Winter 2025

NEWSLETTER

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COLORADO SMALL ACREAGE MANAGEMENT

USDA NRCS U.S. Department of Agriculture Natural Resources Conservation Service

COLORADO STATE UNIVERSITY EXTENSION

Inside this issue

Selenium snack attack: a toxic treat that can trouble your horses

By Karla Melgar Velis, SAM Front Range Specialist

Selenium (Se) is a micrnonutrient required by horses, plants and many living beings. It was thought to be a toxin in the 1930's but is currently known as an essencial nutrient in grazing animals diets. In some places, Se toxicity remains a concern due to the higher concentrations of Se in soils and the hability of some rangeland plants to absorb and retain toxic amounts of Se that may be consumed by cattle, horses or other grazing animals.

Selenium in soils

Se is a naturally occuring element, essential to most organisms. Soil Se content in most soils around the world ranges between 0.1 - 2 ppm, although soils that developed from Cretaceous shale in places like South Dakota, Montana, Wyoming, Nebraska, Kansas, Utah, Colorado and New Mexico, tend to have concentrations of Se between 2-10 ppm.

Even in soil with high Se concentrations only one portion is available for plants to absorb. Soils that supply enough Se to produce toxic plants are often called toxic seleniferous soils. Nontoxic seleniferous soils are soils that contain a high Se concentraiton that is not available for plants to absorb in enough quantities to become toxic. Toxic seleniferous soils are usually alkaline and contain free calcium carbonate, they occur in arid and semi-arid places and contain water-soluble Se, making many regions in CO the ideal place for toxic seleniferous soils.
Although Se occurs naturally in many soils, research suggest that some agricultural practices like applying manure from animals fed with adequte level of Se diet or liming soils may slighlty increase the Se content in soils.

What happens if horses ingest large amounts of Se in their diets?

Se consumed in large quantities that exceed the animal's needs may lead to a series of potentially life threatening effects. Se tends to accumulate in plants that are tipically not preffered by horses, however, studies have found that when those Se accumulator plants are found between desirable forages and hay, they do not discrimitae from eating Se accumulating plants.

Tipically, horses need to consume large amounts of Se accumulator plants before they become intoxicated. Unfortunately, the effects of Se toxicity may not be evident until months after ingestion. Liver damage is usually the main effect of over consumption of Se, which is irrevesible. Recognizing and controlling the consumption of some of the indicator plants is crucial to ensure animals do not ingest toxic amounts of Se. Even desirable grasses that do not tipically accumulate Se may contain concerning amoutns of Se under the right conditions. Soil testing may be a good idea if you suspect high amounts of Se on your field.
Symptoms of toxicity include abnormal hair and hoof formations, hair loss, abdominal pain and diarrhea, and ultimately liver chirrhosis.

Prince's plume inflorescence

What plants accumulate selenium?

Some plants require relatively large amoutns of selenium to grow. Those plants are called obligate selenium accumulators, also referred to as selenium indicator plants. Se concentration on these plants may range from 1,000 to 13,000 ppm.

Common **obligate selenium** accumulator plants in Colorado include Pentsemons, Prince's plume, woody aster and two-grooved milkvetch.

Secondary selenium accumulators may accumulate toxic amoutns of Se under the rigth condition but their presence in the field doesn't always indicate high selenium soils. Some common species in Colorado include saltbrush, tansy asters and gumweed.

To learn more about Se poisoning on grazing animals visit CSU's Guide to Poisonous plants. Reach out to your local Extension Specialist if you suspect having Se accumulating plants for ideas on how to control them and prevent poisoning.

Picture of a Saltbrush in grassland

REFERENCES

Colorado State University College of Veterinary Medicine and Biomedical Sciences. (2024). Guide to poisonous plants. Retrieved from poisonousplants.cvmbs.colostate.edu: https://poisonousplants.cvmbs.colostate.edu/search

National Research Council (US) Subcommittee on Selenium. (1983). Selenium in Nutrition. National Academy Press (US).

