CSU Veterinary Diagnostic Laboratory System

Fort Collins

Rocky Ford Laboratory

Western Slope Grand Junction

Plants Poisonous to Horses and Ruminants in Southern Colorado

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Director, Rocky Ford Branch

CSU Veterinary Diagnostic Laboratory

27847 CR 21

Rocky Ford, Colorado

Colorado State University
Veterinary Diagnostic Laboratories

Plants that cause Acute Death due to Asphyxiation

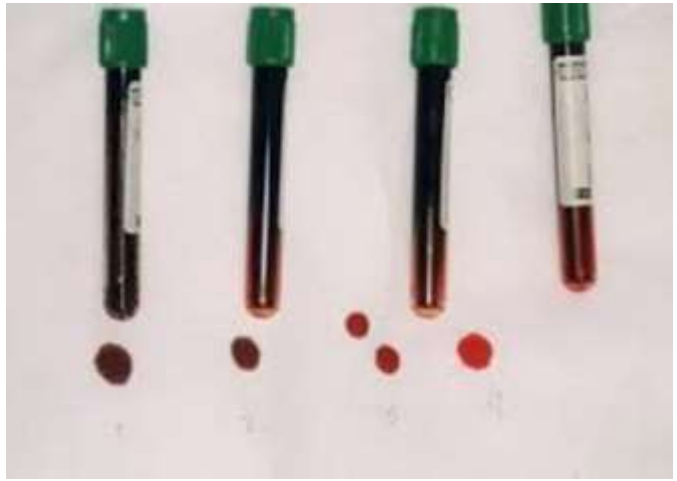
Nitrate – blood can't carry oxygen- muddy brown color

- Species affected – Cattle > sheep >>> horses
- Toxic Principle – nitrite (rumen bacteria convert nitrate to nitrite)
- Drought stress plants - water
- Clinical signs
  - Dyspnea - shortness of breath
  - Muddy, cyanotic mucus membranes
  - Staggering gait
  - Bloat
  - Convulsions -Death
- Chocolate-brown blood
- Treatment – Methylene Blue – Not approved for use in food or dairy animals (18 month withholding)
- Prevention – adaptation; Proprionbacterium rumen inoculant

Hydrogen Cyanide (Prussic Acid)-blood can't release oxygen – cherry red color

- Species Affected - Ruminants – equine?
- Toxic principle – cyanogenic glycosides – (dihurin)
- Regrowth (<24 in) especially important
- Clinical Signs -
  - Dyspnea
  - Cyanosis (blue discoloring of the lining of the mouth)
  - Bloat rumen contents may smell like almonds
  - Convulsions - Death
- Blood and tissues a bright cherry red
- Treatment - sodium thiosulfate, sodium nitrate

Blood Color Nitrate vs Cyanide



Nitrates

pigweed (hay)

Amaranthus retroflexus

(renal toxin)

kochia

K. scoparia

Canadian thistle

Cirsium arvense

sorghum sudan

Sorghum sp

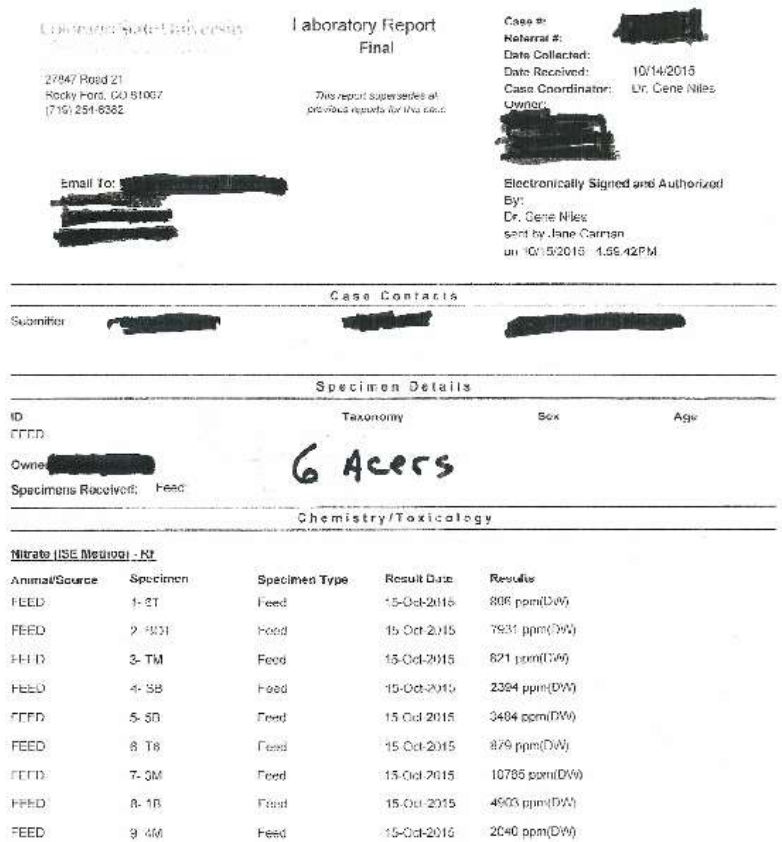
Nitrates

oats

corn/milo forages & stalks

Nitrate Variation 6 Acer Field

2/3 nitrate content in the lower 1/3 of the stock



Laboratory Report
Final

This report supersedes all previous reports for this case.

27847 Road 21
Rocky Ford, CO 81067
(719) 254-6382

Case #:
Referral #:
Date Collected:
Date Received: 10/14/2015
Case Coordinator: Dr. Gene Niles
Owner:

Email To:

Electronically Signed and Authorized By:
Dr. Gene Niles
sent by Jane Carlson
on 10/15/2015 1:59:42PM

Case Contacts

Submitter

Specimen Details

ID	Taxonomy	Sex	Age
FEED			

Owner:
Specimens Received: Feed

6 Acers

Chemistry/Toxicology

Nitrate (ISE Method) - NI

Animal/Source	Specimen	Specimen Type	Result Date	Results
FEED	1- ST	Feed	15-Oct-2015	806 ppm(DW)
FEED	2- MM	Feed	15 Oct 2015	7931 ppm(DW)
FEED	3- TM	Feed	15-Oct-2015	821 ppm(DW)
FEED	4- SB	Feed	15-Oct-2015	2394 ppm(DW)
FEED	5- SB	Feed	15 Oct 2015	3484 ppm(DW)
FEED	6- TB	Feed	15 Oct 2015	879 ppm(DW)
FEED	7- BM	Feed	15-Oct-2015	10785 ppm(DW)
FEED	8- TB	Feed	15-Oct-2015	4903 ppm(DW)
FEED	9- MM	Feed	15-Oct-2015	2040 ppm(DW)

Cyanide

toxin in the “green” leaves

Arrowgrass – Triglochin maritima - palatable

Early spring growth - marshes/wet hay meadows – retains toxicity in poorly cured hay; 0.5-2% bw

Suckleya suckleyana – Eastern front of Rocky Mountains – receding shallow ponds

Cyanide

sorghum sudan

johnsongrass

Flax cultivated

horses - ataxia/cystitis & fetal deformities

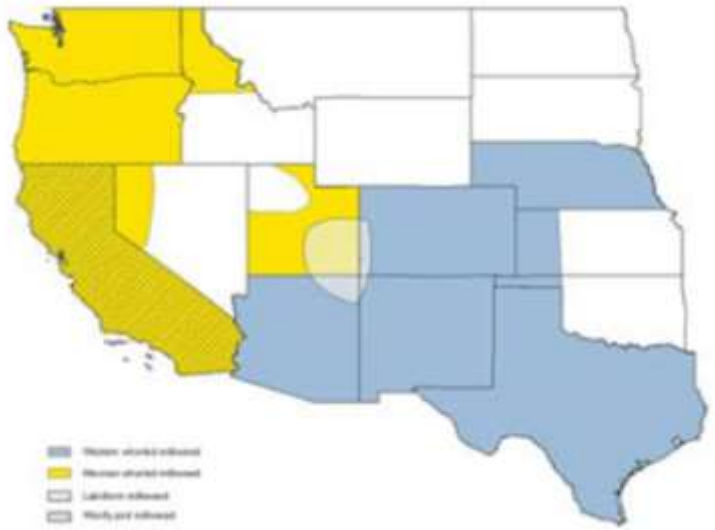
rare in wild flax requires dense stands

Western Whorled (Horsetail) Milkweed

Asclepias subverticillata-one of the most toxic plants in North America

- Species affected – all - except butterflies
- 0.2-0.4% bw is toxic
- Narrow verticillate-leaved – neurotoxic;
- Broad and narrowed-leaved – cardiotoxic (arrow poisons)
- Toxic Principal – unknown neurotoxin
- Unpalatable green but palatability increases when dry → hay
- Dense stands along ditches and irrigated hay fields
- Clinical Signs
  - Acute Death
  - Depression, weakness, and staggered gait
  - Difficulty in breathing with expiratory grunting sounds
  - Rapid, weak pulse or other cardiac arrhythmias

