound of calf that's $8,000 more from those 200 cows. At $1.20 per pound, that's $9,600 additional income. The economic incentive to get cows pregnant, to maintain that pregnancy to get a live calf, and to keep the calf alive and healthy to weaning is clear. So how do we get that done? What are the potential problems that stand in our way? In this discussion we will split this up into three areas: (1) getting the cows pregnant, (2) maintaining the pregnancy, and (3) keeping the calf alive after birth. Nature doesn't make these nice distinctions in all cases and we need to be aware of that variability.

What are the industry averages for calf crop losses?

As mentioned above, the U.S. average for net calf crop weaned per cow exposed is about 71%. Therefore, 29% of the cows exposed to breeding fail to wean a calf. About 17% of cows exposed to the bull or AI'ed do not become pregnant. These are cows that do not cycle and come in heat, cows that are exposed to infertile bulls or AI'ed incorrectly, and cows that contract Trichomonosis or vibriosis and lose the pregnancy early. Nationwide, about 2.3% of cows have abortions and thus do not wean a calf. In California this number is probably higher because of our problems with Foothill Abortion. Six percent of calves born die in the neonatal period, which is the first month or so of life. These deaths are usually due to diarrhea and/or pneumonia; however, in California we lose a number of calves to "white muscle disease" because of selenium deficiency. About 3% of calves that make it through the neonatal period die before weaning, these deaths are due to pneumonia, BRSV, blackleg, and similar infectious diseases. With over 50% of our reproductive losses due to cows that don't become pregnant we will discuss this aspect first.

What steps do we need to take to get the cows pregnant?

First, be sure the cows are in good body condition prior to calving. The cows' ovaries are beginning to produce the eggs that can become next year's calf well before calving and the cows need to be in positive energy and protein balance for that to occur. The cows should be in body condition score 5, 6, or 7 (on a scale of 1 to 9 with 1 being too thin to stand and 9 being obese). Body condition scores of 5, 6, and 7 is optimum for most beef herds. Cows with body conditions scores of 3 and 4 may need additional feed before calving—so think about segregating these cows from the main herd for supplemental feed or marking them for culling after they calve (don't expose them to the bulls). This assessment of body condition can easily be done at the time the cows are checked for pregnancy at 4-7 months of gestation. In addition to general nutrition, be sure the cattle have adequate trace mineral supplementation. Copper deficiency and selenium deficiency both decrease reproductive performance in beef cattle

cattle and both problems are very common in California. If you are in doubt of the cows' mineral status, your veterinarian can take a few samples at the time of the pregnancy check to supply that information.

Second, be sure the bulls are ready to perform. Your veterinarian should check each bull for semen quality, any infections of the reproductive tract (seminal vesiculitis, etc), general soundness (feet, legs, body condition), and eyes (no cloudiness or eye infections). Additionally, all bulls should be checked for Trichomonosis before the breeding season. This is particularly important if any of your neighbors have had problems with "Trich". More than 10% of California beef herds are infected with "Trich" by conservative estimates. Checking the bulls ***before*** the breeding season will eliminate or minimize economic losses. Checking after the breeding season will only help to diagnose an existing problem; but losses for that year will continue. It is very important that the bulls are checked for breeding soundness and "Trich" ***before*** each breeding season.

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EPD Accuracy

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There are two issues about accuracy of Expected Progeny Differences (EPDs). The first is whether EPDs are accurate in accessing or estimating genetic value and the second is the accuracy of a specific numerical EPD. These are completely different concepts, but one may influence the other in actual practice.

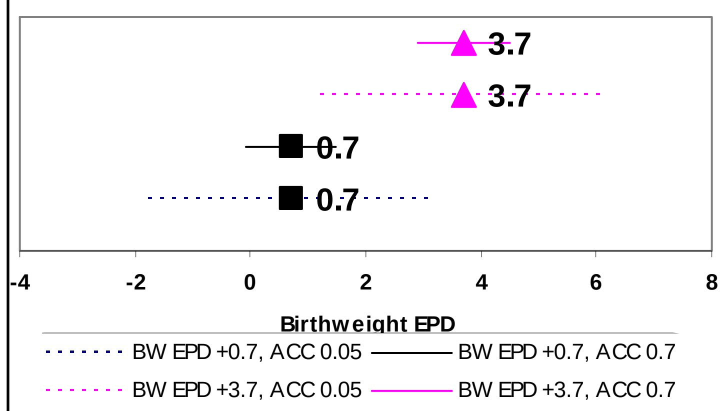
There has been a great deal of experimental research and practical use of EPDs to show that they can be successful in selection and improving genetic merit. EPDs from individuals with numerous progeny and extensive pedigrees have been very useful. It gets confusing because the mathematical models that calculate a specific EPD value have some error associated with that predicted value. Usually we call that error a variation or deviation or it may be expressed as a standard deviation which implies certain statistical properties about the error.