Junipers of Colorado

These resilient trees are commonly used for many purposes, from landscaping to wind breaks to culinary uses and flavoring gin. The three major species that can be found in Colorado are the Rocky Mountain Juniper, the Utah juniper and the One seed juniper, although some other species and cultivars of those species are grown for aesthetic purposes.

The characteristics of a juniper tree

Junipers are unique looking evergreen small trees with leaves or needles that have triangular or pointed overlapping scales, usually pressed close to the stem.

Juniperus occidentalis scale-like leaves. Photo from: OSU College of Agricultural Sciences - Department of Horticulture. Landscape Plants.

The bark color goes from reddish-brown to gray with a scale-like texture that breakes into scales or long, fibrous shreds.

Juniperus scopolorum bark
Photo from: University of Minnesota - A tour of trees on the University of Minnesota Campus

The fruit is a small berry, usually blue or brown that contains a few seeds inside. Berries of the juniper trees take from 1-3 years to mature the seeds inside of it.

Juniperus scopolorum berries in a branch
Photo from: iNaturalist, taken by © Graham Montgomery

Photo by Doug C. Backlund

Bird perched on a branch eating juniper berries.

Junipers in native landscapes

Pinyon–juniper woodlands are vital ecosystems that occur on the eastern and western slopes of Colorado between the grasslands of the eastern slope and the shrublands of the western slopes. The altitude at which the pinyon-juniper communities exist is often altered by severe climatic events like frost and drought.

Both species are well adapted to dry contitions, however junipers usually adapt better to drought are more abundant in forests at lower and drier elevations. Pinyon pines prefer slightly wetter soils and are more abundant at higher elevations, pinyon pines often drop out of the drier lower elevations, resulting in pure juniper species dominating these ecosystems.

Juniper species on pinyon-juniper woodlands vary from east to west of the state. While the Utah juniper dominates the western slope, the One-seed juniper seems to be more abundant in the eastern slope and south western parts of the state.

A few juniper species are common in Colorado, whether they are naturally occuring or used for ornamental purposes. These are a few of the most common ones:

Rocky Mountain Juniper

Juniperus scopulorum

Found thorughout Wyoming, Colorado and northern New Mexico along with Utah juniper, pinyon pine and gambel oak on the western parts of the state. It is the talles juniper found in the state, tipically between 20-50 feet in height. It grows well on rocky soils in the foothills and on the plains.
The resinous wood is very flammable and susceptible even to low intensity fires because of the tree's thin bark and compact crown.
In natural landscapes the lower branches of the tree are used for browsing by deer, with little foliage on the lower portion of the tree.

It is tolerant of calcium carbonate and soils with a pH ranging from 5-8.5, does not tolerate shade, wet, compacted, saline and sodic soils.

Rocky Mountain Juniper is an excellent choice in windbreaks and shelterbelts, field borders and living snow fences. Provides food, nesting and cover for wildlifeand is often used in mine-land reclamation, carbon sequestration and in native landscaping.

Utah Juniper

Juniperus osteosperma

Bushy tree with a rounded crown and a trunk that divides into many branches and occasionally a central dominant trunk. Mature trees are usually less than 30 feet tall and can live up to 650 years. It is commonly found on dry plains, plateaus and the lower elevation of the mountains of the state, tipically between 4,000 and 7,500 ft. It is common in elevations below pinyon pine and above the sagebrush-grass zone.
In some states it has become an invasive plant due to overgrazing, fire suppression and climatic change, which has led them to crowd out herbaceous and shrub species in the sagebrush/grass communities.