- Loss of muscular control
- Elevated temperature
- Violent spasms - colic
- Bloating
- Respiratory paralysis
- Treatment – symptomatic



Western Whorled (Horsetail) Milkweed

Locoweed (Astragalus and Oxytropis spp.)
locoweed & milk vetches

- 2300-2500 species – Toxic Plants of North America lists 52 sp. as potentially toxic
- 1st USDA Poisonous Plant Laboratory est. at Hugo, CO – 1904 (CD Marsh)
- Colorado (late 1800's) paid $50,000/year for Locoweed (dug below the crown)
- Stands generally short lived but seeds are viable >50 years
- Species affected – Horses > cattle, sheep, goats, and wildlife (elk, deer, antelope)
- 4 Clinical Syndromes occur in US:
  1. Locoism – swainsonine – highest concentration in seeds & pods, stems retains toxicity when dry
     - Neurologic disease
     - Emaciation
     - Poor reproductive performance, abortion, deformed fetuses
     - Right heart failure
     - Depressed immune function
  2. Selenosis – Selenium accumulation
  3. Photosensitization – Astragalus cicer (chickpea milkvetch) West and N Central US
  4. Nitrotoxicosis (cracker heels) – A miser (timber milk vetch) – Northwest US

Locoweed (Astragalus and Oxytropis spp.)

- Swainsonine effects are cumulative – 0.03% in plant can produce effects in as little as 3 weeks
  - Threshold dose of 0.3 mg swainsonine/kg of body weight (0.14 mg/lb bw)
- Toxic at all stages of growth, dry and in hay
- Learned process that can lead to habituation
- Excreted in milk – offspring can become ill before their dams
- Signs and Lesions of Poisoning

  Depression

  Dull dry hair coat

  Eyes dull and staring

  Irregular gait or some loss of muscular control

  Weakness

  Some animals show extreme nervousness

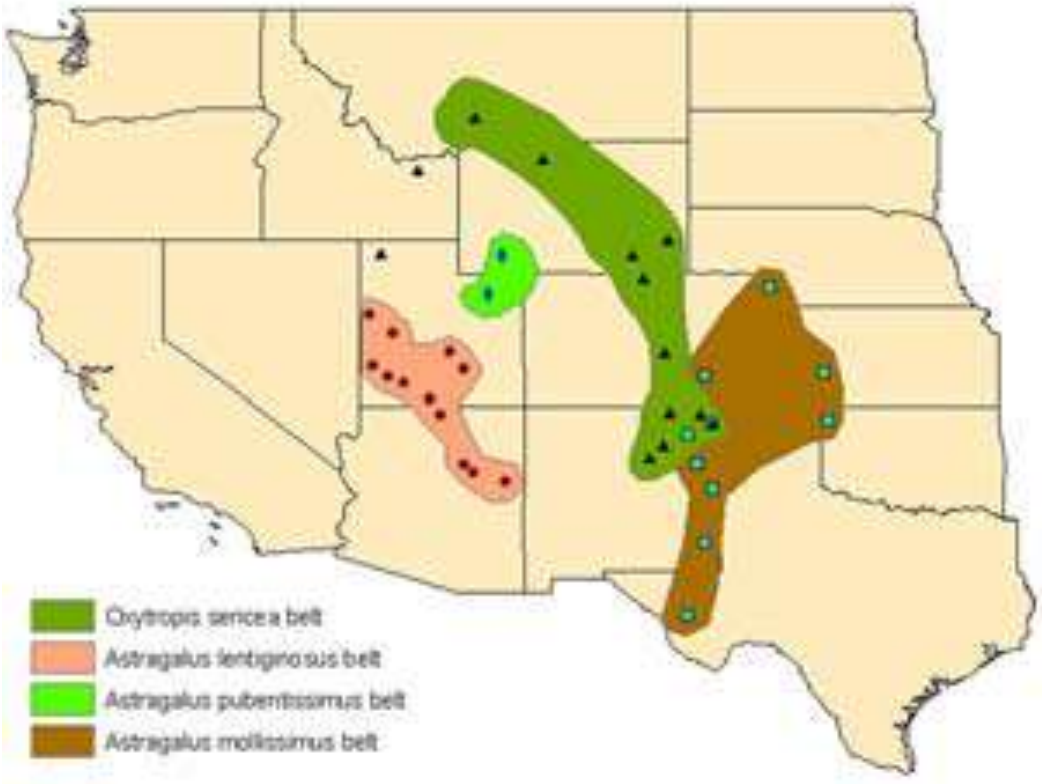
  Loss of sense of direction

  Withdrawal from other animals

Locoweed and Oxytropis spp

- Clinical Signs cont.
  - Some animals develop inability to eat or drink
  - Abortions are common; hydrops may occur in some cattle
  - Skeletal malformations may occur
  - Animal may become violent if stressed
  - Reduced libido in males and altered estrous behavior in females
  - Cessation of spermatogenesis and oogenesis
  - Recumbency and death may follow prolonged consumption of locoweed
  - Vacuolation of neurons, renal tubular epithelium, hepatocytes, etc.
  - Congestive heart failure when grazed at high elevations
- Diagnosis
  - serum swainsonine – half live <20 hrs - animal must be eating locoweed at the time of testing
  - serum mannosidase – cattle; no commercial place to test samples
- Treatment
  - Remove from source
  - Symptomatic
    - Horse reserpine (temporary/transport)
- Prevention
  - Flash graze during early pod stage
  - Rotational graze – 1 week on 2 weeks off (2 on - 3 off)
  - Aversion therapy - lithium chloride

Locoweeds



A. mollissimus

wooly Loco

Oxytropis sericea

white loco

Locoweed

A. lambertii – purple loco

A. lentiginosus - spotted loco

Artemisia filolia- fringed sage; A. frigida - sand sage

Species affected – Equine
  sage sickness
Toxic principle –lactones
  abrupt ingestion of large amounts 0.75% bw
Target Organ – nervous system
Clinical signs
  incoordination – front legs
  excitable & unpredictable
  stumble & fall
Diagnosis – sage smell to breath
Treatment – none
Recovery general complete 2-3 days

- fringed sage

sand sage

Selenium Toxicosis

Acute

- Lethargy
- Dyspnea with abnormal posture
- Ataxia
- Diarrhea
- Abdominal pain (teeth grinding)
- Death (Sheep may not show signs and are found dead)
- Treatment none - remove source

Chronic

- Dullness
- Rough hair coat loss of mane/tail
- Emaciation
- Lack of vitality, anemia
- Lameness, joint stiffness
- Hooves may become overgrown or deformed circular bumps or breaks below coronary band)
- Cardiomyopathy and liver cirrhosis
- Reproductive losses in cattle

Selenium Indicator Plants

Primary - several thousand ppm Se

milkvetch (Astragalus)-

TPNA list 19 species of Astragalus

aster (Machaeranthera section Xylorrhiza),

goldenweed (Haplopappus section Oonopsis)

princes plume (Stanleya pinnata).

stickleaf (Mentzelia)

Secondary - several hundred ppm Se

asters (Aster)

milkvetch (Astragalus)

saltbush (Atriplex)

Indian paintbrush (Castilleja)

toadflax (Comandra)

gumweed (Grindelia)

snakeweed (Gutierrezia)

woody aster (Machaeranthera)

narrowleaf marsh elder (Iva)

beardtongue (Penstemon)

goldenrod (Solidago)

