HIGH DESERT RANCH & FAMILY

Harney County Extension Service, 450 N. Buena Vista #10, Burns, OR 97720, 541-573-2506, Fax 541-573-8387 Winter 2008
http://extension.oregonstate.edu/harney/index.php

Inside Stories Page

Happy New Year!

From the Extension Office

Dustin, Shana,

Georgia & Crystal

Dustin's Digest...

Well...I finally picked a title for this section of the newsletter. Although, I do have to admit that I'm not nearly as creative as it might appear. After my rant in last fall's newsletter, I received several suggestions. Some good, a lot that were funny, and a few that would be inappropriate for a newsletter with "family" in its name. Nonetheless, I appreciate all the suggestions.

The transition to a new year is not only a good time to look forward to new opportunities, but also a time to reflect on the past year's challenges and accomplishments. It seems like slowing down long enough to do this can be challenging in itself, but it is an important exercise nevertheless. "Fortunately," OSU generously provides me the opportunity to reflect on the past year about this time every year in the form of a mandatory Report of Accomplishments. At first, this process seems more like punishment for trying to be productive in your job than anything else, however, as I work through it, I'm finding it has a number of important redeeming values. Most importantly, I've learned that keeping good records on what you actually did and how it worked out is probably not a half bad idea; my supervisor would agree wholeheartedly with this realization. Good records would not only allow me to complete the mandatory report more easily, but would also allow me to make better decisions about what has worked in my extension program and, perhaps more importantly, what has not worked and possibly needs changed. I think this is probably important for everyone, no matter what field or industry you're in.

Last year, we held several extension programs throughout eastern Oregon on rangeland monitoring, managing feed costs and other ranch operating costs, invasive plant management and prevention, and riparian assessment and grazing management. We plan to offer similar educational opportunities in 2009. Take a look at the calendar of events for upcoming events. And, as always, please let us know if there is a need for information or education that we're not currently covering.

Happy New Year!

Dustin Johnson

OSU Rangeland/Livestock Extension Agent

MEET OUR NEW STATE BEEF EXTENSION SPECIALIST

Reinaldo Fernandes Cooke, Oregon State University Beef Extension Specialist

Reinaldo Fernandes Cooke was recently hired by Oregon State University to work at the EOARC-Burns as a Beef Extension Specialist.

Reinaldo grew up in a medium-sized town surrounded by large citrus, sugarcane, and cow-calf operations in the state of São Paulo, Brazil. He received a B.S. degree in Animal Sciences from the São Paulo State University in December 2003, and moved to Florida in the fall of 2004 to attend graduate school. Reinaldo received both M.Sc. (May 2006) and Ph. D. (December 2008) degrees in Animal Sciences from the University of Florida. His graduate research focused on beef cattle nutrition and management, and was conducted under the direction of Dr. John Arthington, associate professor and director of the UF/IFAS-Range Cattle Research and Education Center, Ona.

Reinaldo plans to build an integrated extension and research program targeted to address the needs of beef cattle producers in the state of Oregon. More specifically, Reinaldo plans to directly investigate questions and issues raised by Oregon beef producers, delivering answers and results via extension activities and materials, and also focus his research program on alternatives to enhance productivity of growing and mature cattle within cow-calf scenarios.

Reinaldo is married to Flavia Cooke, who is also working at the EOARC-Burns as a Faculty Research Assistant with Dr. David Bohnert. They're expecting their first son, which is due in May. If you would like to meet or contact Reinaldo, please feel free to stop by, call, or send an email to:

Eastern Oregon Agricultural Research
Center - Burns Station
Oregon State University
67826-A Hwy 205
Burns, OR 97720
Email: reinaldo.cooke@oregonstate.edu
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WINTER COLD STRESS ON CATTLE

Steve Boyles, Ohio State University Beef Extension Specialist and Jeff McCutcheon, Knox County ANR Agent (reprinted from *Prime Cuts*, Montana State University)

Factors that create stress during the winter months are cold, wind, snow, rain and mud. The primary effect on animals is due to temperature. All these factors alter the maintenance energy requirement of livestock. Maintenance requirement can be defined, as the nutrients required for keeping an animal in a state of balance so that body substance is neither gained nor lost. An interesting thing to note is that while energy requirements increase, protein requirements remain the same.

