Conditions of Internal Poisoning

- Grazing animals will not eat poisonous plants unless forced to do so by some unusual or artificial condition.
Conditions of Internal Poisoning

- Lack of good forage – drought, overgrazing, etc.
- Deficient rations – unbalanced diet
- Waste or trash – garden waste, houseplants, etc.
- Newly cultivated areas – exposed roots
- Dry or partially dry water holes
- Incidental causes
Poisonous Substances

- **Minerals:** selenium, molybdenum, copper, lead, cadmium, fluorine. Mostly a problem in central and western US

- **Nitrates:** sudden change in animals diet to plants with high nitrate content. Nitrate is reduced to nitrite which oxidizes hemoglobin – results in sudden death (alfalfa, Amaranthus)

- **Resin or Resinoids:** extremely poisonous – affect nervous system (Rhododendron)
Poisonous Substances

- **Glycosides:**
  - Cyanogenetic (hydrocyanic acid or prussic acid): rapid death with few obvious symptoms (Hydrangea, Prunus, Photinia)
  - Saponic: cause gastric irritations (Aesculus, Agrostemma, Medicago, Phytolacca, Sesbania)
  - Goitrogenic: inhibits formation of thyroid hormone (found in mustards)
Poisonous Substances

- Glycosides (con’t):
  - Irritant oils: found mainly in seeds (mustards, Ranunculus)
  - Coumarin: hemorrhagic agent (Aesculus, Melilotus)
  - Cardiac: stimulate the heart (Liliaceae, Apocynaceae)
Poisonous Substances

- Alkaloids: affect the heart and nervous system (Crotolaria, Taxus, Narcissus, Amaryllis, Crocus)
- Oxalates: cause kidney damage. Produces dullness, depression, and death (Rumex)
- Nonglycoside Oils: irritant effects in the gut, can cause death (Chenopodium, Glechoma)
Toxicity Rating For Plants

**Group 1:** most likely to cause poisoning or death

**Group 2:** cause serious poisoning or death but are rarely eaten

**Group 3:** cause serious poisoning or death but are uncommon in AR

**Group 4:** cause minor disorders or irritation

**Group 5:** may cause poisoning but are usually unavailable to livestock
Poisonous Plants

- Many kinds of plants have a wide range of poisonous effects.
- Poisonous plants cause chemical or physiological disturbances when taken internally.
Poisonous Plants When Taken Internally

- **Bacteria and Algae**: from farm ponds and polluted streams
- **Fungi**: mushrooms
- **Vascular Plants**: herbaceous and woody plants
Published in 1964, one of the few, maybe the only, comprehensive poisonous plant book for North America.
Published in the 60’s, this book helped counter-culture types poison themselves with Jimson weed, peyote, morningglory and other plants.
Published in 1888 by Parke-Davis, from an era when plant derived medicines, however ineffective, played a bigger part in our lives. I have included some excerpts from this book about some of the toxic pasture plants.
Red Maple
*(Acer rubrum)*

- Wilted leaves are toxic.
- Cattle and horses have been poisoned.
- Toxic principle not known.
Red Buckeye
(Aesculus pavia)

- Dangerous
- Parts of Plant young leaves in spring and seeds in fall
- Poisonous Principle: glycosides, alkaloids, and neurotoxins
- Animals Poisoned: horses, cattle, pigs
BUCKEYE. *Esclus glabra, Willdenow. (Bark.)
Properties.—Has a special action on the portal circulation and the liver.
"It is especially valuable in the constipation attending hemorrhoids. It relieves hepatic congestion admirably and seems to promote the biliary secretions." *

Buckeye
*(Aesculus spp)*
Smooth Pigweed
(Amaranthus hybridus)

- Dangerous
- Parts of Plant: all parts
- Poisonous Principle: oxalates and nitrates – results in cardiac arrest 5 to 10 days after eating
- Animals Poisoned: pigs, cattle, and sheep
Hemp Dogbane
(Apocynum cannabinum)

- Group 1 (dangerous)
- Parts of Plant: green or dry leaves – 15 to 30 g of green leaves can kill horse or cow
- Poisonous Principle: resins and glycosides with cardioactivity
- Animals Poisoned: cattle, horses, and sheep
Hemp Dogbane

(Apocynum cannabinum)

CANADIAN HEMP. Apocynum, U. S. P. Apocynum cannabinum, Linné. (Root.)

Synonyms.—Black Indian Hemp; Chanvre du Canada, Fr; Canadische Hanf wurzel, Gr.