Primary Selenium Accumulator Plants

Princes plume

A. bisulcatus two-grooved milkvetch

Primary – up to 3000 ppm Se

Primary Selenium Accumulator Plants

Pyrrocoma sp. - goldenweed

Mentzelia sp - stickleaf

Secondary Selenium Accumulator Plants

Atriplex sp – fourwing saltbrush

Castilleja – Indian paintbrush

Secondary Selenium Accumulator Plants

Comandra - toadflax

Grindelia - gumweed

Secondary Selenium Accumulator Plants

Gutierrezia - snakeweed

Iva –narrow leaf marsh elder

Secondary Selenium Accumulator Plants

Penstemon - beardstongue

Soldiago - goldenrod

Selenium toxicosis

Selenium toxicosis

Selenium toxicosis

Selenium toxicosis

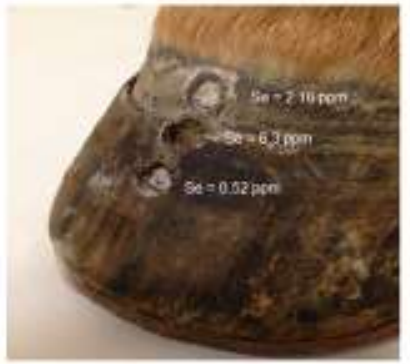
Se Concentrations

Blood, ppm	Hoof, ppm
0.45	6.82
0.39	4.78
0.35	
0.39	
0.47	
Liver, ppm, DW	
2.16	5.33

Case 2
Hoof 7.43
Hair 8.63

Selenium (ppm)– Hoof

- Adequate 0.60 – 1.20
- High 0.8 – 2.8
- Toxic chronic 5.0 – 20.0
- Toxic Acute – 2.8



Locoweed, Selenium and General Custer

- Custer, selenium and swainsonine.
- Hintz HF1, Thompson LJ.
- Abstract

- The Battle of Little Bighorn was fought over 100 y ago but many controversies remain. Some feel the defeat of Custer could have been avoided if Benteen and Reno had united with Custer. A slow-moving pack train may have hindered the troops of Benteen and Reno from joining up with Custer. One report indicated the horses and mules in the pack train were lame and behaved crazily. It has been previously suggested that the animals had selenium toxicosis. We propose the lameness could have been caused by selenium, but that the behavioral problems may have been caused by the ingestion of plants containing swainsonine.

Animal ID	Iron, Serum (ug/dL)	Reference Range (ug/dL)	Manganese, Serum (ng/mL)	Molybdenum, Serum (ng/mL)	Zinc, Serum (ug/mL)	Reference Range (ug/mL)
414	318 H	110-160	2.6	17.7	1.03	0.90-2.00
436	128	110-160	2.6	9.3	1.08	0.90-2.00
415R	103	110-160	2.6	11.6	1.14	0.90-2.00
362	183 H	110-160	2.1	13.5	1.03	0.90-2.00
415R	344 H	110-160	2.7	14.3	1.10	0.90-2.00
410	101	110-160	2.3	10.4	0.80	0.90-2.00
400	182 H	110-160	2.8	11.2	1.10	0.90-2.00
841	162	110-160	2.4	13.8	1.20	0.90-2.00
867	215 H	110-160	2.7	15.6	1.41	0.90-2.00
827	204 H	110-160	14.8	14.6	0.87	0.90-2.00
889	200 H	110-160	3.2	15.8	1.33	0.90-2.00
912	103	110-160	2.8	12.0	1.10	0.90-2.00

Animal ID	Selenium, Serum (ng/mL)	Reference Range (ng/mL)	Selenium, Whole Blood (ng/mL)	Reference Range (ng/mL)
2401	115 H	70-100	403 H	120-250
413A	156 H	70-100	501 H	120-250
444	154 H	70-100	542 H	120-250
415A	141 H	70-100	566 H	120-250
2402	163 H	70-100	621 H	120-250
428	163 H	70-100	622 H	120-250
408	184 H	70-100	625 H	120-250
403	160 H	70-100	569 H	120-250
414	184 H	70-100	620 H	120-250
436	143 H	70-100	441 H	120-250
415B	183 H	70-100	603 H	120-250
362	178 H	70-100	543 H	120-250
415B	167 H	70-100	613 H	120-250
440	168 H	70-100	536 H	120-250
403	139 H	70-100	528 H	120-250
841	141 H	70-100	538 H	120-250
867	156 H	70-100	681 H	120-250
827	184 H	70-100	622 H	120-250
889	163 H	70-100	582 H	120-250
912	136 H	70-100	497 H	120-250

Case Comments

Adequate serum vitamin A concentrations in adult cattle range between 225 and 500 ng/ml, values less than 150 ng/mL are considered deficient.

Death Camas – Zigadenus nuttallii all species are considered toxic

Western US - <8000 ft

Early season growth

Death camas – several species - all toxic

Early spring growth – leaves and stalks toxic

Ingestion of 0.5-1% bw for **sheep;** same for cattle (less likely to eat Zigadenus)

Species affected - all (toxic pollen –bees) <24 hrs

Toxic principle – neurotoxic alkaloids (nitrogen compounds) - repetitive firing of nerves to muscles

Clinical Signs

- found dead or die within 48 hours
- ropey salivation and frothing
- retching, vomiting and colic
- posterior incoordination and staggering
- sheep hyperexcitable - pulse fast, weak and possibly irregular
- prostration, labored breathing, gasping
- convulsions, collapse or coma

Treatment – sheep (atropine 2 mg, picrotoxin 8 mg) , activated charcoal

Larkspur - Delphinium sp

- 3 types - Tall , Low and Plains
- Toxic principle – alkaloids; all parts of all larkspur species are poisonous, but new growth and the seeds contain the highest concentrations of toxic substances.
  - Effects are cumulative
    - 5 – 20 # of low larkspur lethal for 1000# cow; less for tall larkspur
  - Early grazing season (April-May-plains larkspur)
- Species affected cattle>sheep (management tool)> horses
-

Larkspur - Delphinium sp

Western US – plains larkspur

Clinical Signs

Occur within 3 - 8 hours

6 stages

tremors, wide stance, staggering

lies down often

can lift body but not stand

sternal recumbency

lateral recumbency

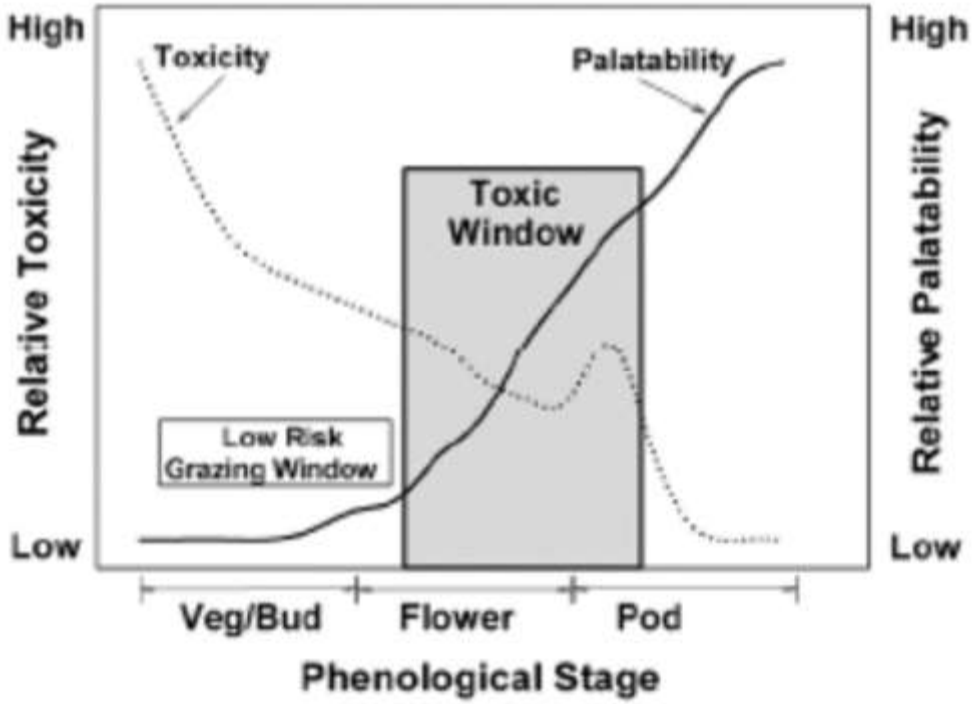
death

Treatment - prevent bloat - position animal on sternum facing uphill

atropine, physostigmine, neostigmine

Prevention aversion training – lithium chloride; vaccination; genetic modification, insect control

Larkspur Delphinium sp.



