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University of California
Agriculture and Natural Resources
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Ranch Update

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Pasture Aeration Trial

Larry Forero, UCCE Shasta, Farm Advisor
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Pasture aeration is a practice done on some ranches in an effort to improve water penetration and improve production. Proponents of the technique claims this practice will increase the quantity of forage produced from pasture improve production.

In the 2009 field season, a trial was initiated to determine the benefits of aeration on pastures in Hat Creek as well as the Palo Cedro area. The Hat Creek Trial results are described below.

Figure 1. Pasture Aeration Implement

The treatments and controls were applied in the spring of the year. Figures 1 and 2 depict the equipment and the results of the treatment. The soil was a sandy cobbly loam. Both control and treatment plots were protected from grazing and harvested on a 30 day interval.

Figure 2. Field after treatment (Hat Creek)

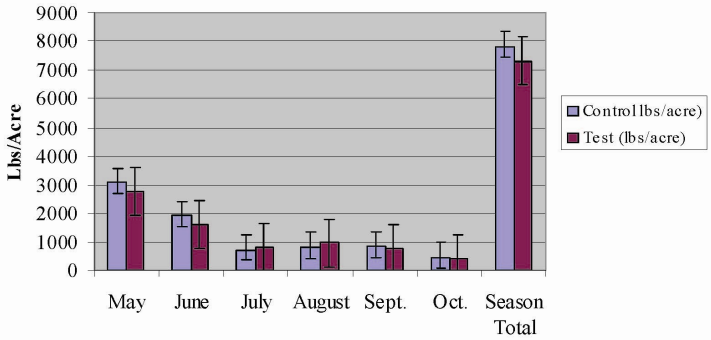
Results

Figure 3 outlines the monthly forage production as well as the total production at the site. The overlapping confidence intervals indicate the treatment and control cannot be separated statistically.

Palo Cedro Trial

A pasture aeration trial was conducted on loamy soil in the Palo Cedro area. Alternating borders were treated in June after haying. Replicated control and treatment plots were protected from grazing and harvested at the end of the growing season. No statistical difference in production could be found.

Figure 3-Hat Creek Plots-2009 Field Season



Conclusion

Most of the research done on the value of aerators for pasture and hay is not encouraging. This does not mean that aeration will always be ineffective. It is possible that there are sites where severe compaction problems exist from cattle trampling or heavy equipment traffic on certain soils where aerator equipment may improve water infiltration and increase forage yields. Careful evaluation of potential aeration sites should be done before using a soil aerator. From research results so far, it is unlikely that most areas will give much economic benefit from this practice. Soil disturbance by an aerator could also result in weed problems in a pasture.

Research in Canada and New Zealand showed similar results. In both cases the authors were unable to document lasting benefits due to aeration.

Malhi, S., K. Heir, and K. Nielsen. 2000. Efficacy of pasture rejuvenation through mechanical aeration of N fertilization. Canadian Journal of Plant Science 80:4 813-815.

Courname, F., R. McDowell, and R. Littlejohn. 2011. Is mechanical soil aeration a strategy to alleviate soil compaction and decrease phosophorus and suspended sediment losses from irrigated and rain-fed cattle-grazed pastures? Soil Use and Management 27:3 376-384.

2010/11 Northern California Winter Pasture Experience
Larry Forero and Glenn Nader, UCCE Livestock Farm Advisors

Forage production on California annual range is highly variable. The 2010/11 forage year was an especially difficult year to predict. The timely fall rains coupled with a warm January and then a favorable rainfall pattern in the spring resulted in better than average forage production. The late spring rains resulted in additional forage growth after some ranchers had shipped and provided dry feed for cattle to come back to in the fall. Figure 1 represents long term plot data on a ranch located near the Redding Airport with an average annual production of about 1500 lbs/acre. The 2010-2011 annual production is estimated at about 116% of normal.

Figure 2 shows the average monthly and seasonal production at the UC Sierra Foothill Research and Extension Center near Marysville. The forage produced on a monthly basis last year was about the average until the month of March. The late season rains pushed up the forage total to about 125% of average. This situation was common across northern California. Many producers made arrangements and removed livestock from annual ranges and the rains that came after the shipping resulted in additional dry forage to ship back to in the fall.

If we fast forward to the 2011/2012 forage year—we had timely fall rains that got grass started. This forage start coupled with residue from the previous forage year resulted at least a comfortable start to the grass season. The problem many cattle producers were facing was inadequate stock water. The lack of rain in November and December has left many reservoirs and seasonal streams dry and many ranches are either stocked lightly or not at all.