Properties.—Powerfully emetic and cathartic, possessing marked diaphoretic, expectorant and diuretic powers. It produces much nausea, diminishes the frequency of the pulse, and appears to induce drowsiness. Acting as a powerful hydragogue cathartic, it is of value in dropsy, especially the anasarca of Bright’s disease and in ascites, but is recommended also in intermittent and remittent fevers, and pulmonary affections. Dr. Cawthorn considers its anti-periodic powers scarcely inferior to those of quinine.

- Organic Materia Medica, Parke-Davis, 1888
Butterfly Milkweed
(Asclepias tuberosa)

- Dangerous, but rarely eaten.
- Parts of Plant: all parts, green or dried (toxicity decreases with maturity)
- Poisonous Principle: cardiac glycosides and resinoids
- Animals Poisoned: sheep, cattle, horses, poultry
Butterfly Milkweed
(*Asclepias tuberosa*)


(Root.)

Synonym. — Butterfly Weed.

Properties. — Diaphoretic, antispasmodic, tonic, diuretic and carminative. It has obtained a reputation in diseases of the respiratory organs, more particularly in pleurisy, inflammation of the lungs and catarhal affections. Beneficial in acute rheumatism, in febrile diseases, and in flatus of adults and children.

Pleurisy-root, U.S.P., compressed in pound packages for retailing purposes,

- *Organic Materia Medica*, Parke-Davis, 1888
Mustards
(\textit{Brassica})

- Poisonous principle: mustard oil (isothiocyanates).
- Animals poisoned: pigs, cattle, horses.
- All plant parts are toxic.
Mustards

*(Brassica)*
Marijuana  
*(Cannabis sativa)*

- Dangerous, but uncommon
- Parts of Plant: leaves and stalks (most toxic)
- Poisonous Principle: resin tetrahydrocannabinol. Depression of central nervous system
- Animals Poisoned: cattle, horses
Marijuana (*Cannabis sativa*), aka Mary Jane, heathen devil weed, weed, ganja, dope, reefer, etc.
Marijuana
(Cannabis sativa)

- Organic Materia Medica, Parke-Davis, 1888
Sicklepod
*(Cassia obtusifolia)*

- Weakly toxic.
- Parts of Plant: leaves, stems, seeds
- Poisonous Principle: anthraquinones, glycosides, alkaloids
- Animals Poisoned: cattle, possibly others
Coffee Senna
(Cassia occidentalis)

- Weakly toxic.
- Parts of Plant: leaves, stems, seeds
- Poisonous Principle: anthraquinones, glycosides, alkaloids
- Animals Poisoned: cattle, possibly others
Buttonbush
*Cephalanthus occidentalis*

- Poisonous principle: glycosides in the leaves.
- Forage of last resort.
- Found in or near water.
Goosefoot, Mexican Tea
(Chenopodium ambrosioides)

- Dangerous but rarely eaten.
- Parts of Plant: seeds
- Poisonous Principle: oxide ascaridol – causes nausea, muscular weakness, and vertigo
- Animals Poisoned: poultry (eating seeds)
- Folk remedy for worms
Goosefoot, Mexican Tea
(Chenopodium ambrosioides)

Received a sample of this plant from a woman in south Arkansas who recognized it as a plant her mother used to worm her and her siblings in their youth. Out of botanical curiosity, she had recently cooked up a pot and drank the broth which she reported made her quite ill.
Poison Hemlock
(*Conium maculatum*)

- Dangerous but rarely eaten.
- Parts of Plant: leaves and unripe fruit
- Poisonous Principle: alkaloids, also contains coniine and coniceine which are teratogenic
- Animals Poisoned: horses, cattle, swine, poultry, goats, sheep
Poison Hemlock
(Conium maculatum)

CONIUM, U.S.P. Conium maculatum, Linné. (Leaves, seed.)

Synonyms.—Poison Hemlock, Poison Parsley. Grande cigué, Fr.; Schierlingsfrüchte, Ger.

Properties.—Poisonous. Conium is anodyne, antispasmodic, anaphrodisiac and discutient. In overdoses it produces motor paralysis. It is of value as a palliative in the treatment of scirrhous cancerous ulcers, mammary tumors, chronic enlargements of the liver, painful scrofulous tumors and ulcers, also in various diseases of the skin, especially strumous. Its most important use is in controlling excitement in maniacs, and in the treatment of chorea, whooping-cough and other spasmodic affections.

Antidotes.—Tannin (strong tea, decoction of oak bark or sumach). Emetics (apomorphine, zinc sulphate, mustard). Sustain the vital powers by stimulants, external heat, faradization; employ artificial respiration persistently as long as there is any sign of cardiac action.