With EPDs the variation or error associated with the calculation of an EPD is called its accuracy. These are often reported (but usually ignored) with the EPD, and they range from 0 to 1. A stud bull with lots of progeny and an extensive pedigree may have an accuracy of 0.90. A value of 1.0 would be no error. Young bulls as typically purchased will often have an accuracy of 0.05. Accuracy values are a handy tool to help guide us in accessing the "true" value of an EPD. Accuracies of 0.70 or greater are usually considered highly accurate. That means the reported EPD is likely very close to the "true" EPD. It will not change much as more records are reported.

EPDs that are clearly of low accuracy are those of about 0.05. This means that the reported EPD has a good chance of changing as more records are reported. Accuracies between 0.05 and 0.70 are more problematic in classifying as to their "accuracy" or error but are still useful as a guide.

The question not often asked is how much error (variation) is there in the EPD based on the accuracy? It is helpful to know that an EPD is of "low accuracy" but can we learn more and is it helpful in our decision-making? A good number to keep in mind is 2.5 pounds. For an Angus bull with a birthweight EPD accuracy of 0.05, their "true" EPD will be above or below the reported birthweight EPD value by about 2.5 pounds. For example, for a reported birthweight EPD of 0.7 with an accuracy of 0.05, the "true" birthweight EPD will be between –1.8 and +3.2 about 2/3 of the time. These values are calculated by: 0.7-2.5= -1.8 and 0.7 + 2.5= 3.2. This is illustrated in the figure (below) showing a birthweight EPD of 0.7 and a dotted line indicating the variation expected in that EPD ranging from –1.8 to

8 to +3.2. If we compare this bull to one with a birthweight EPD of 3.7 with an accuracy of 0.05, we find that the second bull's EPD will most of the time (2/3 of the time) finalize between 1.2 and 6.2. This is illustrated with the triangle symbol in the figure and its dotted line. The problem is there is a substantial chance that the true EPD of these bulls are about the same. There is an "overlap" between 1.2 and 3.2, suggesting that there is not a difference between the two low accuracy EPDs.



When the accuracy is higher the amount of the error is smaller. For an accuracy of 0.70 the birthweight accuracy is about 0.8 pounds, which is much smaller than the 2.5 pounds associated with the low accuracy EPDs. The figure demonstrates the EPDs with higher accuracy.

When comparing birthweight EPDs of young low accuracy bulls the EPD values need to be about 5 pounds different to be confident of a true difference. This doesn't happen too often. As the difference gets less we are less confident that the reported EPDs for birthweight are really different. Remembering to add or subtract 2.5 pounds to a birthweight EPD for Angus is helpful in deciding if the EPDs are really different. Different breeds have different values associated with the accuracy. But for all breeds 0.05 represents low accuracy and 0.70 is much higher accuracy.

Low accuracy EPDs can be very meaningful and useful, but they must be very much larger or smaller than comparative values. For example, a young bull has a marbling EPD of 0.55 with an accuracy of 0.05. A marbling *accuracy* of 0.05 is associated with a marbling *error* of 0.25. The young bull with a reported marbling EPD of 0.55 will likely have a "true" EPD of between 0.3 (0.55-.25=0.3) and 0.8 (0.55+0.25=0.8). With time, even if all the additional records are not favorable, the "true" EPD of this young bull is most likely at least 0.3 which is higher than most Angus sires. In this example, even though the accuracy is low, the early EPD value is so high that the odds are very good that at worst case it will be recalculated and still be relatively high.

The table below shows the error associated with important common EPDs for low accuracy Angus bulls (accuracy of 0.05). The errors can be applied like the examples above to the reported EPD for a young bull to help determine what the "true" EPD might be when more records become available. As a general rule when any two EPDs are different by twice the value in the table for that trait they are likely going to be different when their accuracy improves. If the EPDs for a specific trait are only different by the value in the table then the odds go down that the EPDs are really different.