While the situation at this point has cattle producers nervous, we are a long ways from June and as seen last year the timing of the spring rains have more impact on total production. At this time there has been no discussion related to government programs to help offset the forage and water situation, however the drought monitoring group is watching the situation and updating the precipitation maps weekly. The local Farm Services Agency is charged with the responsibility of administering disaster programs and these programs key to these maps. Your local FSA staff is interested in hearing about range conditions. Take the time to get acquainted with them and how these programs work now so that should they become necessary, you will be better prepared.

Figure 1

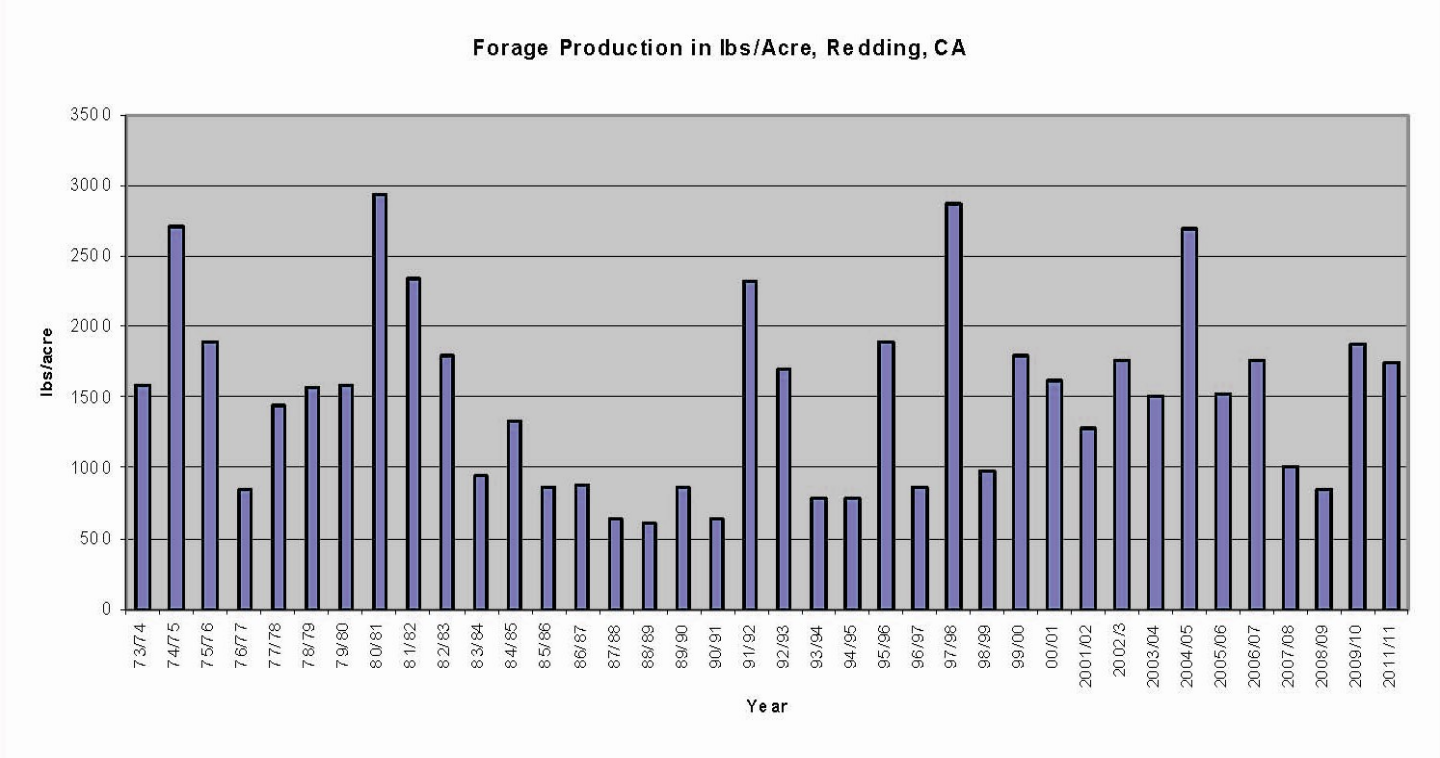
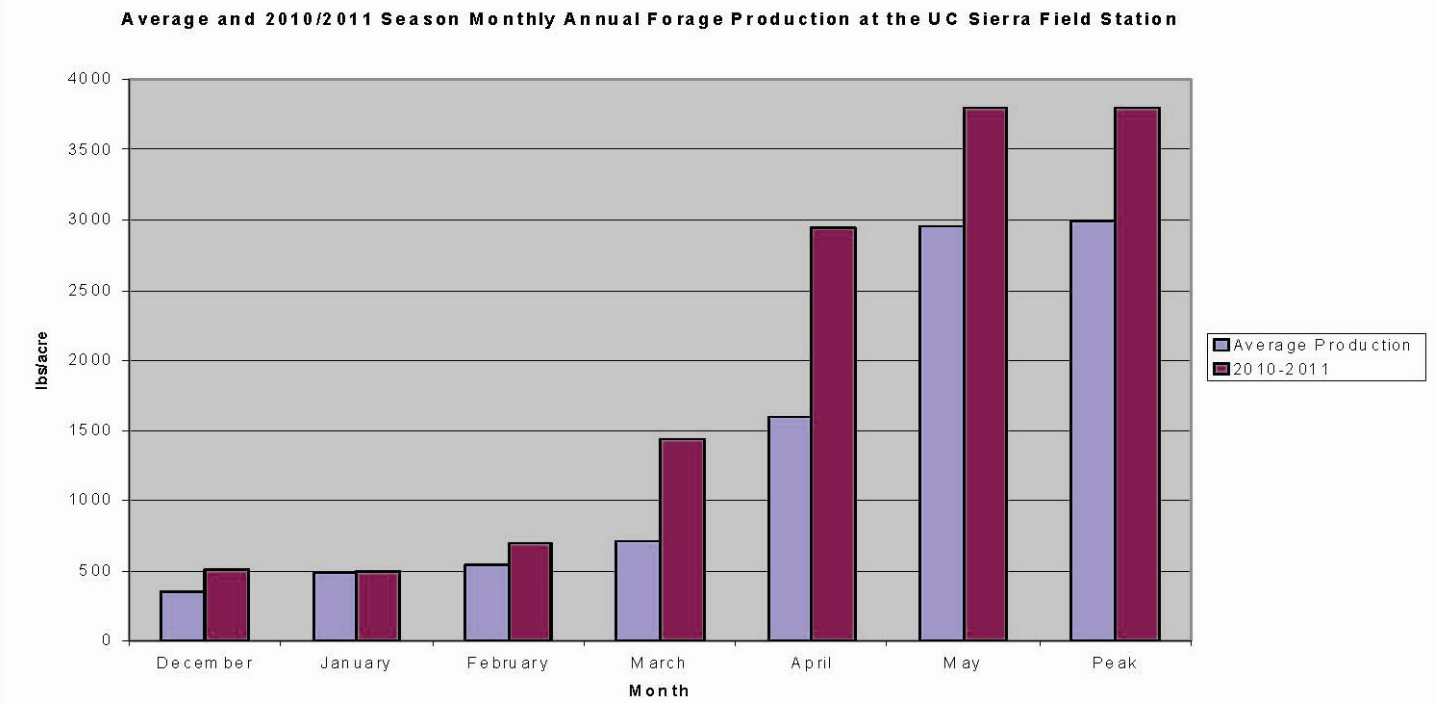