Plains larkspur – high plains of CO,WY,NM – early growth

Delphinium

Tall Larkspur - >7000 ft – late growth

Short larkspur, low elevation early growth

Equine Chewing Disease

Yellow Star Thistle

Centaurea solatitialis

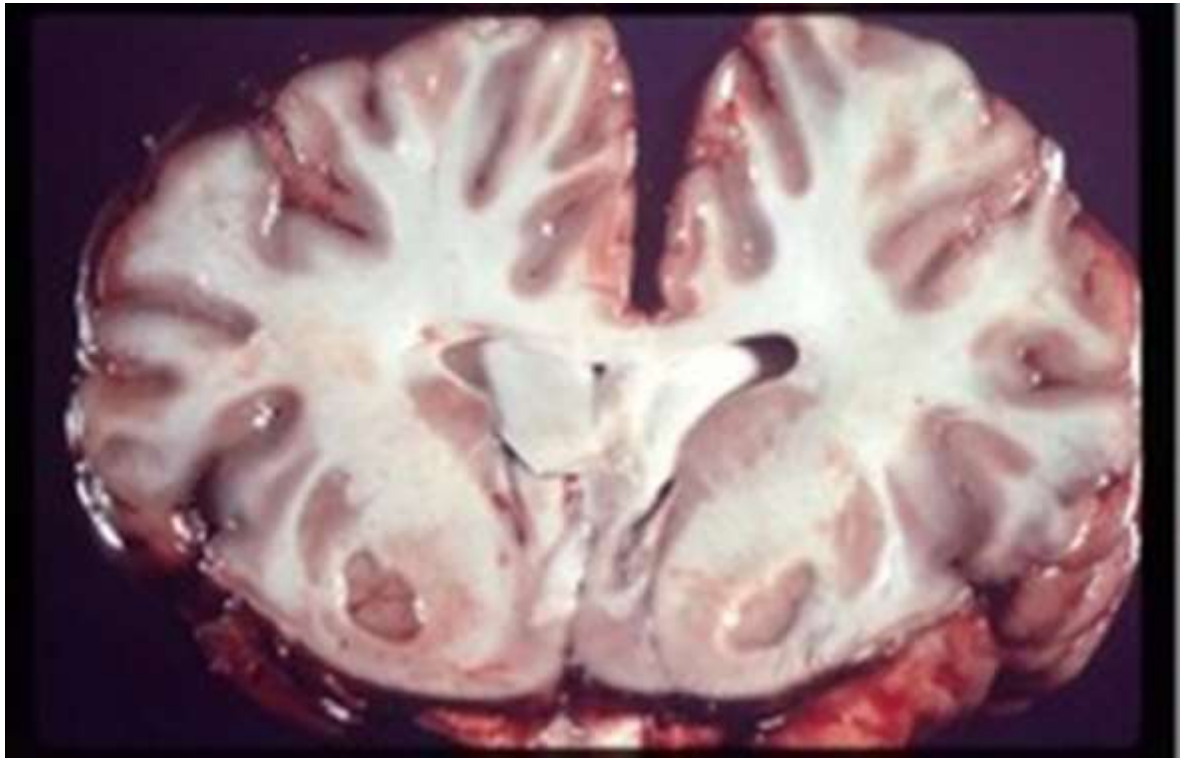
Nigropallidal Encephalomalacia
Signs and Lesions of Poisoning

- Clinical signs occur after the horse has eaten large quantities of either plant for 30-60 days
- Chewing disease (dysfunction of facial, mouth, and throat muscles)
- Facial paralysis
- Depression
- Dehydration and malnutrition
- Incoordination
- Muscle tremors
- Irreversible necrosis of the brain

Russian Knapweed

Acrptilon repens

Equine Chewing Disease



Plants that cause Liver Disease

equine walking disease, hard liver disease

Plants Containing Pyrrolizidine Alkaloids

- Species affected – equine and cattle
- Disease occurs from a few days up to months depending on the quantity of toxins
- Cynoglossum – throughout NA - pastures & hayfields – remains toxic
  houndstongue
- Senecio >1000 species-gravely plains/foothills primary horse & cattle
  groundsels
  ragworts
  lambstongue ragwort
- Amsinckia-SW US disturbed ground/roadside
  - horse
- Packera – numerous ragworts Midwest & E US
- Crotalaria – Easter US- Missouri Bottom Disease

Clinical signs

- Lethargy; loss of interest in food and abdominal pain
- Crustiness around eyes and nose; eyes may also be red and watery, especially in bright sunlight (secondary photosensitivity)
- There may be diarrhea or constipation
- Weakness as manifest by wobbling and dragging rear feet
- Secondary neurologic disorder - animals may wander aimlessly and appear to be blind, and may become belligerent
- Cattle may develop a pig-like odor that has a somewhat sweetish quality
- Ascites - the abdominal cavity may fill with fluid
- Death may occur within a few days after symptoms appear
- Icterus and hyperbilirubinemia
- Liver cirrhosis, fibrosis, enlarged liver cells (megalocytosis) and bile duct proliferation

Plants that cause Liver Disease

houndstongue - Cynoglossum

tarweed fiddleneck - Amsinckia

Plants that cause Liver Disease

Riddell's (sand) groundsel – S. riddellii

threadleaf ragwort (wooly) - S. flaccidus

Plants that cause Liver Disease

lambstongue ragwort (butterweed)

S. integerrimus

Crotalaria – Missouri bottom disease

Cocklebur - Xanthium strumarium

- Location – throughout NA
- Species affected – all calves> sheep>horses
- Toxic principle – glycoside carboxyatractylocide
  - spring /early summer
  - Sprouts - 1% bw calves; 2-2.5% sheep bw
    4 leaf stage – toxicity greatly decreased
  - Burrs (ground) – 02 -5% bw; whole 20-30% grain or hay
    - mechanical damage
- Clinical signs -acute liver failure

Cocklebur - Xanthium strumarium

Clinical signs

- Within 12 hrs (pre-ruminant) up to 1-2 days
- Salivation
- Tremors
- Ataxia
- Seizures
- Death

- Diagnosis – blood tests
  - ↑ liver enzymes (10X)
  - ↓ blood glucose (approach 0)
- Massive liver failure (necrosis)
- Treatment
  - symptomatic

Plants that Accumulate Sulfur

Ruminant Neurologic disease - PEM/Polio

Sulfur Accumulating Plants

- Canada thistle -Cirsium arvense
- Kochia - K. scoparia
- Lambsquarter -Chenopodium album
- Fourwing saltbrush - Atriplex
- Tansy mustard - Descuraina pinnata

Polioencephalomalacia – PEM/Polio

- Sulfur intake is accumulative
  - Feed- grain, molasses & dairy byproducts
  - Hay
  - Water
  - Weeds
- Clinical Signs
  - Blind
  - Circling
  - Depressed or Nervous
  - Salivation
  - Teeth grinding
  - Head pressing
  - Dead or down unable to rise
- Treatment – Thiamine (vitamin B1)