Expected Progeny Difference	Error or change associated with an Accuracy of 0.05
Birthweight	2.5
Weaning weight	11
Yearling weight	16
Milk	9
Calving ease direct	8
Calving ease maternal	9
Marbling	0.25
Ribeye area	0.27
Fat Thickness	0.034
Ultrasound IMF	0.17
Ultrasound ribeye area	0.31
Ultrasound fat thickness	0.022

New tools to help predict genetic value at an early age are being developed. But until then you should be the producer that uses the reported accuracy of an EPD. Use the error value associated with the accuracy for a specific trait to determine whether an EPD is really different. If not different then let someone else pay more for that bull.

Occurrence of Animal Plant Poisonings in California

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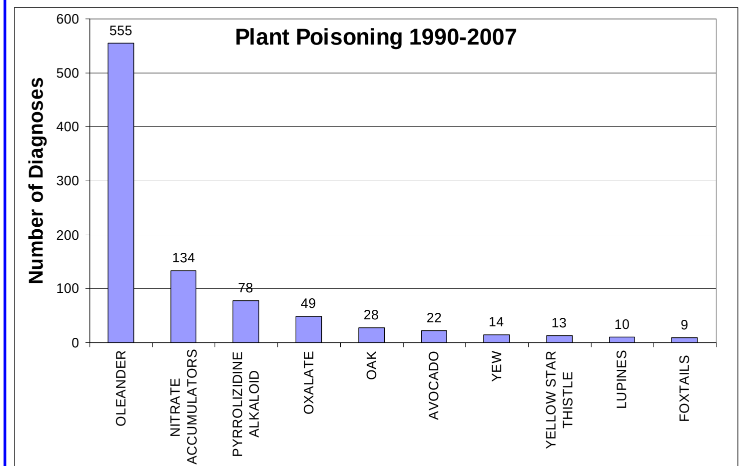
The California Animal Health and Food Safety (CAHFS) Laboratory System Toxicology Laboratory has investigated numerous cases of suspected plant poisoning from 1990-2007. The CAHFS veterinary toxicologists have diagnosed plants as the cause of toxicosis in more than 600 submitted cases, most of these in livestock. The largest numbers of submissions were for cattle, followed by horses, pigs, goats and sheep. Figure 1 shows the numbers of confirmed cases for the ten most frequent diagnoses.



These data show that the most commonly diagnosed plant poisoning is that of the ornamental oleander, a non-native species. The data from CAFHS are from samples submitted for diagnosis, thus they do not necessarily represent the actual occurrence of plant poisonings in California.

Cattle	Horses	Sheep	Goats
Oleander	Oleander	Oleander	Avocado
Nitrate/Nitrite	Pyrrolizidine Alkaloids	Oxalate	Nitrate/Nitrite
Oxalate	Yellow Star Thistle	Nitrate/ Nitrite	Oxalate
Pyrrolizidine Alkaloids	Dogbane (Apocynum)	Lupinus Sp.	Lupinus Sp
Tannic Acid – Oak	Setaria Sp. (Foxtails	Perennial Ryegrass	Cyanide

These toxic compounds are contained in the following plants:

<u>NITRATE/NITRITE</u> - Sorghums - like Johnson Grass and Sudan grasses, Oat hay, other grass hays, Lambs quarters (Chenopodium), Pigweed (Amarathus).

<u>PYRROLIZIDINE ALKALOIDS</u> - fiddleneck, tansy ragwort, groundsel.

<u>OXALATE</u> - Greasewood (Sarcobatus), Sorrels (Oxalis), and Dock (Rumex sps), Pigweed, and Lambs Quarters.
Landscape plants have also become a bigger risk of plants poisonous to livestock animals. Some are due to planting of poisonous ornamentals in or near the pasture or livestock facilities while other poisonings are caused by yard trimmings that are offered to livestock by unknowing neighbors.

