LESSON EIGHT:

Poisonous Rangeland Plants of Nebraska

Impact of Poisonous Plants on Livestock:

- Contain toxic chemicals that can cause loss of productivity, illness, or death of livestock if eaten in large enough quantities
- Cause physiological or biochemical changes to the grazing animal when eaten
- Produce a wide range of symptoms and effects when eaten by livestock including:
  - Mild illness
  - Birth defects
  - Sensitivity to light
  - Chronic illness
  - Debilitation (long-term weakening)
  - Death

https://globalrangelands.org/topics/uses-range-and-pasture-lands/poisonous-plants-rangelands

What Determines a Plant's Level of Toxicity?

The impact of eating a poisonous plant to livestock is directly related to what the animal consumes. The toxicity and/or amount consumed are related to:

- **Palatability**: Plants that taste good will be eaten first. Some toxic plants are unpalatable and rarely consumed, some are very palatable, and others are palatable in early growth stages, when fertilized or when treated with herbicide.
- **Forage Availability**: Many toxic plants begin their growth very early before most other plants. Some toxic plants grow well under drought conditions and may become dominant during or immediately after drought.
- **Climate Stress**: Toxins can increase when the plants are under stress (for example, during drought or after freezing).
- **Soil Conditions**: Some generally non-toxic plants become toxic under specific soil conditions.
- **Plant Part:** Some plants accumulate more toxins in specific plant parts rather than in the entire plant.
- **Livestock Related**: Toxicity can vary with the age and type of livestock, sex, color, condition and nutritional status of animals. For example, larkspur is toxic to cattle, but rarely to sheep; pine needles cause loss of unborn calves but cause no health problems in males; stressed animals are impacted more than unstressed; and hungry animals may eat more of the toxic plants than animals that are not as hungry.

Livestock Are More Likely to Consume Toxic Plants When They:

- Are put into the paddocks when plants are most toxic.
- Are driven, trailed through, or unloaded from trucks into areas infested with poisonous plants.
- Are not watered regularly or are allowed to become hungry, making them more likely to eat lethal quantities of poisonous plants.
- Are allowed to graze in heavy stands of highly poisonous plants.
- Graze early in the spring when there is no other growing vegetation except poisonous plants.

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Ranchers can Prevent Livestock Losses By:

- Learning to identify poisonous plants that may occur on rangeland in their area.
- Not placing vulnerable livestock into areas where poisonous plants make up a large portion of the plant community.
- Using control measures if excessive numbers of poisonous plants are present or invading in the pasture.
- Grazing when and where there are high amounts of desirable, palatable plants.
- Evaluating the plants present in the next pasture to be grazed and delaying entry if poisonous plants are common.
- Utilizing stocking rates which promote desirable species and prevent overgrazing.
- Distributing livestock so that easy-to--graze areas are not over used.

Classification of Nebraska's Toxic Plants

According to Stubbendieck, et.al. (Nebraska Plants Toxic to Livestock), toxic plants can be classified as:

Primary Toxic Plants: The most dangerous and lethal plants to livestock in Nebraska in terms of actual poisoning from ingestion.

Occasionally Toxic Plants: Plants that cause livestock losses each year in Nebraska.

Potentially Toxic Plants: Plants that can poison livestock under certain conditions, but have the lowest level of threat.

Potentially Toxic Crops: Crops or annual forages that can poison livestock under certain conditions if precautions are not taken.