Some published sources contain nutrient requirements for beef cattle that include guidelines for adjusting rations during winter weather. Even without published sources, competent livestock producers realize the need for more feed during cold weather. Make sure that water is available. If water is not supplied, cattle will reduce feed intake.

Daily dry matter intake of beef cows with respect to temperature

Temp, F	<5	5-22	22-41	41-59	59-77	77-95	>95
Intake, % change	1.16	1.07	1.05	1.03	1.02	0.90	0.65

The metabolic response to the stimulus of cold involves practically all the systems of the body. The striated muscles shiver, the heart beats faster, breathing becomes deeper, urine flow is increased and the sympathetic and pituitary controlled systems are activated so to elevate biological oxidations (energy expenditure or heat production) in all tissues. The result is an increase in the cow's requirements for energy.

Spring calving cows, and particularly heifers, in poor body condition are at risk for calving problems. The result may be lighter, weaker calves at birth, which can lead to a higher death loss, and more susceptibility to things such as scours.

Animals in poor condition before calving, provide inferior colostrum and lower milk production. This can lead to lighter weaning weights or fewer pounds of calf to sell. Females that are in less than desirable body condition at calving are slower to return to estrus. Therefore body condition at calving affects the current calf crop (milk production) and next year's calving date (rebreeding date).

In most years hay and stockpiled forage can adequately provide the needed nutrients, but it can very widely and should be tested to make sure it is adequate. Your local Extension Office may have a test probe and can help you with submitting the sample to a laboratory.

There is a range of temperature where cattle are neither too hot nor too cold and their performance is optimal. This temperature range is called the thermoneutral zone. It is the temperature range where the fewest nutrients are needed to maintain bodily functions. For cattle the lower temperatures of the thermoneutral zone are shown in Table 1. All of the critical temperatures listed are effective ambient temperatures, which basically means the wind chill temperature is used if the cattle are not sheltered. The critical temperatures also take into consideration the insulating ability of the cattle, as shown by the change between a wet and dry coat.

Table 1. Estimated Lower Critical Temperatures for Beef Cattle *

Coat Description	Critical Temperature
Summer Coat or Wet	60 degrees F
Dry Fall Coat	45 degrees F
Dry Winter Coat	32 degrees F
Dry Heavy Winter Coat	19 degrees F

* From Browsen, R. & Ames D."Winter Stress in Beef Cattle" Cattle Producer's Library. CL760.

If we have a choice, snow is preferred to a cold rain. We lose what is called "air insulation" in cattle that get wet versus those that are out in the snow. The air pockets between hair fibers are a source of insulation. We lose this insulation when hair gets matted down in a cold rain. The result is that the Dry Winter Coat goes from having a critical temperature of 32 degrees F to about 59-60 degrees F.

From several studies it is estimated that for every one degree below the critical temperature a cow's energy requirement (TDN) increases 1 percent. It is also estimated that for every ten degrees below the critical temperature the digestibility of the ration decreases by 1 percent. This means that when the temperature drops below the critical temperature the cattle need to be fed better. It may be that more or better hay needs to be fed.

Table 2.Example of Effect of Temperature on Energy Needs

Effective Temperature	Extra TDN Needed	Extra Hay Needed (lbs./cow/day)	or, Extra Grain Needed, (lbs/cow/day)
50 F	0	0	0
+30 F	0	0	0
10 F	20%	3.5-4 lbs	2-2.5 lbs
-10 F	40%	7-8 lbs	4-6 lbs

Besides cold weather effecting cattle performance producers have another thing to consider during winter, mud. It is less clear what effect mud has on a cow's energy requirements but it is estimated that it can increase the maintenance requirement from 7-30%. If cattle have to deal with mud then their ration should also be improved, to help avoid the consequences listed above.

Another tool producers have to help determine if what they are feeding is adequate, besides forage testing, is Body Condition Scoring (BCS). In the last trimester of pregnancy a cow should have a score of 5, 6 or 7 on a 1-9 scale. If a cow is going down in BCS then the ration is inadequate and should be improved.