Plants that Accumulate Sulfur

Kochia – Kochia scoparia

Canada thistle - Cirsium arvense

Plants that Accumulate Sulfur

Lambsquarter – C. album

Fourwing saltbrush - Atriplex

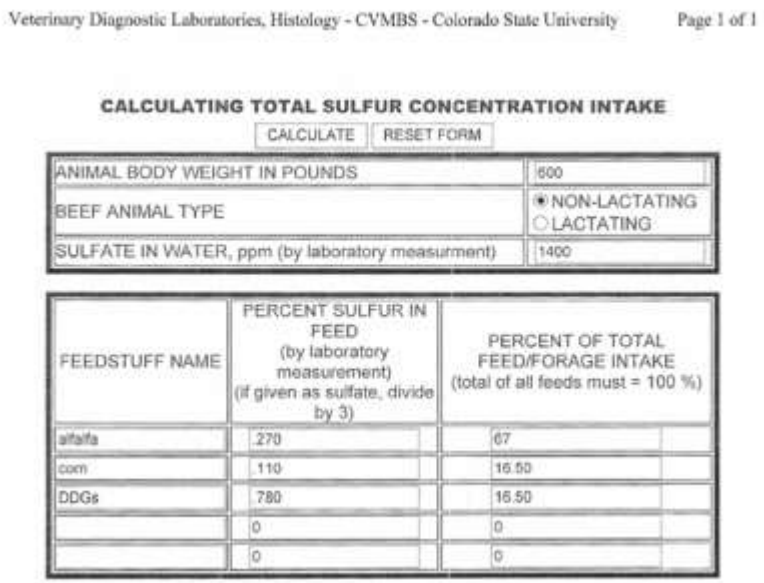
Plants that Accumulate Sulfur

tansy mustard - Descuraina pinnata

Water

Sulfur calculator

- http://csu-cvmbs.colostate.edu/vdl/sulfur-calculator/Pages/default.aspx



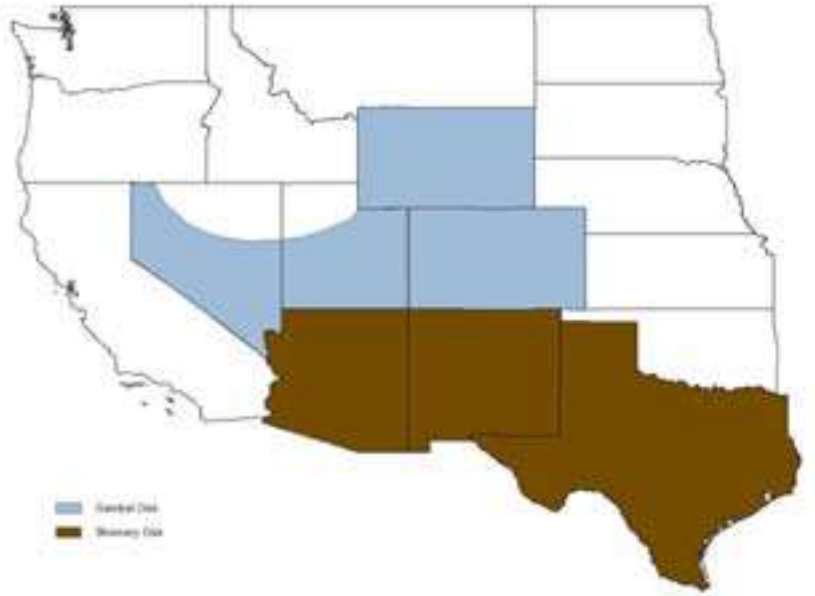
CALCULATING TOTAL SULFUR CONCENTRATION INTAKE

CALCULATE RESET FORM

ANIMAL BODY WEIGHT IN POUNDS	600
BEEF ANIMAL TYPE	◉ NON-LACTATING ○ LACTATING
SULFATE IN WATER, ppm (by laboratory measurment)	1400

FEEDSTUFF NAME	PERCENT SULFUR IN FEED (by laboratory measurement) (if given as sulfate, divide by 3)	PERCENT OF TOTAL FEED/FORAGE INTAKE (total of all feeds must = 100 %)
alfalfa	.270	67
corn	.110	16.50
DDGs	.780	16.50
	0	0
	0	0

Oak Poisoning – Quercus sp.



Oak Poisoning – Quercus sp

- Oak buds/ leaves -spring
- Large amounts for 2-10 DAYS
- Acorns – fall
- Toxic agent – tannins
- Destroys kidneys
- Species – cattle>sheep/goats>horses

Clinical signs

- Cattle
- anorexia, listless, rumen stasis, constipation
- diarrhea (bloody), increased urination (decreased urine specific gravity)f, ventral edema
- weakness, recumbency
- Sheep – less edema
- Horse – diarrhea (bloody), colic, straining to defecate (severe)
- Postmortem findings
  - Subcutaneous edema
  - GI irritation
  - Renal failure – ascites
- Treatment – remove from source
- Prevention – 5-10% calcium hydroxide supplement

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References:

- Toxic Plants of North America 2nd ed, Burrows and Tyrl; Wiley-Blackwell 2013
- Plants Poisonous to Horses,A. P. Knight BVSc, MS, DACVIM;Colorado State University,February 2005 http://www.extension.colostate.edu/boulder/sam/pdf/PlantsPoisonoustoHorses2005.pdf
- USDA - Plants Poisonous to Livestock in the Western States http://www.ars.usda.gov/is/np/PoisonousPlants/PoisonousPlants.pdf
- USDA Agricultural Research Service
- http://www.ars.usda.gov/Services/docs.htm?docid=9951
- Colorado's Poison Menace - BCHA www.boulderhorse.org.

kochia

Locoweed and Oxytropis spp

Clinical Signs cont.

- Some animals develop inability to eat or drink
- Abortions are common; hydrops may occur in some cattle
- Skeletal malformations may occur
- Animal may become violent if stressed
- Reduced libido in males and altered estrous behavior in females
- Cessation of spermatogenesis and oogenesis
- Recumbency and death may follow prolonged consumption of locoweed
- Vacuolation of neurons, renal tubular epithelium, hepatocytes, etc.
- Congestive heart failure when grazed at high elevations

Prevention

- Flash graze during early pod stage
- Rotational graze – 1 week on 2 weeks off
- Aversion therapy - lithium chloride

Oak Poisoning – Quercus sp

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  - LARGE AMOUNTS FOR 2-10 DAYS
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- Clinical signs
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Oak Poisoning – Quercus sp

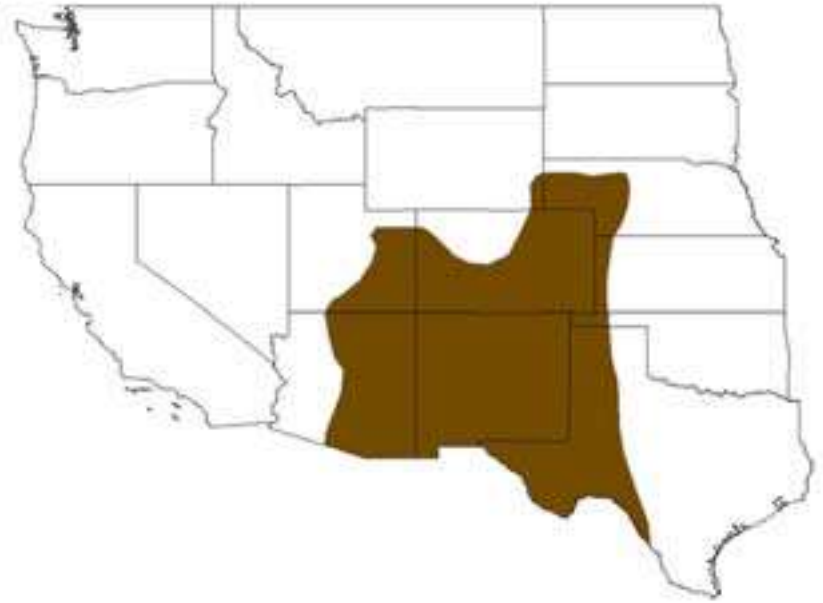

5389999

Plants that cause Liver Disease

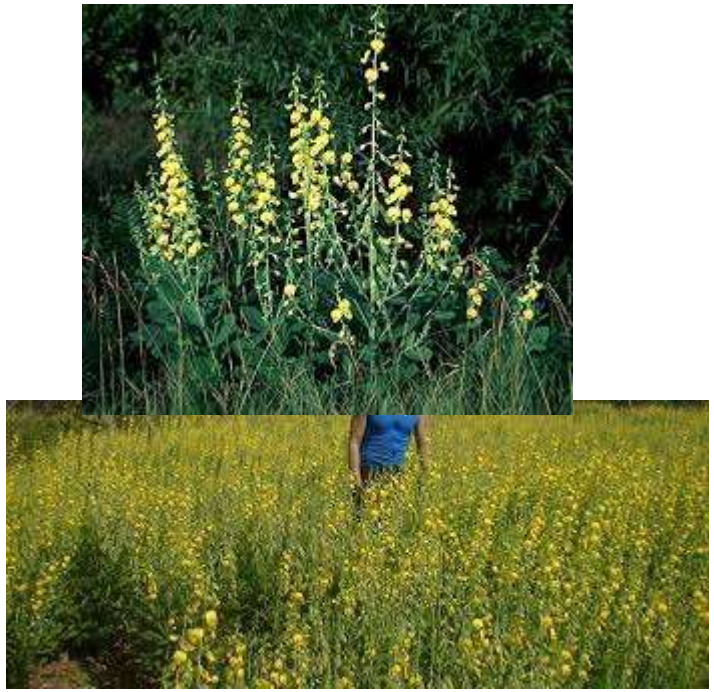
Amsinckia hard liver disease

Crotalaria – Missouri bottom disease

Houndstongue and groundsel (senecio)thread leaf & ridell bottom)