http://extensionpublications.unl.edu/assets/pdf/ec3037.pdf

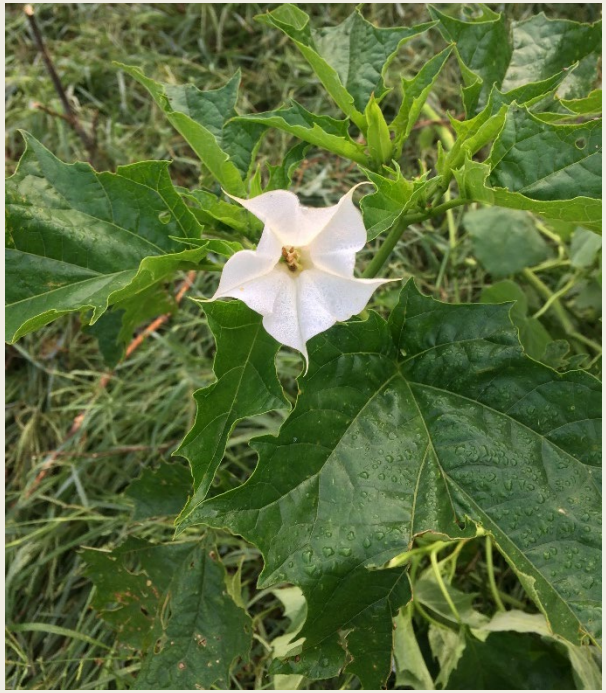

Photo: Jimson Weed is uncommon on NE rangeland, but occurs in waste areas, corrals and cultivated fields and flood plains. Although it is highly toxic, it is classified as an occasionally toxic plant because it is rarely grazed. It is a threat to children who like to play with the seed capsule. It is highly toxic to humans as well as livestock.

How Many Toxic Plants Are Found in Nebraska?

Degree of Toxicity	Number
Primary Toxic	17
Occasionally Toxic	25
Potentially Toxic	71
Potentially Toxic Crops	31

Source:

http://extensionpublications.unl.edu/assets/pdf/ec3037.pdf

Photo: Buffalobur is common on disturbed areas in Nebraska's rangeland, especially sandy sites. It is highly toxic, but is rarely eaten due to the spiny herbage, so it is rated occasionally toxic.

17 Most Dangerous and Lethal Plants Found in Nebraska

- Arrow Grass
- Chokecherry
- Death Camas
- Halogeton
- Lambert Crazyweed
- Low Lupine
- Nebraska Lupine
- Plains Milkweed
- Poison Hemlock
- Prairie Larkspur
- Racemed Poisonvetch
- Riddell Groundsel
- Silvery Lupine
- Spotted Water Hemlock
- Twogrooved Poisonvetch
- Whorled Milkweed
- Woolly Locoweed

Arrow Grass

Arrow grass is a native, perennial, grass-like plant found in marshes, wet meadows and wet depressions in prairies, rangelands and pastures.

In Nebraska, it is commonly found in saline and alkaline marshes.

Arrow grass contains cyanogenic glycosides which produce cyanide. Cyanide stops cellular processes that produce energy. These plants can be very toxic.

All parts of the plant are poisonous. When soils are moist the amount of toxin present is low. During extended drought the amount of toxin is high.

Cattle and sheep are susceptible to poisoning.

Photo: Arrowgrass. Photo Source: Agricultural Research Service, Logan Utah

Chokecherry

Chokecherry is a native shrub found on moist soils of prairies, rangelands, fence rows, draws, forest edges and roadsides.

It is found statewide across Nebraska.

Chokecherry contains cyanogenic glycosides which produce cyanide. Cyanide stops cellular processes that produce energy. These plants can be very toxic.

Fresh, bruised, wilted and dry leaves are poisonous. The highest toxicity is found in young, wilted leaves.

The most dangerous time of year is after an early spring freeze. The leaves are also quite toxic during drought conditions.

Cattle, sheep and goats are more susceptible to poisoning than horses.

The fruits are safe for human consumption but the seeds are poisonous to humans and livestock. Children have been poisoned after eating large quantities of fruit and swallowing the seeds.

Photo: Chokecherry

Death Camas

Death camas is a perennial, native forb found on dry prairies, rangelands, badlands, and pine woodlands.

It is found in the Nebraska Panhandle and in other western states.

The toxin present is an alkaloid that affects the function of nerve and muscle cells. The toxin can cause death within several hours to 1-2 days.

Death camas is dangerous year round, but most livestock losses occur in the spring when there is little forage available.

Sheep are most susceptible to poisoning, but horses and cattle have been poisoned by death camas.

