



Small Acreage Management Newsletter

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How Woody Plants and Shrubs Survive the Winter

by Edward B. Page, CSU Small Acreage Management and Community Resource Development Agent

Plants adapt gradually to winter conditions, becoming more winter hardy through changes in light due to reduced day length and cooler temperatures. Hardening off is a term used to describe the process, which a plant goes through to prepare for the cold weather to come. The process begins with shortening days in the fall, which lead the plant to stop initiating new growth. Chemical changes then occur in the plant, which lead to a buildup of sugars in overwintering plant tissues that act as a type of antifreeze.

Adverse practices that can cause damage by reducing the ability of the plant withstand cold temperatures may result in weakening of the plant or death. Specific practices or factors leading to injury or winter kill include: anything that causes lush late season growth. For example: excess nitrogen fertilizer, late summer pruning, or fall irrigation after an extended period of drought. Best management would avoid these problem situations and assure that plants are in good condition, rather than under stress based on rapid growth before going into dormancy. You should follow practices that encourage carbohydrates to be stored in the roots to promote winter health and spring re-growth. These things include good year-long fertility management, control of weeds, appropriate harvest or pruning, and maintaining a proper water balance in the soil

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How Insects Overwinter

by Bob Hammon, CSU Extension/TriRiver Area Entomology & Agronomy Agent

There are tens of thousands of insect species native to Colorado. All survive the winter, some in the coldest of habitats – alpine tundra, Fraser, Gunnison, Silverton. The strategies they have developed to survive five or more months with cold, often frigid, temperatures are as varied as the insects. Some understanding of how insects overwinter can be useful in developing management strategies for pest species. Here are some examples of insect overwintering natural history.

Many, but not all, aphids spend the winter as eggs on twigs of hardwood host plants. **Green peach aphid (GPA)** is a perfect example. GPA feeds on many different herbaceous hosts during the summer. It is a common pest on peppers and potatoes. During the summer, all GPA reproduced asexually: all are females who give birth to living young. When day length shortens in the fall, winged migrants are produced that move to plum and peach trees, where they in turn produce a generation of sexual forms, males and egg producing females. These sexual reproducing variants mate and eggs are laid on the twigs. The eggs are resistant to cold and desiccation and have no problem surviving the winter. During extreme cold winters, the only GPAs that survive outdoors are those in the egg stage. In mild winters, asexual GPA can survive in protected microhabitats, sometimes feeding underground on plant rhizomes and roots.

We know that most peach and plum trees will have overwintering GPA eggs and that the vast majority of the population is concentrated on the twigs. Dormant oils are safe, effective and inexpensive sprays that can smother aphid eggs if they are covered. The eggs are living, breathing organisms that use a small hole called a micropyle for respiration. If the micropyle is covered with a film of oil, the egg dies. If enough peach and plum growers treat their trees in the early spring with dormant oil, the entire population of GPA can be reduced to the point that problems can be reduced on peppers and potatoes during the growing season.

Mountain pine beetles (MPB) are killing hundreds of thousands of acres of lodgepole and ponderosa pine in

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for plant growth and production. These recommendations, though differing in specifics for different plants are needed by all perennial plants.

Ideally, cold weather will come on slowly, allowing the plant to gradually adapt to the winter conditions. This cycle begins in the fall and the plant reaches its most hardy state in January or early February when temperatures begin to moderate then warm into spring. The process works best when the temperatures decrease gradually to the seasonal minimum and then increase in the same manner. If the shift is interrupted by a period of warm weather, the plant will become less able to withstand the cold temperatures. This, in essence, sets the hardening off process back. Too much protection (keeping plants warmer than their surroundings or not letting them harden off) may make the plant vulnerable when really cold weather comes later in the season.

Bud hardiness is the most critical and sensitive point in the plant. Dr. Horst Caspari, the state viticulturalist at the Western Colorado Research Center (WCRC) tests grape and fruit bud hardiness throughout the winter and spring months. You can get his information by going to: www.colostate.edu/programs/wcrc/. Then press the research/outreach button and go to either fruit growing or viticulture for current information on cold hardiness.

**Range & Pasture Management Workshop Agenda
January 22, 2008
Two Rivers Convention Center
159 Main Street
Grand Junction, Colorado**

USDA-ARS FORAGE AND RANGE RESEARCH
LABORATORY; LOGAN, UTAH
COLORADO STATE UNIVERSITY EXTENSION
SERVICE
9:30 a.m. to 3:00 p.m.