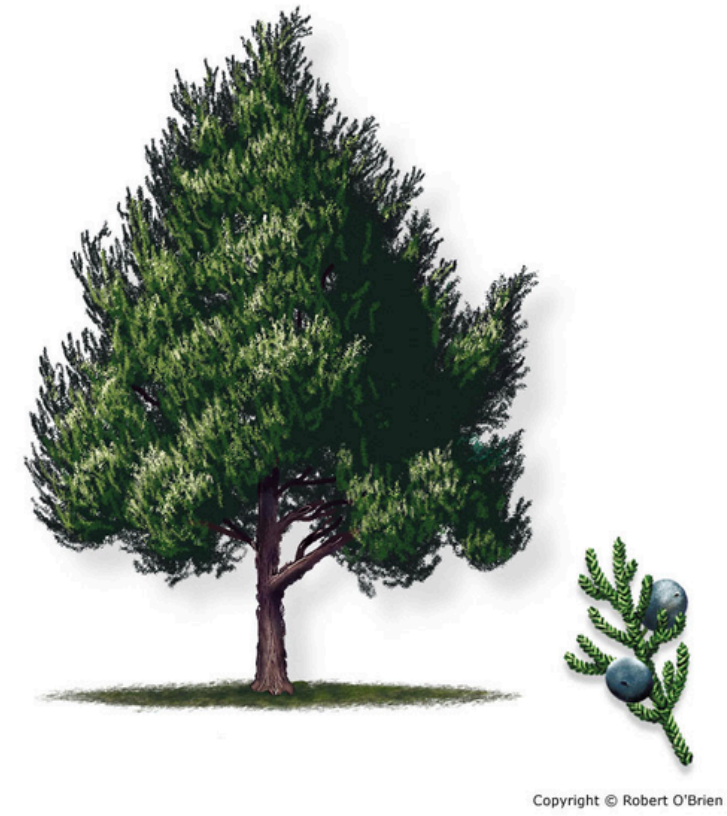
Utah juniper is usually killed by fire, especially when trees are small. Trees do not form a solid canopy because roots spread horizontally, so an individual can occupy a large area and leave no room for other species. It has a more irregular form than Rocky Mountain Junipers and are often used as bonsai trees.


Utah juniper. Photo fom Colorado Native Plant Society by Mo Ewing

Eastern Red Cedar

Juniperus virginiana

Native to the great plains, including Colorado where it occurs strongly on limestone derived soils and it is cultivated in Wyoming and Colorado. Suitable for screen planting and windbarriers when a medium height and dense barrier is desired. It is tipically 10-40 feet in height when fully grown, and has a pyramidal shape.
Considered a "weedy" plant in unmanaged sites where it is considered a threat to prairie and schrubland ecosystems due to its efficiency at taking over abandoned properties and neglected sites. A variety of easter redcedar cultivars have been developed to capture some of the preferred traits of this tree.



Copyright © Robert O'Brien

Creeping Juniper

Juniperus horizontalis

Low-growing evergreen, usually found growing in rocky or sandy soils. It is fairly adaptable to various soil types and pH. Native to the Northern portions of the United States. It prefers full sun and well drained soils. Commonly used as ground cover in many landscaping projects, it is also resistant to air pollutants in urban areas and resistant to deer browsing. It can form dense mats of up to 10 feet wide, while keeping a height that remains below 1.5 ft. It has little water requirements when used in landscapes.

Creeping juniper over a rock. Photo from City of Fort Collins

REFERENCES

Ewing, M. (n.d.). Colorado Plateau Pinyon-Juniper Woodland. Retrieved from conps.org: https://conps.org/project/semi-desert-shrubland-pinyon-juniper-woodland/

USDA Natural Resources Conservation Service. (2011). Plant materials technical note - Rocky Mountain Juniper. Plant materials technical note.

Wier, K. (2014). Junipers of Colorado. Retrieved from http://www.westernexplorers.us/ColoradoJunipers.pdf

Basics of soil salinity

Bonface Manono, SAM Specialist, Mountain Region

What are saline soils?

Soils that contain excess soluble cations such as sodium (Na+), potassium (K+), calcium (Ca2+) and magnesium (Mg2+) or anions like chloride (Cl-), sulfate (SO42-), nitrate (NO3-), bicarbonate (HCO3-) and carbonate (CO32-).

Where do salts come from?

Salt comes from two sources:

- Natural processes, for example reactions of minerals in the soil, rock formation, intrusion of seawater into low-lying areas along coastlines and close by fresh-water aquifers, accumulation of salt from precipitation and, water table rise.

- Human activities also add salts to the soil through use of saline water in irrigation and soil fertilization. Industrial processes, road salting and mining activities add salts to local streams and ground water and eventually onto land.

Where do salts go?