BODY CONDITION SCORE DESCRIPTIONS

Barbi Riggs, Crook County Livestock Extension Agent, Oregon State University

Body Condition Score (BCS) is a system for cattle that was created at Colorado State University in 1975 by R.W. Whitman. This scoring system ranges from 1 to 9 (1=emaciated; 9=obese). Weight gain or loss of about 75 lbs result in an increase or decrease in one body condition score. In the industry, both in research and in production, this scoring system has become a standard for which we visually appraise the nutritional status of the animals.

Description of Body Condition Scoring (BCS)

1. Severely Emaciated. Bone structure of shoulder, ribs, back, hooks and pins is sharp to the touch and easily visible. Little evidence of fat deposits or muscling.
2. Emaciated. Little evidence of fat deposition but some muscling in the hindquarters. The backbone feels sharp to the touch.
3. Very thin, no fat on ribs or brisket, and some muscle still visible. Backbone easily visible.
4. Thin, with ribs easily visible but shoulders and hindquarters still showing fair muscling. Backbone visible.
5. Moderate to thin. Last two or three ribs can not be seen unless animal has been shrunk. Little to no evidence of fat in brisket, over ribs or around tailhead.
6. Good smooth appearance throughout. Some fat deposits in brisket and over tailhead. Ribs covered and back appears rounded.
7. Very good flesh, brisket full. Fat cover is thick and spongy and patchiness is likely. Ribs very smooth.
8. Obese, back very square, brisket distended, heavy fat pockets around tailhead. Square appearance.
9. Rarely observed. Very obese. Animal's mobility may actually be impaired by excessive fat.

The optimum score is 5. There are dangers associated with scores equal to or less than 3 and likewise of scores equal to or greater than 8. Cattle have a priority in how they allocate the nutrients they ingest. The cow's first priority is to maintain her own body weight, followed by lactation and growth (in young cows) and finally reproduction. When a cow is short on nutrients, her ability to reproduce is the first biological function that suffers and is also the last function to recover.

During the course of the year an animal, particularly a mother cow, fluctuates in BCS. Her BCS may be a 4 after calving and prior to spring green-up but can rapidly increase to a BCS 5 prior to the breeding season if adequate forage is available. A cow may lose condition as the quality of the forage decreases and the lactation demand and gestation pulls nutrient requirements to support that biological state of production. This natural change in body condition is often referred to as *weight cycling*. Documenting BCS at different production stages allows researchers and producers to evaluate management practices in regards to nutrition.

Production Period Management

Late Lactation - Depending upon current forage availability, supplementation and/or a modified (2 months prior to weaning) weaning strategy may be necessary. Wean thin cows, especially thin, young and older cows.

Weaning - Pay particular attention to young cows weaning their first calf and cows beyond their prime age; they are most likely to be thin at this time.

100 Days Before Calving - Last opportunity to gain body condition. This would be a good time to separate thin cows from cows in good condition and increase feed to thin cows.

Calving - If cows are thin, a change in the feeding program is needed. It is expensive to increase condition on cows after calving.

Breeding Season - If cows are thin at this time, additional supplementation and/or implementation of an early weaning strategy may be necessary.

COW NUTRITION FOR HEALTHY SPRING-BORN CALVES

David Bohnert, Oregon State University Beef Extension Specialist

The profitability of cow-calf operations is significantly affected by calf mortality (death) and morbidity (sickness) during the period of time immediately after birth. Harsh weather conditions during the calving period (Figure 1) and dystocia (calving difficulty) are the main causes of baby calf death and/or illness. However, the cow-calf producer can increase the likelihood of a strong, healthy calf, by providing the cow with adequate nutrition during the last third of gestation (90 days prior to calving). A beef cow's nutrient requirements during the last third of gestation are greater than at any other point during her production cycle, not including the first 6 to 8 weeks of lactation. Table 1 provides the estimated requirements for dry matter intake, total digestible nutrients (TDN), and crude protein (CP) for 1,000, 1,200, and 1,400 pound cows during the last third of gestation. Cattle producers should remember that calving difficulty **CANNOT** be starved out of cows and heifers. The reason for increased nutrient requirements during the last third of gestation is because approximately 80% of all fetal growth occurs at this time. Research has indicated that proper nutrition during the last third of gestation will improve the calf's immune function and ability to withstand cold temperature at calving. Consequently, survival rate of newborn calves is approximately 20% higher in cowherds fed to meet their nutritional requirements compared with cowherds underfed during the last third of gestation.