Humans have become ill or died after eating death camas bulbs when confusing it with wild onions. Eating one bulb may cause death.

Photo: Death camas

Halogeton

Halogeton is a annual introduced forb and is native to Russia and China. It is found on heavily grazed rangelands and disturbed sites. It can be abundant on alkaline and saline soils.

In Nebraska, it is found in the far northwest corner of the state.

Halogeton contains soluble sodium and potassium oxalates which when grazed can cause acute calcium deficiency resulting in kidney failure.

Halogeton is toxic year round, and most toxic in the fall and winter. Toxins are found in the entire plant, but the highest concentrations are in the flowers and seeds.

Sheep are the most susceptible to poisoning, but cattle can be poisoned. In western states, hundreds of sheep have died in a day at a single location after eating this plant.

Photo: Halogeton. Photo Source: NRCS Plant Materials

Lambert Crazyweed

Lambert crazyweed is a native, perennial forb found on a variety of soils on dry upland rangelands and prairies.

In Nebraska, it is found statewide.

The toxin in Lambert crazyweed is an alkaloid called swainsonine which forms when plants are infected with a fungus called *Undifilium oxytropis*. Uninfected plants do not contain the toxin. The toxin prevents carbohydrate metabolism and accumulates in the animal's brain cells and other organs, permanently impairing cell function

Toxins are found in the entire plant, but the highest concentrations are in the flowers and seeds.

All grazing animals can become poisoned, but horses are most affected. Affected animals will prefer to eat lambert crazyweed to other species. The toxins cause the animals to behave abnormally and poisoned animals are said to be locoed or crazy.

No antidote is available.

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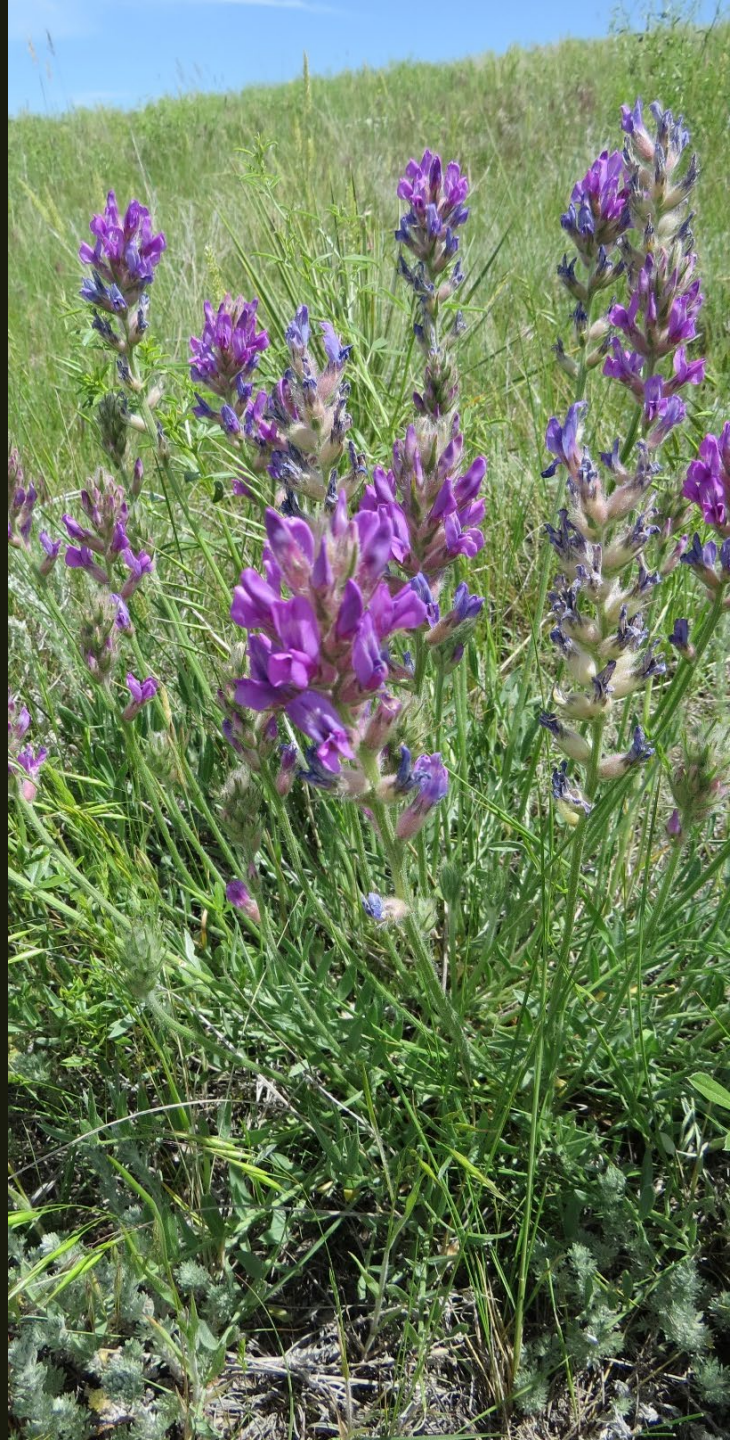