Figure 2



Effects of Heavy Grazing on Tarweed and Vinegarweed

Josh Davy – UCCE Farm Advisor and Casey Dykier – UCCE Intern

Tarweed (*Hemizonia*) and Vinegarweed (*Trichostema lanceolatum*) are native plants that grow throughout the summer. They are not palatable to livestock. In order to provide information on how to best avoid large occurrences of vinegar and tarweed, a grazing study was conducted to determine how to best encourage these weeds.

Personal observations have hinted that a lack of cover during spring encourages vinegar and tarweed growth, so a grazing study was conducted to determine if heavy spring grazing treatments made a difference in their composition. Note that a cool march made early spring grazing later than would normally occur. At the first grazing the grasses were in the late vegetative to early boot stage of development and the filaree was flowering. The final grazing occurred when all grasses were mature and dry except for medusahead, which was mature but still green. The following grazing treatments were applied using weaned heifers:

1. Control (no graze)
2. Single graze early (4/14/11)
3. Single graze late (5/22/11)
4. Season long heavy graze (4/14/11, 5/1/11 and 5/22/11)

To determine utilization, forage clippings were collected following grazing of each plot (see table 1). The site was a modestly productive gravelly loam, so grazing treatments only lasted between one and two days. Each grazing ended when roughly 100 lbs/acre was left in the plot area.

Table 1. Pounds per acre of residual forage left in each treatment by date

Treatment	04/14/2011	05/01/2011	05/22/2011
Control	550	950	600[1]
Late Graze	550	950	**170**[2]
Early Graze	**100**	400	400
Season-long Graze	**100**	**70**	**40**

[1]weight decreased due to shattering dry matter from late rain. Early grazed plots did not shatter because grazing caused them to mature later. [2]bold indicates when grazing treatment occurred .