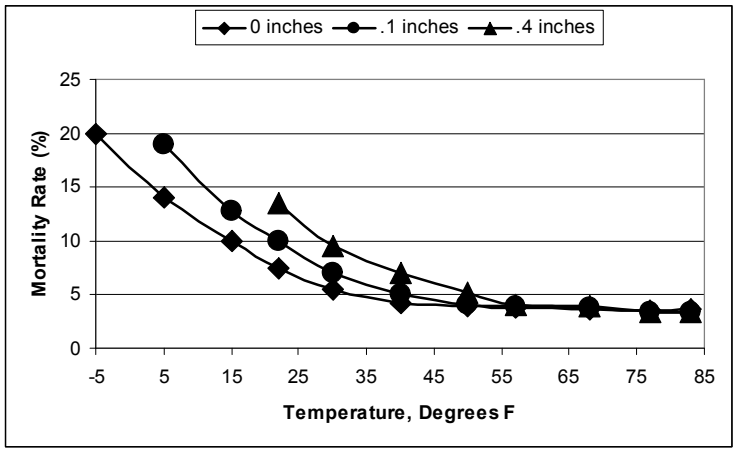

Figure 1. The effects of temperature and precipitation on the day of birth on mortality of calves born without dystocia (adapted from Azzam et al., 1993).

Table 1. Dry matter (DM) intake, total digestible nutrient (TDN), and crude protein (CP) requirements of mature beef cows during the last third of gestation (adapted from NRC, 1996)

	DM	TDN (DM basis)		CP (DM basis)	
Cow Wt. (lb)	Intake (lb)	lb	%	lb	%
1,000	21.0	11.0	52.3	1.6	7.8
1,200	24.1	12.7	52.6	1.9	7.8
1,400	27.2	14.4	52.9	2.1	7.9

Weak Calf Syndrome

The so-called "weak calf syndrome" is generally believed to result from inadequate protein intake by the cow during the last third of gestation. Some common signs of a "weak calf" include a calf that appears depressed, will not

stand and/or suckle, and may have difficulty breathing. Also, arthritis and swelling around the leg joints has been described in some cases of weak calf syndrome. Research in Idaho (Bull et al., 1974) has suggested that providing at least 2 pounds of crude protein per day (total crude protein intake) to beef cows during the last third of gestation will greatly decrease the incidence of weak calf syndrome (Figure 2; Table 2). Also, these researchers stated that for every 0.1 pound decrease in consumption of crude protein below 2 pounds per day, the incidence of weak calf syndrome could be expected to increase by 1%.

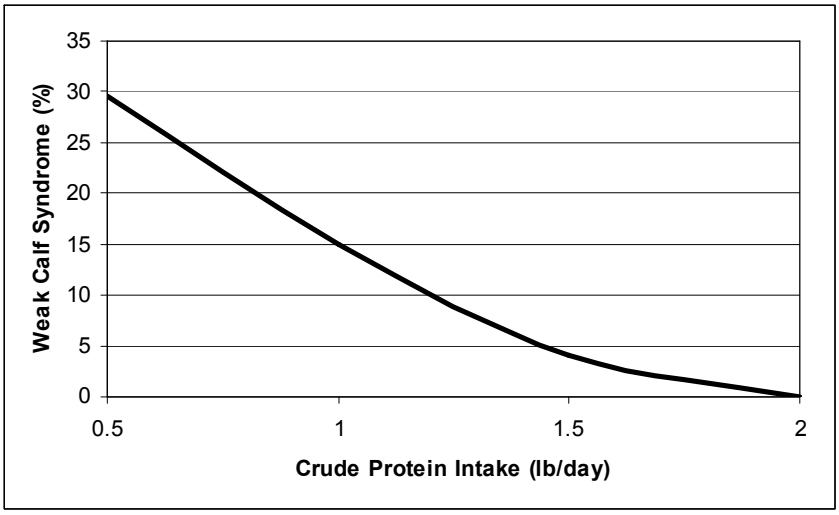

Figure 2. Incidence of weak calf syndrome in cattle herds consuming differing amounts of crude protein (adapted from Bull et al., 1974).