Fertilizing Grazed Irrigated Pasture

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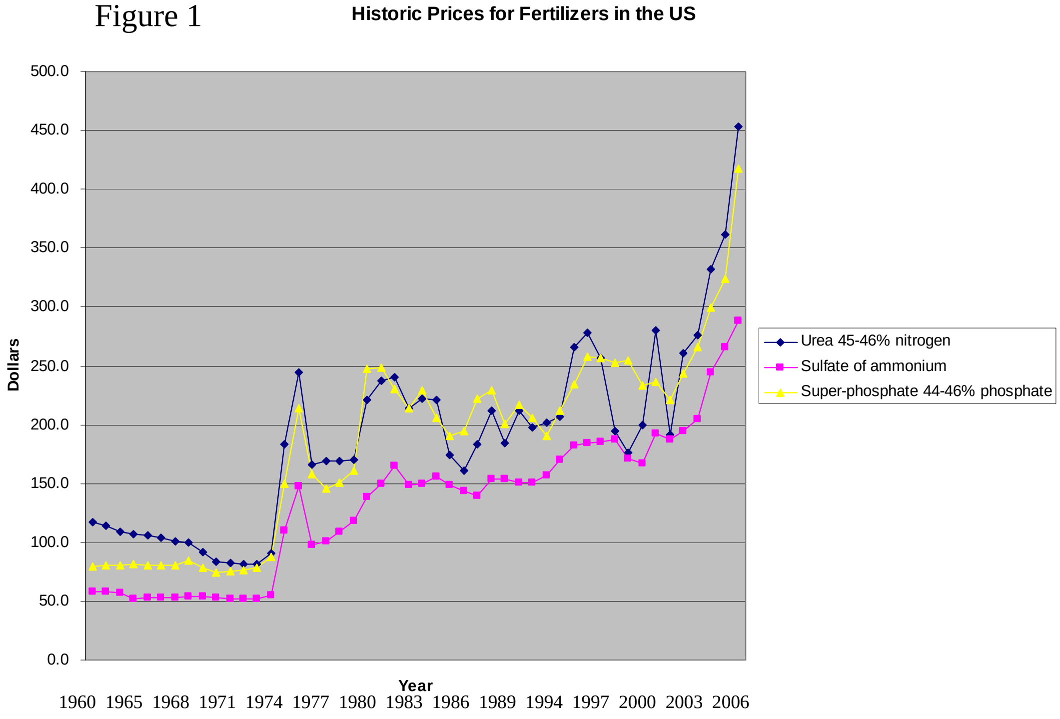
High energy costs coupled with limited fertilizer production facilities and competing demands for fertilizer from other segments of the agriculture industry has many livestock producers trying to figure out a cost effective fertilization strategy. Figure 1 outlines the cost of fertilizer between 1960 and 2007. Current fertilizer prices have continued to move higher, with local retail prices for urea approaching $600/ton. Much of this dramatic increase in fertilizer costs has occurred in the past three years.

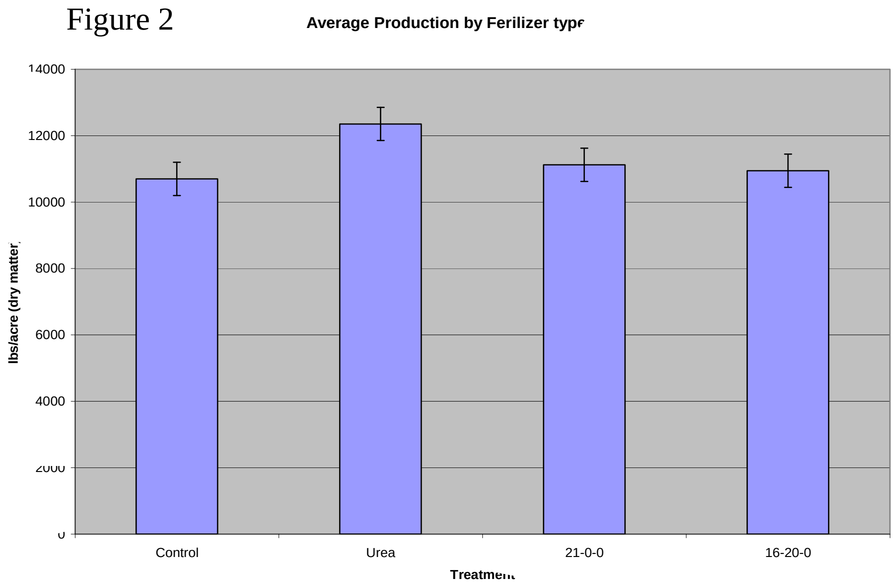
Figure 1



Fertilization in a hay operation can make sense in the current market. Farm Advisors Rob Wilson and Steve Orloff have recently published an excellent overview of fertilization strategies for grass hay production (celassen.ucdavis.edu). Fertilizing at the present prices in grazed irrigated pastures may not be prudent.