Photo: Lambert crazyweed

Woolly Locoweed

Woolly Locoweed is found on dry prairies, rangelands, pastures and roadsides. Its is most common on sandy or rocky soils.

Wooly locoweed is found in the Panhandle and southwest Nebraska.

The toxin in woolly locoweed is an alkaloid called swainsonine which forms when plants are infected with a fungus called *Undifilium oxytropis*. Uninfected plants do not contain the toxin. The toxin prevents carbohydrate metabolism and accumulates in the animal's brain cells and other organs, permanently impairing cell function.

Affected animals will prefer to eat woolly locoweed to other species. Animals with locoweed poisoning behave abnormally and are said to be locoed (crazy).

There is no antidote available.

Photo: Woolly Locoweed

Low Lupine

Low lupine (small or rusty lupine) is a native annual forb found on sandy soils on rangelands of the western US.

In Nebraska, it is found in the Panhandle and the southwest part of the state.

Toxins are found in the entire plant, but the highest concentrations are in the pods and seeds. The toxins are alkaloids which can cause respiratory failure. Non-lethal quantities cause birth defects.

Low lupine is palatable to livestock. Goats are very resistant to the toxins found in lupine. Sheep are most susceptible to poisoning. Horses and cattle usually avoid the seed and are rarely poisoned.

When cows eat low lupine, calves may be born with skeletal defects including crooked calf syndrome.

Photo: Low lupine

Nebraska Lupine

Nebraska lupine is a native perennial forb found on sandy or rocky soils on rangelands, open woodlands and stream valleys.

In Nebraska, it is found in the Panhandle.

Toxins are found in the entire plant, but the highest concentrations are in the pods and seeds. The toxins are alkaloids which can cause respiratory failure. Non-lethal quantities can cause birth defects.

Nebraska lupine is palatable to livestock. Goats are very resistant to the toxins found in lupine. Sheep are most susceptible to poisoning. Horses and cattle usually avoid the seed and are rarely poisoned.

When cows eat Nebraska lupine, calves may be born with skeletal defects including crooked calf syndrome.

Photo: Nebraska lupine

Silvery Lupine

Silvery lupine is a native, perennial legume found in prairies, rangeland, pastures, road sides and open woodlands in dry and moist soils in all states west of the Mississippi River system.

In Nebraska, it is found in the western Panhandle.

Toxins are found in the entire plant, but the highest concentrations are in the pods and seeds. The toxins are alkaloids which can cause respiratory failure and death. Eating non-lethal quantities can cause birth defects.

Silvery lupine is palatable to livestock. Sheep are most susceptible to poisoning. Horses and cattle usually avoid the seed and are rarely poisoned. When cows eat silvery lupine, calves may be born with skeletal defects.