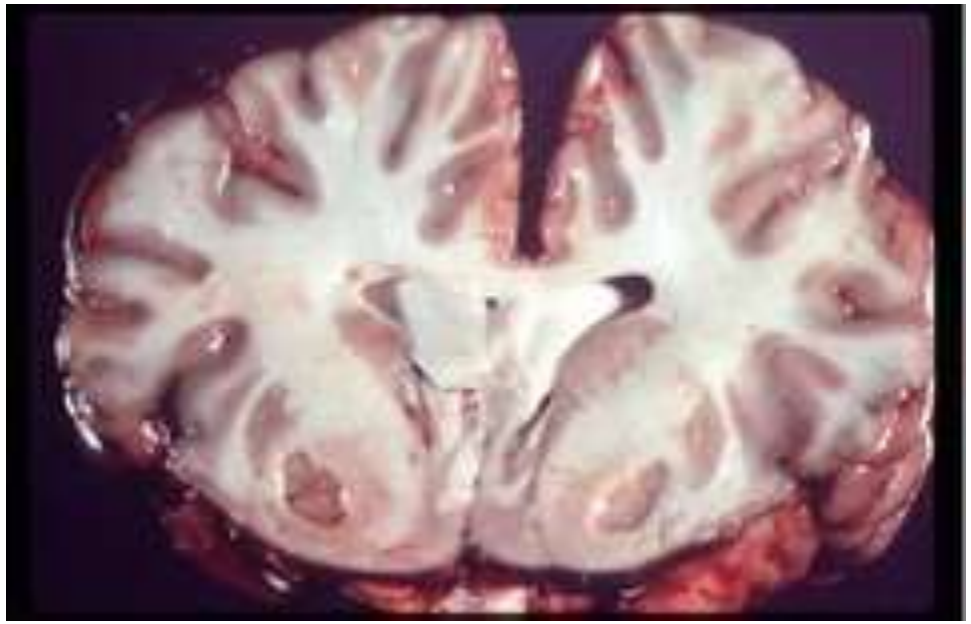


Ridell grounsel crotilaria amsinkia



Chewing Disease - Equine

- Signs and Lesions of Poisoning
- • Clinical signs occur after the
- horse has eaten large quantities
- of either plant for 30-60
- days
- • Chewing disease (dysfunction
- of facial, mouth, and throat
- muscles)
- • Facial paralysis
- • Depression
- • Dehydration and malnutrition
- • Incoordination
- • Muscle tremors
- • Irreversible necrosis of the
- Brain
- Treatment None



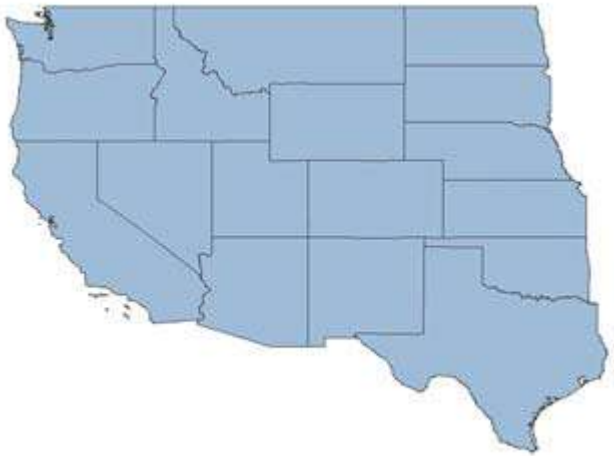
Equine Chewing Disease

Western US

Yellow Star Thistle **Centaurea solstitialis**

Russian Knapweed **Acroptilon repens**

Brakenfern pteridium aqulinum wide dist, thiamine def, wasting, depression incoordination, cumulative hay, crouch, arched back legs apart. WUS large amt 2-4 wks tremble



Brakenfern – clinical signs

Ruminants acute disease

- In cattle and sheep: destroys mone marrow – bladder cancer
- ◦High fever
- ◦Loss of appetite
- ◦Depression
- ◦Difficulty in breathing
- ◦Excessive salivation
- ◦Nasal and rectal bleeding; bloody urine and feces
- ◦Anemia, leukopenia, thrombocytopenia, and hemorrhagic syndrome
- ◦Hemorrhages on mucous membranes
- ◦Aplastic bone marrow
- ◦Bladder tumors in cattle
- Hemmorhage
- Treatment none

Equine chronic disease

- In horses: disrupts thiamine vit b1 metabolism
- ◦Loss of weight and condition; emaciation
- ◦Progressive incoordination
- ◦Marked depression
- ◦Crouching stance, back arched with legs apart
- ◦Twitching muscles
- ◦General body weakness
- ◦Weak, fast pulse
- ◦Inability to stand
- ◦Convulsions or spasms
- ◦Pericardial and epicardial hemorr
- Treatment - Thiamine

PAs
Senecios - threadleaf roundsel ragworts houndstongue cynoglosum md

Milk vetch nitro compounds acute(death n hrs) and chronic palatable toxicity decrease as mature wasatch milkvetch(2# kill 1000# cow)

Milk vetch wasatch

A miser - timber milkvetch

- Acute Poisoning:
- • Respiratory distress
- • Muscular weakness primarily
- in pelvic limbs; prostration
- • Death usually occurs in 3 to
- 4 hours
- • Lobular alveolar emphysema;
- collapsed lungs and constricted
- bronchioles with interlobular
- edema
- • Forced movement may cause
- these animals to collapse
- and die

- Chronic Poisoning:
- • Nervousness
- • Labored, rapid respiration
- • As intoxication progresses,
- respiration develops a wheezing
- or roaring sound
- • Knuckling of fetlocks
- • Goose stepping, knocking
- of hocks and/or feet when
- walking

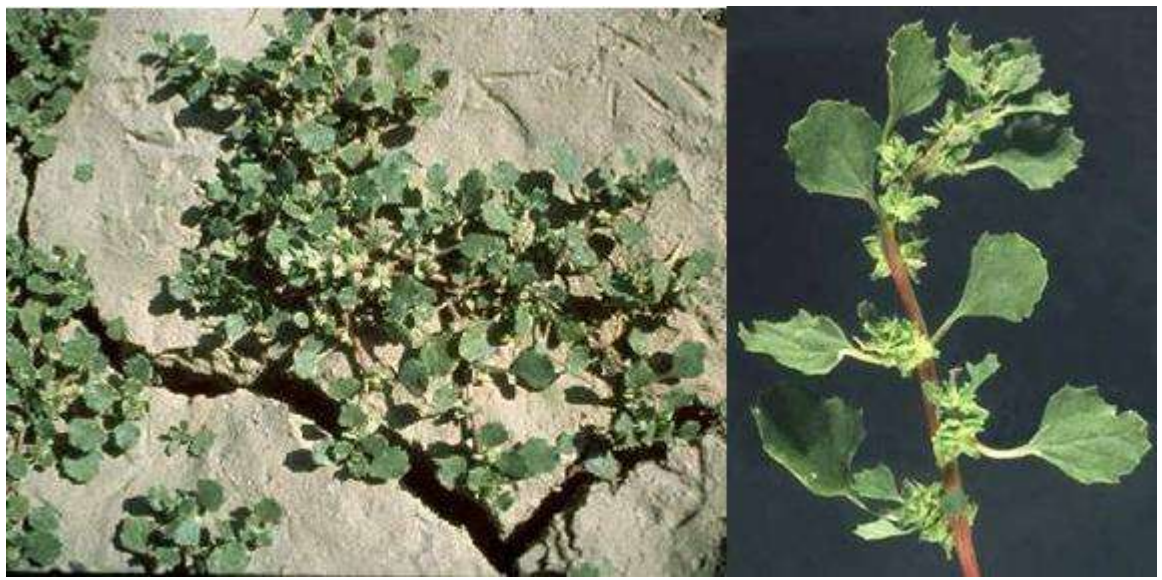
- Drooping of pelvic limbs and
- loss of control of hind limbs,
- which may be dragged when
- animal moves
- • Indications of temporary
- blindness
- • Drooling; rough hair coat;
- constipation or diarrhea may
- occur
- • When forced to move rapidly,
- animal may collapse and die
- • All signs of poisoning increase
- with forced movement
- • Lactating cows are more
- commonly affected than nonlactating