Topics will include

- New developments in pasture and range grasses
- Forage kochia for fire prevention, and fall and winter grazing
- Utilizing legumes to enhance pasture and rangeland productivity
- Seeding and establishing pastures and rangelands
- Weed problems and control in range and pastures
- Maximizing pasture benefits

Lunch Provided - **RSVP by January 18th**

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Getting Your Horse Ready for winter:

By Trent Hollister, 4-H Agent

Winter months are here and it is getting colder every week. Health care, nutrition and shelter are the three things that need to be addressed. Making a proper plan will insure your horse to make it through the colder months in comfort.

In regard to health care you must be concerned with annual vaccinations, deworming, and hoof care. Vaccinations are of more importance if you plan to travel or work with your horses than if they are turned out for the winter. The most common vaccination would be for influenza and rhinopneumonitis. Deworming simply prevents the overwintering of parasites like bots in the stomach. Deworming will also improve feed utilization giving horses more energy from their feed. It is recommended that you pull off your horse's shoes if you are not planning on routine riding during the winter. If you plan to ride your horse during the winter, then it is essential to routinely check the hoof and remove any built-up snow, ice, and frozen mud.

Nutrition is also something that is very important. Ask yourself if your horse is too fat, too thin or just right? The recommendation varies from person to person but ideally you want the ribs to just be covered during the winter. Fat provides the horse essential energy and heat to stay warm. It is important to adjust body condition before January and February when it is really cold. Feeding your horse quality hay in the amount of 2 to 2.5% of your horse's body weight is the most ideal base ration. A high fiber diet during the winter will provide more heat for the horse to stay warm. One thing that must not be ignored is **water!** Water should be clean and range from 50-60F°. If it is too cold it will cause the horse to utilize energy warming it up and intake will also be reduced.

Shelter is the final thing to remember. A horse can easily survive in 20 and 30F° if allowed to grow an adequate hair coat. A horse must be given the opportunity to escape wind and stay dry. A simple open front barn or wind shelter is adequate shelter in most situations. If your horse will be stalled inside be sure there is adequate ventilation. A barn with a temperature of about 45F° is all they need to stay warm.

Western Colorado Insects Web Site

A web site with information on western Colorado insects is now on line at <http://wci.colostate.edu>. The site was created by Bob Hammon and has original articles, pictures and also links to information on the insects we see and live with in western Colorado. There are pages on agricultural, forest, and landscape insects, insects affecting seed production, household insects, natural history of native insects, and much more. There is information on pesticides (traditional and organic) and pest management as well as information on upcoming extension programs.

There is a photo gallery in the site which allows local photographers to display their work. All insects displayed in the galleries are identified, always to family level, and to species if possible. Nature photographers are invited to submit photos. If you have quality photos of insects that can be identified, contact bob.hammon@mesacounty.us.

The site is being expanded and improved on a regular basis. New articles and links to existing information are added when there is interest expressed through calls and samples at the Extension office. Check it out. If you want something added let Bob know at 970-244-1838.

Honeybee Workshop

CSU Extension is organizing an intensive beekeeping workshop, tentatively scheduled for Jul 10 and 11, 2008 at the Mesa County Fairground in Grand Junction. Dr Marion Ellis, beekeeping specialist from the University of Nebraska at Lincoln will be conducting the class along with several other honey bee experts. The workshop will cover advanced aspects of honeybee management, such as mite and disease management, swarm management, re-queening and other hive issues. The second day of the workshop will have hands on demonstrations with live bees and a half day session on marketing of honey and wax based products. There will be a \$100.00 charge for the workshop. Details are now being worked out and will be posted on <http://wci.colostate.edu> as soon as they are finalized.

northern and central Colorado. They overwinter as partial grown larvae under the bark of infested trees. MPB are easily killed by cold temperatures during most of the year, but they develop complex sugars within their bodies during the coldest months that function as antifreeze. When they are at their most cold tolerant, their bodies must cool to -20° F for mortality to occur. Since they live under the bark of trees, they are insulated from short term drops in temperature and it takes extended periods of bitter cold to kill them. This extended cold has not occurred in the past few years, so the MPB outbreak, which was triggered by numerous factors, has expanded to its current size. A single ten day or two weeks of extreme cold could stop the outbreak.

Many **brush footed butterflies** spend the winter as adults. It is not uncommon to see them flying among skiers in the mountains when we have days with above freezing temperatures in the late winter. These insects create antifreezes in their bodies than enable them to withstand temperatures of -30° F and below.