Photo: Silvery Lupine

Plains Milkweed

Plains milkweed (or low milkweed) is a native perennial forb found on dry sandy, clayey or rocky soils of rangelands, prairies and open woodlands.

In Nebraska, it is found in the western half of the state.

The toxins are cardioactive glycosides which adversely affect heart function. When eaten in lethal quantities, death can occur in 1-4 days.

Plains milkweed is toxic anytime that it is actively growing.

Sheep are the most susceptible to poisoning. It is unpalatable to cattle because it has a bitter taste, so they rarely eat it unless there is no other forage available.

There is no antidote available.

Photos: Plains milkweed

Whorled Milkweed

Whorled Milkweed is found sandy, clayey or rocky soils in pastures, prairies, rangelands, fencerows, floodplains and open woodlands. It is one of the most toxic milkweeds.

In Nebraska, whorled milkweed is found statewide except the northwest part of the state.

The toxic compounds are cardioactive glycosides, which disrupt heart function. Death can occur within 1-4 days after consumption of a lethal dose.

All above ground parts of the plants are toxic. The highest concentrations of the toxins are in the leaves and flower buds. The plants remain toxic when dry and death has resulted from feeding hay containing large amounts of this plant.

Sheep are most susceptible to poisoning from whorled milkweed. It is not palatable to cattle and horses, so poisoning only occurs when other forage is not available.

Dogs have been poisoned after eating leaves of the plant.

No antidote is available.

Photo: Whorled Milkweed

Spotted Water Hemlock

Spotted water hemlock (common water hemlock) is often called the most poisonous plant in the North America. It is found in wet areas along streams, ponds, open woodlands and ditches.

In Nebraska, it is common across the state along streams and in moist areas.

The plant contains cicutoxin, an unsaturated alcohol that stimulates the central nervous system. All parts of the plant are poisonous. Death can occur in 15 minutes but may take 8 hours.

The most common time for poisoning is early spring before forage plants begin to grow. In wet springs, livestock can pull the plants out of the ground and eat the highly toxic tubers. Livestock rarely eat it if there is adequate forage.

Humans have been poisoned when mistaking it for an edible plant.

Photo: Spotted Water Hemlock. Photo Source: US Forest Service

Poison Hemlock

Poison hemlock is an introduced, biennial forb from Europe. It was brought to the US as an ornamental.

Poison hemlock is found in moist soils of floodplains, creekbanks, ditches, pastures and disturbed sites.

In Nebraska, it is found statewide.

The toxins found in poison hemlock are alkaloids that disrupt nerve function and cause respiratory paralysis. Ingestion of a very small amount results in death within 2-3 hours.

All parts of the plant are toxic and the seeds are most toxic. The plant is most toxic immediately before the fruits mature. The toxins are slowly lost during drying, but hemlock in hay may remain toxic

Poison Hemlock is extremely toxic to humans as well as livestock.

Photo: Poison hemlock

Prairie Larkspur

Prairie larkspur, sometimes called Carolina larkspur, is a perennial, native forb that occurs on rangelands and prairies on all soil types.

In Nebraska, it is found throughout the state, with the exception of the northern Panhandle.

The toxins found in prairie larkspur are alkaloids that disrupt nerve function and cause respiratory paralysis. Death occurs rapidly after ingestion.

All parts of the plant are poisonous and the seeds are the most toxic. Prairie larkspur begins growth before most grasses, so poisoning is most common in the spring.

Prairie larkspur is palatable to both cattle and sheep, however cattle are most susceptible to poisoning. Sheep can consume six times as much as cattle before being poisoned. Horses seldom graze it.

Prairie larkspur may significantly increase the year after a drought.

Photo: Prairie larkspur

Racemed Poisonvetch

Racemed poisonvetch, is a perennial, native legume. It is found in dry upland prairies on soils that contain selenium.

In Nebraska, it occurs in far northern, far southern and the most south central parts of the state. It is often found growing with twogrooved poisonvetch.

All parts of the plant are poisonous, but it is usually avoided by livestock as long as adequate forage is present in the pasture.