The salts accumulate in the soils after evapotranspiration (evaporation + transpiration) exceeds precipitation + irrigation. Evapotranspiration returns distilled water to the atmosphere and leaves the salts in the surface soil and root zones of plants. (see figure below)

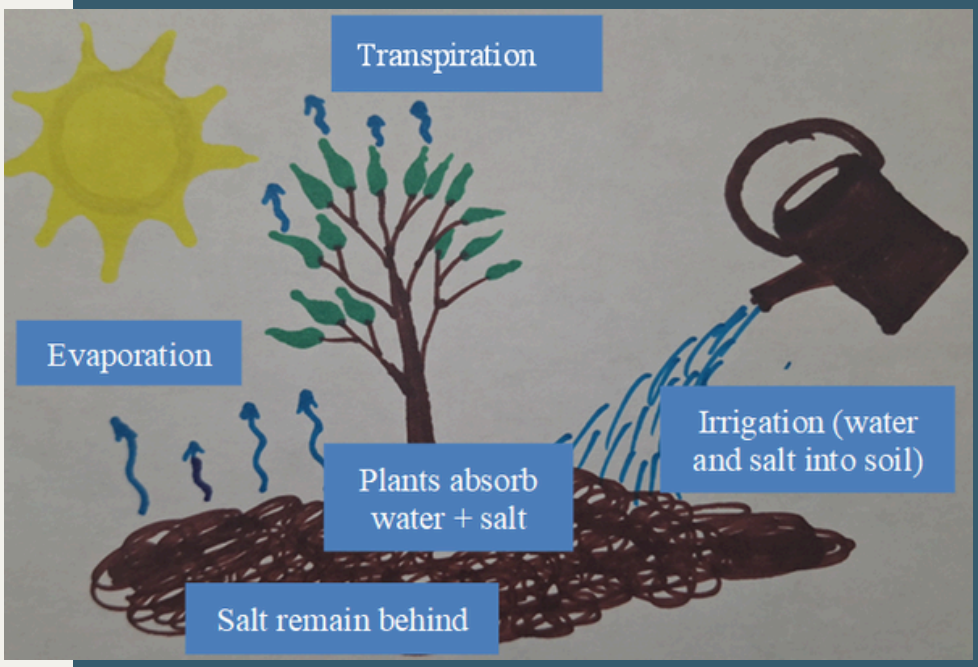


Figure 1: How salt accumulates in the soil after evapotranspiration

What are the effects of salinity on plant growth?

- Reduces water availability for plant use causing physiological drought in the plant. Even when there is adequate water in the soil, the unfavorable osmotic pressure obstructs plant roots from absorbing it. Plants are most affected during germination and early growth stages

- Plant growth is reduced when excess salts enter the plant through the transpiration stream causing injury to the leaf cells. Salt restricts root growth, leaf tip burning/browning, inhibited flowering, and finally reduces vigor and yields.
- Salt cause fine soil particles to bind together thereby reducing drainage capacity.
- Enhances plant mortality during drought.
- Degradation of ground and surface water and negatively impacts biodiversity.

How can you measure salinity in your land?

You can measure salinity problems in your soil through laboratory testing. Tests include:

- Electrical conductivity (EC): A measure of the soil's ability to conduct electricity. It is expressed in decisiemens per meter (ds/m). Increases in soluble salts in the soil result in proportional increases in the solution EC. The U.S. Salinity Laboratory Staff (1954) describes saline soils as those with more than 4 ds/m.
- Total Soluble Salts (TSS): The total amount of soluble salts in a saturated soil paste extract. It is expressed in parts per million or milligrams per liter (ppm or mg/L).

How can you recognize sal affected soil?

Salt accumulation in the soil leads to three soil conditions: saline, saline-sodic and sodic soils. Each has well defined characteristics that you can observe in the field to help you diagnose the problem.

Table 1. Visible characteristics of salt affected soils

Problem	Visible characteristics (symptoms)	
	Color and soil condition	Plant condition
Saline	White soil	Water-stressed plants. Leaf tip burn
Sodic	Brownish-black soil with poor drainage	Inhibit seedling emergence and hinder plant growth
Saline-Sodic	Grey-colored soil	Plants showing water stress

How can you measure salinity in your land?