- • Animals with advanced
- poisoning seldom recover but
- waste and die after several
- months
- • Sheep show more respiratory
- and less neuromuscular
- involvement
- • Horses can be intoxicated;
- cannot get them to back up
- • Focal hemorrhages in brain
- • Wallerian degeneration in
- spinal cord in pelvic region
- • Alveolar emphysema, interlobular
- edema
- • Death

chokecherry moist fertile fields .25% bw

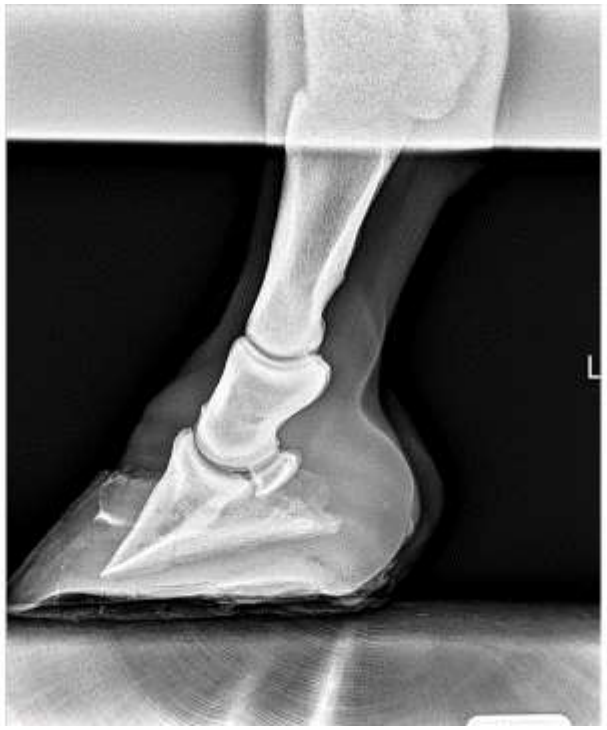
Co rubberweed hymenoxys 6000*80000ft foothills cumulative 1/4-1/2/100# 1-2 wks

Sucklyea sucklyeana – Poison Sucklyea



Poison Sucklyea

Selenium



Se Concentrations

Blood, ppm	Hoof, ppm
0.45	6.82
0.39	4.78
0.35	
0.39	
0.47	
Liver, ppm, DW	
2.16	5.33

Veratrum skunk cabbage 14 -35 days1

Greasewood sarcobatus oxalates sheep acute 4-6 hrs, depression, drool palatable OK in moderate amts

Halogeton disturbed soils overgrazed 12-18 oz kills

Halogeton

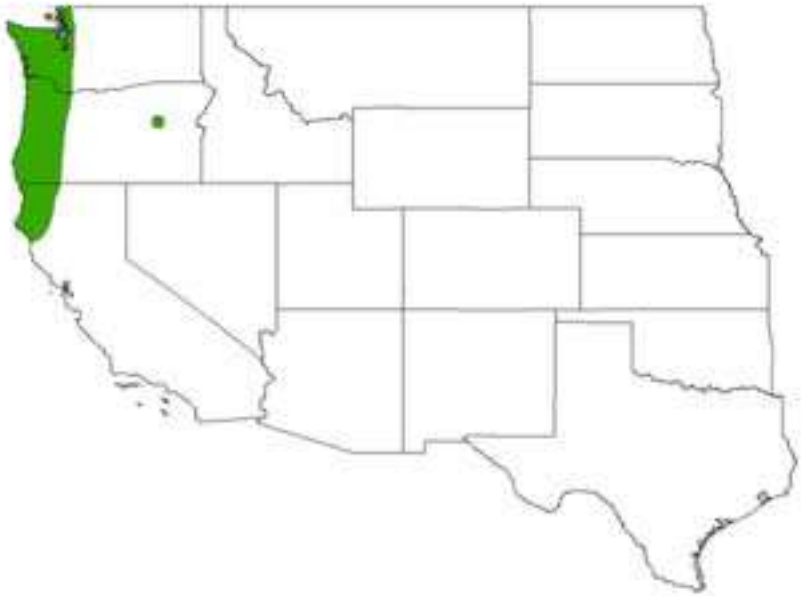
Hemp dogbane gravel up to 7000

horsebrush

Horsebrush + black sagebrush artesemia = sheep big head photosent early growth = ½-3/4 # pohotsen

Apocynum hemp dogbane cardiac glycoside ½ - 1 oz/100 death 6-12 hrs <7000 ft, gavel sandy fields