Monitoring of species ground cover was conducted for all treatments at the end of June (see table 2). All grazing treatments significantly increased tarweed (5%) over the non-grazed control (1%), however, no significant differences were seen between the three methods of grazing. This composition change equated to roughly a rise from no tarweed plants every four square feet to roughly 2 plants every four square foot. The management implication of this result suggests that heavy grazing which opens up the plant canopy at any point during spring will encourage tarweed growth.

Vinegarweed, on the other hand, only significantly increased with the single early grazing treatment. No other grazing treatments significantly raised vinegarweed composition. Although a small part of the overall composition, vinegarweed went from almost no presence to two percent of ground cover (0 plants every four square feet to 1 plant every four square feet).

Interestingly, rose clover was not affected by the single early grazing when compared to the control (both ~3% cover), but was significantly decreased to less 1 percent cover with heavy season long and late grazing treatments. Soft chess was exactly the opposite. The late grazing and control were not different, with 15% soft chess cover, while the early grazed treatment dropped soft chess cover to 9%. This indicates that initially sought out the soft chess, but as forages matured and quality dropped, cattle switched consumption to the higher quality clover and left the soft chess ungrazed.

Table 2. Species composition by percent for each grazing treatment.

Species	No Graze	Single early graze	Single late graze	Season long graze
tarweed	1 b*	4 a*	5 a*	4 a*
Vinegarweed	0.2 a*	2 b*	1 ab*	1ab*

*Within rows, if the letters are the same, the values are not considered different.

Tarweed

Vinegarweed

The spring of 2011 was high for precipitation. The project will be repeated over several years to take yearly rainfall into account. Special thanks to the White Ranch for their help conducting the project!

A Method to Implement Crossbreeding

Dan Drake, UCCE Siskiyou County, Farm Advisor

For this example we will start with a mostly straightbred Angus herd that wants to use Charolais in a two breed rotational crossing system. We will need two new different colored ear tags from what may already be used, e.g. blue and pink. The blue will indicate the female has been exposed to the new breed of bull, Charolais. The pink will indicate that the sire of the animal with the pink tag was Charolais. Females with Charolais sires will always be bred to Angus bulls.

Select the number of cows that you want to start crossbreeding. This might be a multiple of the number of new breed bulls. For example if you obtained 2 bulls of the new breed then you might want to select 25 times 2 equals 50 cows. Select the cows on whatever basis you desire. PUT SOME TYPE OF EASY PERMANENT IDENTIFICATION ON THE COWS AT THE START OF THE BREEDING SEASON. In our example these cows will get a blue ear tag. Blue tagged females go with the new breed bull. The simplest way to implement this system is if the females getting blue tags ALWAYS STAY AS BLUE TAGS AND ALWAYS GO WITH THE NEW BREED BULL.

At the end of the breeding season these blue tag cows and their calves already on the ground can become mixed with all the other cows as needed. They can calve with all the other cows. During calving, process calves as normal for all cows.

When sorting at the beginning of the breeding season is conducted blue tag cows and their calves are sorted to go back with the new breed bull. BLUE TAG FEMALES ALWAYS GO WITH THE NEW BREED BULL. If you want to add more straight Angus cows simply give them a blue tag and put them with the other blue tags. Sometime during the breeding season or at the end of breeding the calves must be processed so the female calves get a pink tag. Pink indicates they have a new breed bull, Charolais, as their sire. (Note: steers could also get a pink tag if desired for sorting or marketing.) Females are always bred with the opposite breed bull as their sire. So, pink tag females have Charolais sires and are bred to Angus bulls.

Select replacements as usual. When they are ready to go with the bulls they go with bulls of the opposite breed as their sire. The pink tag females always have the new breed for their sires so the replacement pink tags go back to the Angus sires. The non-pink females can stay with Angus or go to the new breed bulls but if they go to the new breed they get a blue tag and should stay with the new breed. Just keep repeating the system.

If you want to complicate the system you can move blue tag cows that would normally go with the new breed bull back to the Angus bulls. If you do move her back to the Angus bulls at the start of the breeding season you have to remove her blue tag and at the same time give her calf a pink tag. This identifies that the calf had a new breed sire. Her new calf as the result of the new breeding season will have an Angus sire and will be grouped with the Angus cows.

With this system the new breed percentage in calves would be a high of 5/8 and could drop below 1/16 of the new breed, i.e. back to almost straightbred.

Summary - The system is to give a permanent blue tag to cows going with the new breed bull. She will always go with the new breed. During the breeding season tag her calf with a pink tag indicating the calf has the new breed for a sire. Always bred the pink tags back to Angus sires.

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