- Sodium Adsorption Ratio (SAR): Is a measure of soil sodicity. It describes the proportion of sodium to calcium and magnesium in soil solution. It is expressed in milliequivalents per liter (meq/L).
- Exchangeable Sodium Percentage (ESP): It is the sodium adsorbed on soil particles as a percentage of Cation Exchange Capacity. Sodic soils have an ESP greater than 15 (US Salinity Lab Staff, 1954).

Table 2. NRCS classification of salt-affected soils using the saturated paste extraction

Class	EC (ds/m)	SAR	ESP	Tyipical soil structural condition *
Normal	Below 4.0	Below 13	Below 15	Flocculated
Saline	Above 4.0	Below 13	Below 15	Flocculated
Sodic	Below 4.0	Above 13	Above 15	Dispersed
Saline-sodic	Above 4.0	Above 13	Above 15	Flocculated

How can you reclaim salt affecteed soils?

To avoid salinity damage to crops, salt affected soils can be reclaimed through leaching chemical treatment or a combination of both.

Leaching. Apply good quality irrigation water in the correct amounts. Use deep tillage to break root restrictive hardpans or claypans. The excess salts should be leached below the root zone to lower the EC of the soil solution below the crop's critical threshold.

Table 3. The volume of low salt water required to remove large amounts of salts from the soil

Volume of salt-free water	Reduction of salt content in soil
6 inches	50%
12 inches	80%
24 inches	90%

Chemical treatment

Excess sodium causes surface sealing. To eliminate this and increase soil aeration and water movement, the soil should be treated with calcium. Incorporating gypsum into the soil, followed by salt free irrigation water, is the common method used to correct sodium contaminated soils. The amount of gypsum applied depends on the sodium quantity in the soil.

- **Remediation of salinized soils by halophyte-mediated extraction.** These are plants that either exclude salts at the roots, have central vacuoles that sequester salts, or have specialized salt glands that secrete salts on their leaf surfaces.
- **Irrigation management.** Use improved irrigation practices such as reducing pre-planting irrigation, use drip irrigation that deriver water directly to the plant, shallow groundwater management techniques e.g. tile drains to collect salty water where ground water levels are high.
- **Maintain vegetation cover.**
- **Promote integrated soil fertility management** including manure addition, raised beds, mulching and use of cover crops.

NOTE: Correction of salt-affected soils should be done after salinity tests to determine the kind and amount of salt present in the soil.

REFERENCES

Sonon, L. S., Saha, U., & Kissel, D. E. (2015). Soil salinity. Testing, data interpretation and recommendations. Circular, 1019.

U.S. Salinity Laboratory Staff. (1954). Diagnosis and improvement of saline and alkali soils. USDA Agricultural Handbook No. 60. U.S. Government Printing Office

Upcoming EVENTS

Conservation District tree sales are live! Visit your local Conservation District to find trees available for purchase near you. These are some CDs with available trees

Morgan CD - Orders due April 25th. Pick up in May 2025.
For more information click here

Longmont and Boulder Valley CD - Preorder by April 19.
Click here to order.

DOUBLE EL CD - Order by March 31st.
Click here to see full list and place your order.

West Greeley CD - Order before the end of April .
Click here to see more information.

Native plants for Birds: Backyard habitat and Wildscaping 101

Douglas County Events Center 500 Fairgrounds Drive, Castle Rock

When: Thursday, Feb 27, 6-8pm

Pro Tip: Come ~15 minutes early to walk around the CSU Extension Offices gardens! These gardens are next to the parking lot and across the street from the Events Center.