Poisoning may be acute (occurring soon after ingestion of large amounts) or chronic (poison accumulates and poisoning is gradual due to ingestion of small amounts over time). Chronic poisoning is more common.

Acute poisoning can result in death. Chronic poisoning is called alkali disease and causes very poor body condition, reproductive losses and birth defects.

No antidote is available.

Photo: Racemed poisonvetch

Two-grooved Poisonvetch

Two-grooved poisonvetch is found on dry, alkaline soils of pastures, prairies, rangelands, badlands and roadsides. It only grows in soils containing selenium. The plants also contain swainsonine (see Lambert's crazyweed).

In Nebraska, it occurs in far northern, far southern, and south central parts of the state. It is often found growing with racemed poisonvetch.

Acute selenium poisoning is not common, but can occur from a single dose. Chronic poisoning is more common and occurs when small amounts are eaten over an extended period.

All parts of the plant are toxic. Two-grooved poisonvetch is most toxic in the spring when better forage plants are not available.

No antidote is available

Photo: Two-grooved Poisonvetch. Photo source: Lady Bird Johnson Wildflower Center

Riddell Groundsel

Riddell groundsel is found in dry, sandy and open prairies, rangelands and woodlands.

In Nebraska, it is common in the Sandhills and is found in the southwest, and panhandle.

Riddell groundsel contains an alkaloid that causes irreversible liver damage. Acute poisoning occurs in a few days. Chronic poisoning occurs over several weeks to 6 months. Drought stress increases the toxicity of the plant tissues.

Leaves are more toxic than stems and young leaves are more toxic than older leaves. The plant is not palatable, but will be eaten if other forage is not available. The plant is toxic in hay.

The poisoning is sometimes called walking horse disease. Animals may chew on wooden corrals and fences and eat soil. Death may occur a few days after symptoms appear.

Photo: Riddell Groundsel

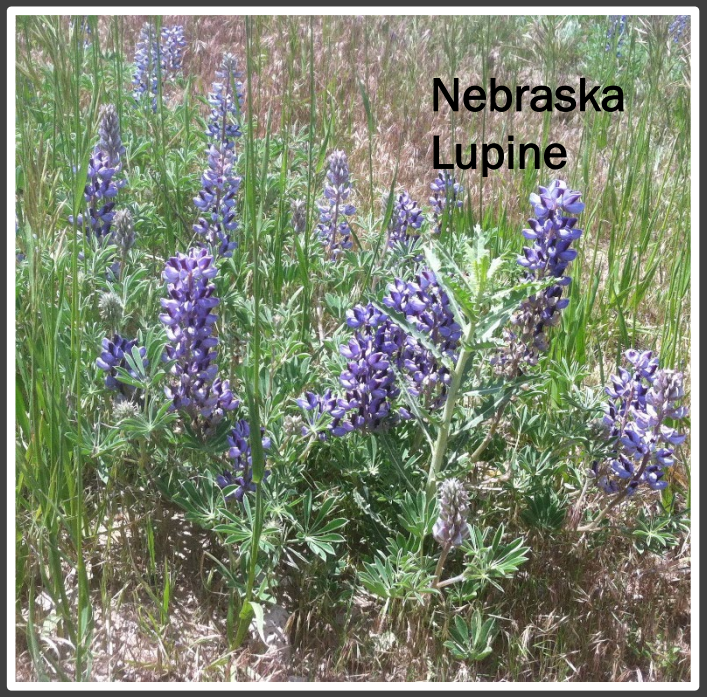
Activities & References

Activities

- Study the range of Nebraska's most toxic plants.
- Determine which plants grow in your area and in the area of the State contest.
- Learn to identify poisonous plants found in your area and the area of the State contest.
- Identify actions that ranchers can take to prevent poisoning of livestock.

References

- Minimizing Livestock Plant Poisoning on Western Nebraska Rangeland
- https://globalrangelands.org/topics/uses-range-and-pasture-lands/poisonous-plants-rangelands
- Nebraska Plants Toxic to Livestock



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