For the past five years annual and monthly production data has been collected on an irrigated pasture ranch in Shasta County. These plots were not grazed and were clipped to ground level on a 30 day interval. The ranch is located at an elevation of 1700 feet. The plots were fertilized in April at a 200 lbs/acre rate (92 lbs N/A) with Urea (46-0-0), Ammonium Sulfate (21-0-0) (42 lbs N/A) and Ammonium Phosphate (16-20-0) (32 lbs N and 40 lbs P_2O_5/A). Annual production by treatment is outlined in Figure 2.

Figure 2



In this well managed pasture, urea is the only fertilizer treatment that increased forage production a substantial amount. The average annual increase in forage production was about 1650 lbs/acre. The lines extending out of the bars on the next two graphs are called "Standard Error Bars." When these lines do not overlap, one can be reasonably expect the difference between treatments is real. When these lines overlap the difference between the treatments might not be real.

A 2004 UC Cost Study looking at the production of Beef Cattle in the Northern Sacramento Valley noted a cost of summer pasture at $ 126/cow. When divided by the 6 month grazing season equals $24.50/AUM in value for irrigated pasture. If we assume an AUM to be the equivalent of 1000 lbs of forage on a dry matter basis, fertilizing irrigated pasture in today's rapidly increasing fertilizer costs needs to be considered very carefully.

From a gross receipts basis grazing and haying have different values. Hay in 2008 is expected to be in the neighborhood of $200/ton. That same forage has a value of approximately $50/ton ($25/AUM) if it is grazed. Assuming a 1650 lb increase in forage production and $600/ton cost for urea, if urea was applied at a 200 lbs/acre rate, the fertilizer cost per acre would be $60. When the cost of application is added, the total moves to $70/acre. This additional forage cost about $85/ton (about $42.50/AUM). Fertilizing for hay production might make sense, but applying fertilizer only to graze pastures might not. Your pasture response to nitrogen fertilizer will depend on your grazing system (24 to 30 days of grazing rest and pasture not grazed below 3 to 4 inches, phosphorus, sulfur, and potash levels in the soil, species composition (grasses, rushes, clovers), and amount of irrigation.

Ideas to consider in planning your fertilization strategy:

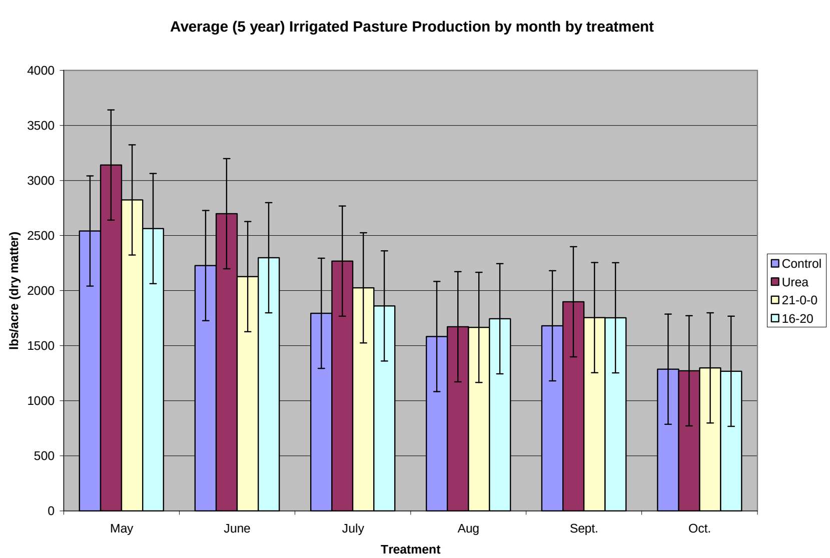
1. Do the necessary field sampling and analytical work. Tissue and soil test to ascertain the fertility status of your pastures and use this information in the development of your fertilization program. For information obtaining and interpreting these samples, call your farm advisor or refer to the Northern California Ranch Update-April 2007, Vol. 1, Issue 2 (ceshasta.ucdavis.edu).

2. Be assured you have adequate irrigation water to make it through the growing season.

3. Consider taking a cutting of hay off. Fertilize the most productive ground, fence the cattle off and make hay. Figure 3 outlines the average monthly forage production by treatment. Note the higher early season production and in particular the increase associated with the urea treatment. A single spring application should yield about 15 lbs of forage for each unit of N applied.

4. Develop a managed grazing program. This does not necessarily mean a high intensity, short duration grazing systemem. If you can bunch cattle up and move them when the forage in the field is grazed to 3"-4" height, you are leaving adequate leaf area to allow regrowth. Allow the plants a rest period between each grazing of 24 to 30 days (varies based on growing season). This allows the plant to increase vigor by having time to store root carbohydrates.