Other insects cannot withstand extended cold temperatures and winter kill almost every year. Many re-migrate in during the spring and summer, riding storm fronts for a thousand miles or more. The **beet leafhopper** does this every year. It transmits a virus disease to tomatoes and other crops that can kill a large proportion of the plants in western Colorado. If we have a mild winter that allows beet leafhoppers to overwinter, tomatoes are doomed. If there are unfavorable winter conditions – extended cold or dry – to the south, where the beet leafhopper emigrates from, our tomatoes can be relatively unaffected. We can often predict the extent of virus damage to western Colorado tomatoes by looking at winter conditions in southern Arizona and Sonora Mexico.

The **monarch butterfly** has taken overwintering to the extreme. The entire population migrates to a small area in central Mexico (and a couple scattered areas in California). Sounds like the way some humans overwinter also. Unfortunately, disturbance, whether natural or manmade, leaves the entire monarch population vulnerable to destruction.

Timing Grass Use with Growth and Vigor

by **Robbie Baird LeValley, CSU/TriRiver Area Extension Range and Livestock Agent**

The growth and development of forage plants have a major affect on forage quality. By understanding these effects, the manager can better utilize forage production and subsequent animal nutrition.

Plants get the energy needed for growth from the sun through photosynthesis in their green leaves. Growth is the process by which a plant increases in the number and size of leaves and stems. All plants have an area of growing tissue called a “growing point.” This growing point is where new cells are developed. The growing point of a grass is situated at the base of the plant. New leaves are pushed upward from this point. As the growing season progresses, the joints on some of the plants begin to elongate and push upward to produce a seed stalk. Only a small percentage of the perennial species plants attempt to produce seed in any one year.

Most highly-productive forage grasses elevate their growing tissue at some time during the growth period. When the growing tissue is removed by grazing or mowing, growth from the harvested stem is temporarily stopped. Length of growth cessation is dependent on the leaf material left for photosynthetic activity and environmental conditions (rainfall, temperature, soil depth, soil texture, fertility, topography, and the plant characteristics). New growth must then begin from a dormant bud located at the base of the plant. Healthy grass plants have more dormant buds than plants which have been mismanaged. An animal may graze off the leaves without removing the growing point, in

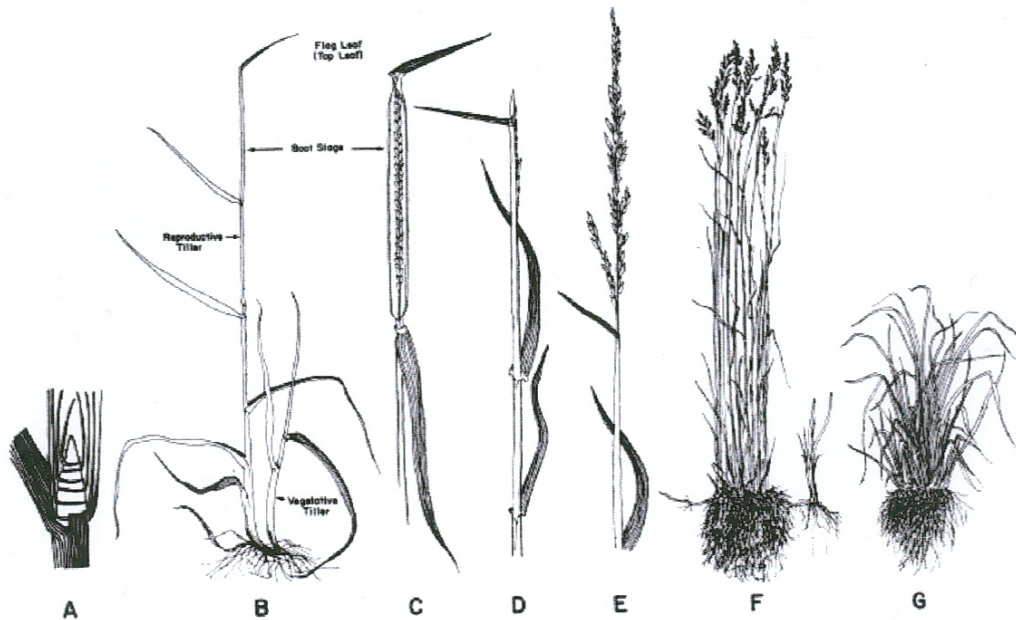
which case the plant continues to grow.

If grass plants are continuously grazed short, the root mass decreases to what the leaf area can support. If grasses are managed correctly, productive pastures and rangelands provide optimum production. The general rule of thumb is to begin grazing when the pasture is seven to eight inches tall, and stop grazing when the average height of the pasture is three inches in height.

Optimum forage yields are achieved by harvesting plants when they reach a height or growth stage corresponding to a high point in the energy reserve cycle, and harvesting them at a height that removes most of the forage, but leaves adequate stubble.