Table 2. Relationship between crude protein intake and the incidence of weak calf syndrome in beef cattle herds (adapted from Bull et al., 1974)

Crude Protein Intake	Number of Cow Herds	Average Crude Protein Per Cow (lbs)	Average Weak Calf Syndrome (%)
High; > 2.0 lb/day	6	2.5	0.6
Medium; 1.5 - 2.0 lb/day	4	1.8	3.4
Low; < 1.5 lb/day	4	1.2	9.8

Immunity of the Calf

Providing insufficient nutrients (protein, energy, vitamins, and/or minerals) to the cow during the last third of gestation has been shown to decrease the immunoglobulin concentration in the blood of baby calves (immunoglobulins help develop immunity and disease resistance in newborns).

Immunoglobulins are obtained from colostrum, with the majority of immunoglobulins absorbed within 12 hours of birth. Selk (1995) reported that the concentration of immunoglobulins in the blood of baby calves decreased as cow body condition score at calving decreased from 6 to 3 (1 to 9 scale; 1 = thin and emaciated and 9 = fat and obese). These data are provided in Table 3. Also, it is of interest to note that it took longer for calves from the lower body condition score cows to stand following birth, with the time ranging from 60 minutes for the body condition score 3 cows to 35 minutes for the body condition score 6 cows (Table 3). This research suggests that calves from cows receiving inadequate nutrition will have lower immune function and will be weaker than calves from cows receiving proper nutrition prior to calving. This is supported by research

with beef cows that were provided either a low- or high-plane of nutrition during the last third of gestation and then adequate nutrition to weaning (Hight et al., 1966). These researchers noted that the number of live calves born was not different between the low and high groups (97 and 100% of the total cows had a live calf; respectively). However, only 75% of the cows that received the low-plane of nutrition had a live calf at her side at weaning compared with 93% for the cows that received the high-plane of nutrition during the last third of gestation. Similarly, Wyoming research (Corah et al., 1975) indicated that feeding cows a low level of nutrition during the last third of gestation resulted in a 10% greater calf death loss at calving and another 19% death loss from scours compared with cows that received adequate nutrition.

Table 3. Effects of cow body condition score at calving on calf vigor and serum immunoglobulin concentration (adapted from Selk, 1995).

Item	Cow Body Condition Score at Calving			
	3 (very thin)	4 (thin)	5 (average)	6 (good)
Time from calving to standing (minutes)	60	64	43	35
Total IG*, mg/dl	2193	2351	2445	2653

*Concentration of total immunoglobulin in serum of calves 24 hours after birth.

Thermoregulation of the Calf

Baby calves have limited ability to conserve body heat during the first few days after birth. Therefore, calves must be able to generate body heat to minimize the effects of cold temperature. Work by Colorado State (Carstens, 1994) and Texas A&M (Branum, 1999) has suggested that providing lower than required levels of protein, energy, and/or copper during the last third of gestation can impair cold tolerance of baby calves, thereby reducing their ability to maintain body heat compared with calves from cows that receive sufficient quantities of nutrients during the last third of gestation. This can have serious implications to spring calving herds in the Pacific Northwest because winter-precipitation and below freezing temperatures are common during the calving season. Therefore, not providing cows with proper nutrition during the last third of gestation can decrease their calf's ability to maintain body heat, which is critical to minimize calf death losses during these types of weather conditions (Figure 1).