Tansey ragwort

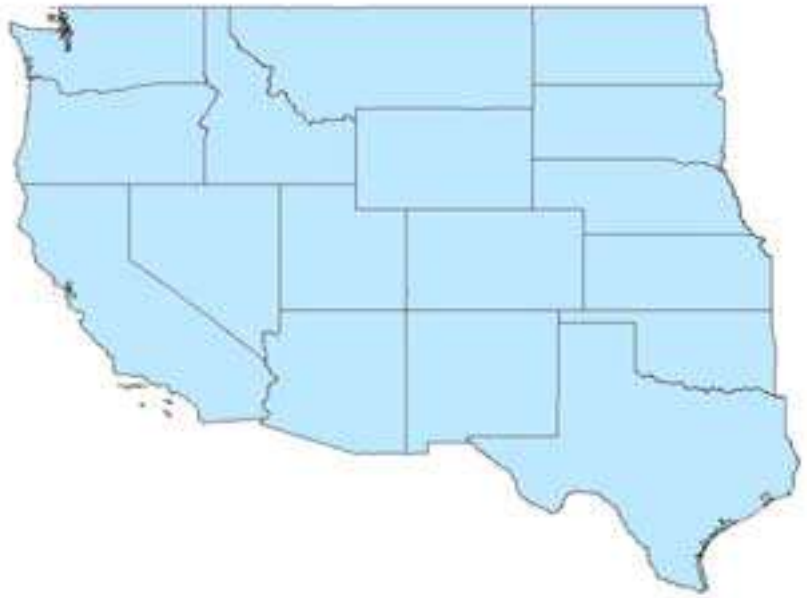


Lupine
crooked calf cleft palate 40-100 days decease after seed shatter

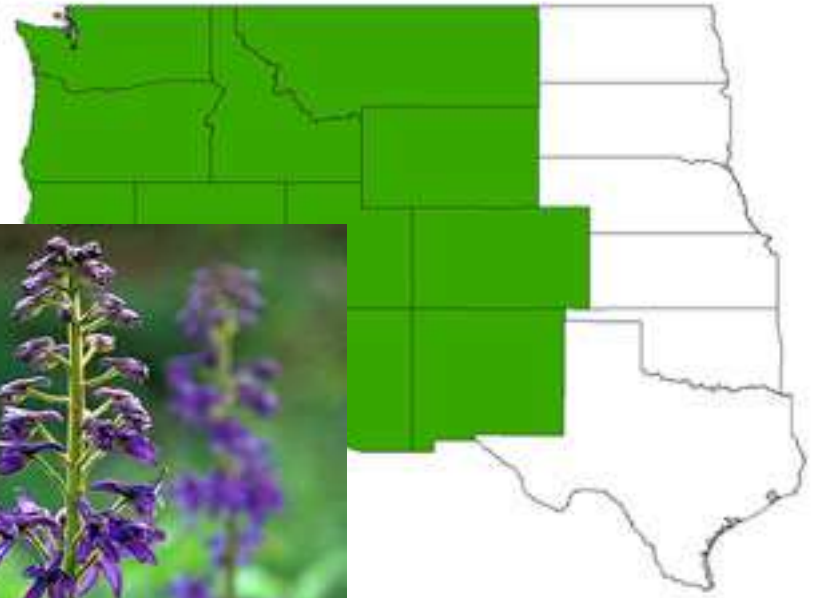


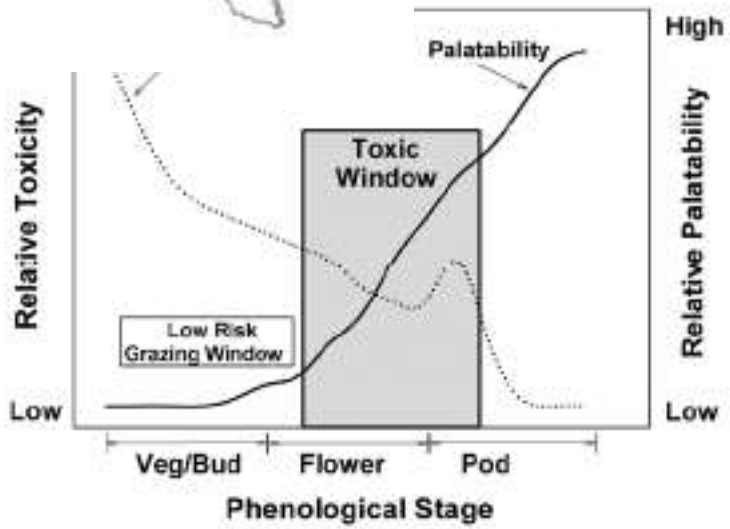


nightshades

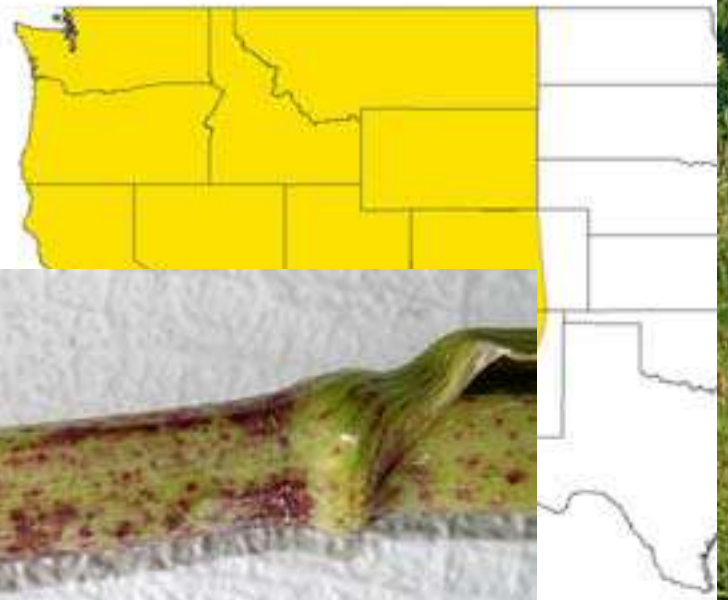


Larkspur delphinium palatable toxic declines with maturity place up hill (bloat) only growth early spring





Poison hemlock



Water hemlock

Rayless goldenrod

Suckleya

Snakeweed

sneezeweed

Spring parsley- cymopterus

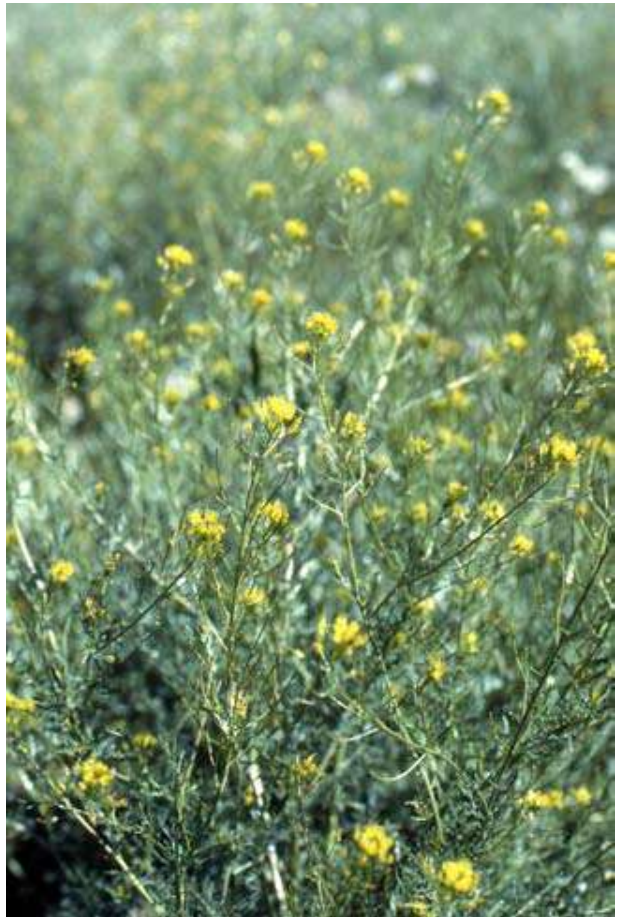
St Johns wort

Sweet clover

yew

horsetail

Tansey mustard

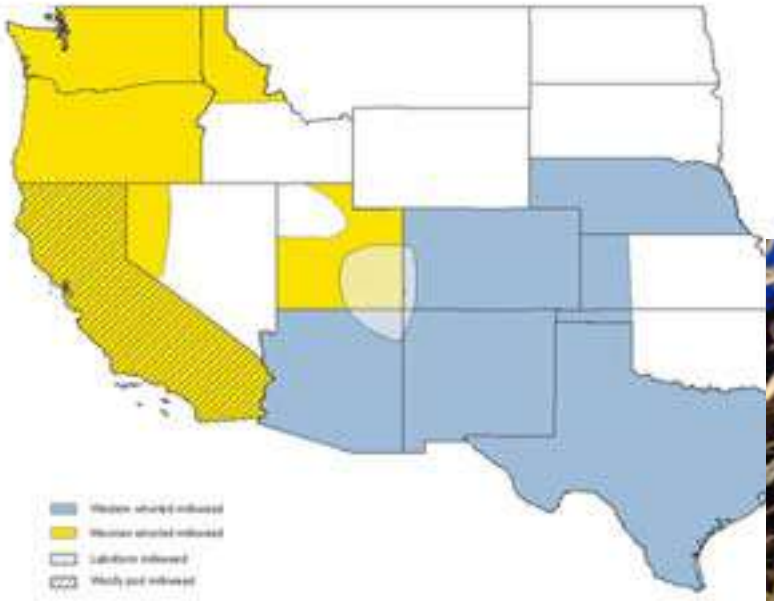


Hydrogen Cyanide (HCN) – Prussic Acid

cardiac glycosides in foliage

- Species Affected - Ruminants
- Regrowth especially important
- Clinical Signs -
- •Dyspnea; rapid breathing and gasping
- •Cyanosis (blue discoloring of the lining of the mouth)
- •Increased salivation
- •Muscular twitching, staggering, and convulsions
- •Bloat may occur; rumen contents may smell like almonds
- •Convulsions
- •Coma
- •Death (animals consuming large amounts of the plant may die in 1 to 60 minutes and
- show only convulsions and death as signs of poisoning)
- •Blood and tissues a bright cherry red (hyperoxygenation)
- •Tracheal and pulmonary congestion
- •Cattle and sheep may be severely affected if they eat large amounts of arrowgrass leaves or stalks in a short time. The leaves contain substances that produce the poison hydrogen cyanide on ingestion.
- Treatment - sodium thiosulfate , sodium nitrate

milkweed



Loco

wooly spotted

nitrate

cyanide

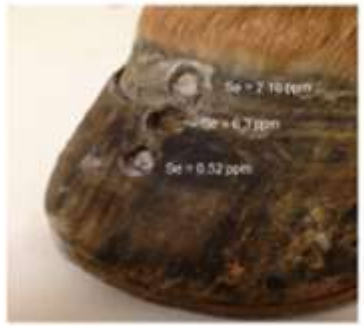
Poison Sucklyea


L

Selenium toxicosis

Selenium (ppm)– Hoof

- Adequate 0.60 – 1.20
- High 0.8 – 2.8
- Toxic chronic 5.0 – 20.0
- Toxic Acute – 2.8



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Locoweed

A mollissimus - wooly loco

O sericea