Root growth determines the ability of a plant to take up nutrients and water. Root growth is determined by the plant’s actively photosynthesizing leaf area, since the roots depend on energy captured by the leaves. To some degree, the volume of roots is in proportion to the volume of leaves produced. Generally, healthy root volume should be two to three times the above-ground volume.

Plant development is the process of a plant changing from one growth stage to another. Plant development is also the major factor affecting forage quality and response to grazing. Forage quality decreases as plants change from vegetative to reproductive stages. As a plant matures, it increases in fiber and decreases in digestibility, crude protein, and intake by animals. Effects of grazing on plants differ with stage of plant development and depend on which stage of growth the plant is in when herbivory occurs. During early growth, the carbohydrates come from the roots for the first few leaves. Following the initial growth, the



energy source is provided by photosynthetic activity of the plant. There is a limited amount of green material available for grazing and animals should be spread out over the pasture or moving through the grazed area fast to avoid grazing regrowth. During the rapid growth phase, regrowth is usually not a problem and appropriate grazing can occur without detrimental impact on the plants. During the reproductive or “boot” stage, plants should be moderately grazed and some plants should be left ungrazed to optimize grass production.

Key points of grass growth and maintaining grass vigor:

1. Photosynthesis is only accomplished with leaf area;
2. The photosynthesis process produces carbohydrates;
3. Carbohydrates are the food that supplies the growing plant;
4. When leaves appear, carbohydrates are being manufactured;
5. When leaves are producing more than is used, carbohydrates are being stored.

Practical application of plant growth and development principles:

1. Implement a rotational grazing plan;
2. Periodically changing the timing (season) of grazing provides benefits to grazed plants in a given area.
3. If the timing can not be changed the time of grazing needs to be adjusted to provide sufficient recovery to grazed plants.
4. Plan a grazing system that allows for growth and re-growth of the forage plants during the growing season;
5. Leave enough photosynthetic material - leaves and stems - to prevent extended root growth cessation;
6. High forage yields can be achieved by allowing plants adequate rest intervals between harvests, and by leaving adequate stubble for vigorous new leaf growth;
7. For high quality pasture, maintain forage in a vegetative growth stage, and allow adequate forage to permit high levels of intake.

Table 1. The effect of a plant developmental stage on the nutritive quality (as a percentage of dry matter); relative dry matter intake; and relative yield of legume and grass forages.

Developmental Stage	TDN ¹	ADF ²	NDF ³	CP ⁴	RDMI ⁵	Rel Yield ⁶
Alfalfa and Red Clover						
Late Vegetative	63	29	38	20	1.02	.70
Early Bloom	60	31	40	19	1.00	.90
Mid Bloom	58	35	46	18	.94	.95
Full Bloom	55	37	49	16	.91	1.00
Late Bloom	52	39	52	14	.88	1.00
Mature	50	44	58	13	.83	.95
Orchardgrass and Tall Fescue						
Early Vegetative	72	31	55	18	.92	.40
Boot	71	32	57	17	.91	.65
Early Bloom	65	34	61	15	.86	.85
Mid Bloom	57	41	68	11	.78	.95
Late Bloom	54	45	72	8	.74	1.00

¹ TDN - Total Digestive Nutrients

² ADF - Acid Detergent Fiber

³ NDF - Neutral Detergent Fiber

⁴ CP - Crude Protein

⁵ RDMI - Relative Dry Matter Intake

⁶ Rel Yield - Relative Yield

Watering Plants in Winter

by Edward B. Page, CSU Small Acreage Management
and Community Resource Development Agent

Any perennial plant, especially an evergreen shrub or tree, will require water during the winter to carry on its life functions and maintain health to start a new season in the spring. Across the Tri River Area we now have good moisture thanks to the rain and snow of the last two months. Prior to that, we had quite a dry spell during the fall, which saw soils become very dried out. Just before Christmas, I dug some plants in the Grand Junction area. I found that the soil was moist only down to five or six inches at a maximum. At 12 inches I could find no moisture at all.

In the current situation, there is adequate moisture for most plants. If we were to have a dry and windy period that allowed plant's natural metabolic activity and

environmental factors of sun and wind to dry the soil, supplemental water would be needed to keep plants healthy. In the absence of water, even lower rates of metabolism that occur in winter will not be possible. If you think that you might be getting near the point where watering is needed, check the soil for moisture. Go to a point near the drip ring of a shrub or tree and dig up a spade full of soil. If the soil will not form a weak ball when squeezed, there is not enough moisture in that soil. Watering should be seriously considered. If you have doubts about your results, call your Extension office for more advice.

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