Pre-calving Management to Improve Calf Health

Nutritional management of beef cows during the last third of gestation can have significant effects on baby calf health and survivability. Providing your cows with proper nutrition during the last third of gestation will help insure that you have strong, healthy calves and that your cows will produce enough colostrum, with sufficient concentrations of immunoglobulins, to allow baby calves to develop adequate protection against common calfhood diseases and illnesses.

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WEED WATCH:

A QUARTERLY COLUMN FOCUSED ON WEED PREVENTION AND CONTROL IN HARNEY COUNTY

Compiled by: Dustin Johnson, OSU Extension

Cheatgrass (*Bromus tectorum* L.)

Growth Habit: Winter annual grass that normally grows up to 2 feet tall

Leaves: Leaves are flat, wide, and bristly at the base, giving the plant a downy appearance.

Stems: Each plant can have multiple upright stems.

Flowers: Cheatgrass flowers as an open panicle, each with five to eight florets tipped with a short awn.

Roots: Shallow, fibrous roots.

Seeds: Shallow, fibrous roots.

Other: Seeds germinate in late winter or early spring.

Chemical Control

- quizaflop (Assure II)
  - Rate: Consult label for rates
  - Time: Early spring when plants are less than 4 inches tall.
- fluazifop-p-butyl (Fusilade 2000, DX)
  - Rate: Consult label for rates.
  - Time: Before seed head is formed.
- sethoxydim (Post, Post plus)
  - Rate: Consult label for rates.
  - Time: Before seed head appears. Consult label for rates.
- Glyphosate (Roundup-ultra)
  - Rate: Consult label for rates.
  - Time: Before seed formation.
  - Remarks: Glyphosate is nonselective, consult label.

The reader is strongly encouraged to read and understand the label directions for the selected herbicide before application. Some of the products are long lasting and can damage subsequent desirable vegetation planted after cheatgrass treatment. The label will provide the information necessary to make an informed decision. Brand names are provided for example purposes only.

Chemical Continued

- Imazapic (Plateau)
  Rate: Consult label for rates.
  Time: Fall or early spring.
  Remarks: For sale to governmental agencies only.
- Trisulfuron (Amber)
  Rate: Consult label for rates
  Time: Early fall, before the cheatgrass emerges.
  Remarks: Can harm some desirable grasses, consult label.
- Sulfosufuron (Maverick)
  Rate: Consult label for rates.
  Time: Fall.
  Caution: Long lasting, consult label for restrictions and rates.
- Trifluralin (Treflan)
  Rate: Consult label for rates
  Time: Fall, before the cheatgrass emerges

Mechanical Control

- Cutting or mowing is not a recommended control method for cheatgrass unless it can be repeated several times per year, for several years. Plants that are cut before seed ripening can generate new culms and produce seeds at the cut height. Plants that are cut after seed ripening will still leave viable seeds. Because seeds may be viable as early as the dough stage, there is only a short period after inflorescences appear that the plants can be mowed without dispersing viable seeds. Therefore there is no single growth stage that can be mowed which will assure complete kill or absence of seeds.
- To be effective, tillage must be 4 to 6 inches deep to bury cheatgrass seeds in the soil and prevent them from germinating. More than 1 tillage treatment is usually needed, because the tillage equipment does not consistently cut deeply enough to bury the seed. Plowing or disking treatments must be done prior to cheatgrass seedripe ("purple" stage) or after fall germination for adequate control.
- Hand-pulling cheatgrass plants in small infestations before seed set would effectively eliminate current seed production, but may not eliminate the infestation. The large seed bank commonly associated with cheatgrass infestations will allow plants to re-establish for several years without noticeable reductions in plant density. Hence, any pulling program must be conducted for several years, or until the seed bank has been exhausted. When pulling, an effort should be made to extract as much of the root as possible so that the plant can not simply regrow and produce new seeds.

Control with Grazing

- All classes of sheep, goats, and cattle can be used to control cheatgrass. Intense flash grazing (i.e., grazing for short period) is recommended to remove biomass, decrease plant density, and suppress flowering. Graze cheatgrass plants as early as possible without harming desirable perennial plants, and repeat grazing to prevent seed production. Livestock readily consume cheatgrass when it is green and before it turns purple. A minimum of two treatments per year is recommended. Two or more years of grazing is required to significantly suppress cheatgrass populations. Grazing can also be used in conjunction with mechanical methods, herbicides, and controlled burning.