Free tickets available by clicking here

Questions: Contact Heather Kelly, District Manager Douglas County CD
Call (303) 218-2622
EMail Heather@DouglasConserves.org
Free

Commercial Pesticide Applicator Seminars

All seminars will be held at the Colorado State University/Adams County Extension offices, 9755 Henderson Road in Brighton, Colorado, 303-637-8100.
The seminars go from 9 AM - 3 PM. Lunch is included. Cost $80

Commercial Applicator General Seminar - Tuesday, March 11
Commercial Applicator General Seminar - Tuesday, March 18
Commercial Applicator Ornamental Seminar - Tuesday, March 25
Commercial Applicator Turf Seminar - Thursday, March 27

MORE INFORMATION HERE

North American Bison Summit

A new chapter for grasslands conservation & the rural way of life
April 1-4, 2025
Loveland.
Register here

Resource Central Waterwise Yard Seminars

Build your knowledge and confidence by progressing through 3-part sessions focused on creating a stunning, waterwise yard.
Topics include:Xeriscaping basincs, Smart irrigation andTurf transformation
To see full schedule click here.

Sun Soil Water Summit 2025

Sun Soil Water Summit 2025 is a weekend-long gathering focused on bringing the community closer to the food system.
When? Friday, March 14- Sunday, March 16.
Where? Pueblo Community College

LEARN MORE HERE

Colorado Grain Summit
Salida, CO
Saturday March 8th, 2025
8-5:30
at SteamPlant Event Center in Salida, CO
REGISTER HERE

ROCKY MOUNTAIN NATURALIST TRAINING

ONLINE COURSE

This will be the first online training of its kind in the Mountain West featuring self-paced, flexible classes in environmental education and stewardship with an emphasis on data-driven lessons and optional hands-on field experiences to equip learners with a deep understanding of ecosystems, wildlife, and conservation practices. preparing individuals to effectively observe, understand, and protect the natural world.

Courses launching Spring 2025:

- Introduction to Rocky Mountain Naturalist
- Rocky Mountain Ecology and Biology
- Life zones: Foundation for Ecological Systems
- Human Connection: Nature and Wellbeing
- Conservation & Stewardship in the Southern Rockies
- Practicing as a Naturalist

Want to learn more?

Fill out this interest form

NATIVE PLANT MASTER
COLORADO STATE UNIVERSITY EXTENSION

Become a Native Plant Master

- Learn fascinating plant facts including landscape uses of Colorado natives and other human uses.
- Discover how noxious weeds threaten native plants and wildlife.
- Learn how to use a key and botanical field guides to identify wild plants.
- Interact with others who share your love of Colorado's native flora.
- Be recognized for your advanced knowledge with a certificate from CSU Extension.

Each 12-hour course is made up of three four-hour sessions. Courses are offered at various open space partks, state partks and other public lands.

Find NPM Courses by County

- Arapahoe
- Delta
- Douglas
- Eagle
- El Paso
- Fremont
- Jefferson
- Mesa
- Montezuma
- Montrose
- Pueblo
- San Miguel
- Summit

If you are interested in these courses but don't have the time for a 3-day class, some counties offer 1-day classes.

Small Acreage Management Webinar Series

Click on the title of each webinar to register

BOULDER COUNTY
COLORADO STATE UNIVERSITY
EXTENSION

Forage and Seeding Establishment

Friday, February 21st
Lyndsay Gonzalez, Small acreage management coordinator, Boulder County

Spring Weed Management

Friday, March 28
Karla Melgar Velis, Small acreage management specialist, Front Range Region

Pasture Management and Forage Quality

Friday, April 28
Lyndsay Gonzalez

Soils for Small Acreages

Friday May 23
Carley Rohrbaugh, Ag and Natural Resource Specialist, Adams County

Water, irrigation and more

Friday June 20
Eric Hammond, Boulder County Extension Director and Horticulture Specialist

Pollinators and Beneficial Insects

Friday July 18
Sheila Prentice, Sustainable Landscapes Specialist, Boulder County

Fall Weed Management

Friday, August 22
Joe Swanson, Boulder County Weed Control Supervisor

Manure Management

Friday September 19
Karla Melgar Velis

Small Acreage Business Opportunity Potential

Friday, October 24
Martha Sullins, Agriculture, Business Management, and Food Systems Specialist

Disaster Planning: Protecting Property, People, and Livestock

Friday, November 21
Sheila Prentice and Lyndsay Gonzalez

Questions?
lgonzalez@bouldercounty.gov
303-678-6107

All webinars will be held from 12:00 - 1:00 PM