Figure 3



5. Consider fertilization as a strategy if you have a way to bank that forage for use in late fall. If you can keep cattle on the pastures longer you may be able to delay feeding hay, resulting in a reduction in feed costs.

6. Leave a “check” spot to see what effect your fertilizer treatment had on forage production. This can be easily accommodated by putting a small tarp down to cover a small area (perhaps 10’ x10’) when broadcasting fertilizer.

References: USDA-Economic Research Service-Average US Farm Prices of Selected Fertilizers (http://www.ers.usda.gov/Data/FertilizerUse/Tables/Table7.xls)

Affect of time of transport after insemination on pregnancy rates: When Should I Not Ship Cows?

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If the current weather pattern in Northern California doesn’t change significantly in the near future, we are looking at a short winter pasture season in the valley and foothill ranges. Spring calving cows may be shifted to summer pasture early, thus creating conditions in which early embryonic mortality, due to shipping stress, may occur. Calf crop could be adversely affected from transportation stress. Increased re-breeds, and a longer calving season may also occur.

Researchers have looked at the affect of day of transport after artificial insemination of heifers on pregnancy rates. Table 1 demonstrates how transporting heifers at different days after insemination affected pregnancy rates. They found shipping heifers between days 5 and 42 could be detrimental to embryo survival, and cause approximately a 10% decrease in pregnancy rates.

Table 1. Effect of time of transport after insemination on pregnancy rates

Item		
Days after Insemination that cattle were transported	Breeding season Pregnancy Rate	Percent Pregnancy loss compared to transportation on days 1-4
1-4 (Early)	95	**
8-12 (mid)	94	12
29-33 (late)	94	9

**This was the standard from which the losses were calculated

Another study depicted shipping heifers 45 to 60 days after insemination could result in 6% of embryos being lost.

Table 2. Effect of time of transport after insemination on pregnancy rates

Item		
Days after Insemination that cattle were transported	Breeding season Pregnancy Rate	Percent Pregnancy loss compared to transportation on days 1-4
40-60	NO DATA	6%

The critical time point is when the adhesion of the embryo to the uterus takes place during this early time of pregnancy. If this process is disturbed increased embryonic mortality may occur. While final pregnancy rates are similar for all shipping times, the number of animals that rebreed may be increased, resulting in a decrease in the number of early season calves produced, and increase the length of the calving season.

When results from the two studies are considered, the potential risk to the calf crop can be estimated.

Item	
Days after Insemination that cattle were transported	Risk to pregnancy
1-4	LOW
6-42	HIGH
45-60	LOW

Before you schedule to ship to summer pasture, take a minute and reflect back on your calendar to determine when the bulls were turned in. Consider when the majority of your calves are born (early, middle or late in the calving season) and figure out how long your cows have been bred. While it is not practical to determine how long individual cows are bred, you should be able to estimate how long the majority of the herd has been bred and the potential shipping risks. Taking the time to do this and schedule accordingly could help prevent higher percentage of later season calves and a potentially reduced calf crop.

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Fiddleneck

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The early and fast spring this year seems to favor fiddleneck (*Amsinckia menziesii*) production. Fiddleneck, which is also incorrectly referred to as fireweed or tarweed, is an aggressive native winter annual that can grow from 12" to 30" in height. When it is mature, it is readily identified by its characteristic yellow or orange flowers that rolls back on the stem to resemble the neck of a fiddle or scorpion tail. Figure 1 is a photo of the weed.

Figure 1
Detail of Fiddleneck flower and neck

Generally poisonous plants on rangeland do not pose a huge risk to livestock. However, limited rainfall in the region has reduced forage availability and livestock may graze plants they typically avoid.

Fiddleneck is toxic and causes damage to the liver in horses and cattle. Sheep seem to be less susceptible to the toxin. Younger animals are more susceptible than are adults. A bred cow can appear to be unaffected, but the toxin can be passed across the placenta to poison the developing fetus. Highest concentrations of the toxins, known as pyrrolizidine alkaloids, are contained in the seeds . Fuller (1986) notes livestock are poisoned after several days or weeks of ingesting fiddleneck seeds in harvested grain or in mature plants present in hay. It is important to note that dried fiddleneck either in the field or in hay can still be toxic to animals.

Control of fiddleneck in rangelands can be achieved with the application of Milestone (aminopyralid) from November to January or Telar (chlorsulfuron) in the fall

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