Biological

- There are currently no USDA approved biological control agents for cheatgrass. Crown rot may be a potential biological control for cheatgrass in the arid environment of the western U.S. Soil bacteria have been isolated which produce a toxin that is specific for cheatgrass and related species. Applications of a strain (D7) of *Rhizobacterium* have been shown to selectively suppress cheatgrass by means of a phytotoxin produced by the bacteria, apparently by inhibition of root elongation.

Fire

- Cheatgrass is a highly flammable species due to its complete summer drying, its fine structure, and its tendency to accumulate litter. Late spring or early summer burns, before cheatgrass seed matures, may effectively control cheatgrass; however, burning before the seed is ripe is difficult because the plants are still green. When cheatgrass plants are dry enough to burn, they are already dead, and have already set seed. Fire will then reduce cheatgrass plants to ash. If burned during a crucial time during seed ripening, fire can greatly reduce the density of the succeeding cheatgrass stand. Burning of mixed shrub-cheatgrass stands generates enough heat to kill most cheatgrass seeds and may offer a 1-season window for the establishment of perennial seedlings. The abundance of viable seeds of cheatgrass after a burn can be judged by examining seeds in the ash. The period of reduction of cheatgrass density (1-2 years) is not usually long enough to allow for the establishment of perennial seedlings. Cheatgrass plants that do establish the 1st post fire year tend to produce so much seed per plant that total postfire cheatgrass seed production for a site may actually increase by a factor of 100 over preburn production. Unless desirable species establish and outcompete cheatgrass, density of cheatgrass plants may exceed preburn levels within 1 to 5 years.

Integrated Management Summary

- Once established, cheatgrass can rarely be controlled or eradicated with a single tool. Effective control of cheatgrass requires 1) eliminating live plants, 2) preventing seed formation, and 3) controlling seed germination and emerging seedlings. Controlling live cheatgrass plants and the existing seed bank requires a combination of treatments conducted over a 1- to 2-year period. For example, mature plants can be killed before seed dispersal in spring by tilling or burning, with fall tillage or herbicide application as a follow-up treatment to eliminate any new seedlings. Seeding of desired species is then conducted in the late fall or early winter. Another strategy is to use prescribed fire in the fall to prepare sites for seeding the following spring. Disking, herbicides, or prescribed livestock grazing can then be used in late spring to reduce vigor and seed production of the cheatgrass plants that establish after the fire. Seeding the site can be delayed until after the disking, herbicide, or prescribed grazing treatment, or the site can be broadcast-seeded immediately before grazing treatment, in order to use livestock to trample in the seed. Another effective approach combines summer burning, when the majority of cheatgrass seeds were still held in the inflorescences, followed by fall herbicide application after cheatgrass seedlings have emerged.

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OSU Harney County Extension Service

High Desert Ranch & Family Newsletter

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CALENDAR:

JANUARY

28 - 31. NCBA Cattle Industry Annual Convention & Trade Show. Phoenix, Arizona.

31st Central Oregon Forage Seminar & COHGA Annual Meeting. Brothers, Oregon. 9:30 am - 5:00 pm.

FEBRUARY

8 - 12. Society for Range Management 62nd Annual Meeting. Albuquerque, New Mexico.

17th. 10:00 am - 3 :00 pm. Harney County SWCD Annual Meeting. Chamber Community Center, Burns, Oregon. Harney County Cattlewomen are serving lunch at 12 noon. RSVP to Marty Suter, SWCD 573-5010

18th. Cows and Creek V. Burns Elks Lodge, Burns, Oregon. 9:00 am - 3:00 pm.

MARCH

5th. Pesticide Applicator's Recertification Training. ESD Office, Fairview Heights, Burns, Oregon. 8:00 am - 4:00 pm. 7 to 9 recertification credits are anticipated.

31st, Harney County Watershed Council Annual Meeting, Burns Elks Lodge, Burns, Oregon. Details TBA