- Organic Materia Medica, Parke-Davis, 1888
Crotalaria
(*Crotalaria spectabilis*)

- Dangerous
- Parts of Plant: leaves, stems, roots, seeds (dry or green)
- Poisonous Principle: pyrrolizidine alkaloid monocrotaline
Crotalaria

- Animals Poisoned: all livestock – 2 g of seed fed daily for 7 days will kill 50 lb hog, 9 lb of dried leaves will kill 300 lb steer in 4 days.
Jimsonweed
*(Datura stramonium)*

- Dangerous
- Parts of Plant: all parts, but particularly seeds. 0.06 to 0.09 % of animal weight is fatal to cattle.

The tree *Daturas* found in South America are very toxic, and are commonly known as the borrachero or drunk tree.
“Where the longhorn cattle feed on the lowly jimsonweed”

“Back in the Saddle Again” – Gene Autry
Jimsonweed

(Datura stramonium)

- Organic Materia Medica, Parke-Davis, 1888
White Snakeroot
*(Eupatorium rugosum)*

- Dangerous
- Parts of Plant: all parts, green or dried
- Poisonous Principle: alcohol (trematol) and glycosides. Daily digestion necessary for toxicity
- Animals Poisoned: cattle, sheep, hogs, horses, mules, and goats
Bitter Sneezeweed
(*Helenium amarum*)

- **Group 1 (dangerous)**
- **Parts of Plant:** leaves, stems, flowers, and fruit
- **Poisonous Principle:** sesquiterpene lactone
- **Animals Poisoned:** sheep, cattle, horses

Very common in Western Arkansas
Sumpweed
(*Iva annua*)

- Poisonous to cattle.
- Rare
- Not well researched
- Often found in swampy areas
- Shown to be toxic to embryos.
Lantana

- Parts of plant: all
- Poisonous Principle: Contains triterpenoid and other compounds that irritate the mucosa lining the gastrointestinal tract.
- Animals poisoned: cattle, sheep, humans, horses.
Poisonous Principle: Moldy hay may contain dicoumarin which interferes with blood clotting.

Animals Poisoned: cattle, horses, sheep.
Perilla Mint
(Perilla frutescens)

- Dangerous.
- Eaten during dry summers when forage is scarce.
- Parts of Plant: leaves and stems
- Found along the edge of woods and streams
Perilla Mint
(Perilla frutescens)

- Poisonous Principle: perilla ketone, egomaketone, isoegomaketone
- Animals Poisoned: cattle and horses
Ground-cherry

*(Physalis spp)*

- Dangerous but rarely eaten.
- Parts of Plant: tops and unripe fruit
- Poisonous Principle: solanine glycoalkaloids
- Animals Poisoned: cattle
Pokeweed
(Phytolacca americana)

- Dangerous
- Parts of Plant: roots (most toxic), shoots, leaves, and berries
- Animals Poisoned: cattle, horses, hogs (roots), causes abortion in cows
Black Cherry

*(Prunus serotina)*

- Dangerous
- Parts of Plant: leaves, twigs, bark, seeds
- Poisonous Principle: hydrocyanic acid (prussic acid), hydrogen cyanide is released in stomach when fresh leaves are eaten
- Animals Poisoned: cattle, horses, sheep, goats, dogs, birds
Cherry Laurel

*(Prunus caroliniana)*

Cherry bark
Bracken Fern
(Pteridium aquilinum)

- Dangerous
- Parts of Plant: leaves and rhizomes, fresh or dry
- Poisonous Principle: causes thiamine deficiency
- Animals Poisoned: cattle, horses, sheep, chickens, hogs
Buttercup
*(Ranunculus spp)*

- Minor importance
- Parts of Plant: top leaves and stems
- Poisonous Principle: irritant oil (protoanemonin)
- Milk of cows is bitter and reddish in color
- Animals Poisoned: cattle, other animals less frequent
Castorbean

(*Ricinus communis*)

- Dangerous
- Parts of Plant: leaves and seeds (contaminated grain)
- Poisonous Principle: alkaloids, hydrogen cyanide
- Animals Poisoned: horses, cattle, sheep, pigs, poultry, and dogs
Black Locust

*(Robinia pseudoacacia)*

- Dangerous
- Parts of Plant: inner bark, root sprouts, wilted leaves, and seeds
- Poisonous Principle: alkaloids and glycoside
- Animals Poisoned: all livestock
Groundsel (Senecio)

- Contains alkaloids.
- Suspected of poisoning cattle and horses.
Hemp Sesbania
(*Sesbania exaltata*)

- **Dangerous**
- **Parts of Plant:** seeds
- **Poisonous Principle:** saponin
- **Animals Poisoned:** cattle
Horsenettle
(Solanum carolinense)

- Plant Parts: ripe berries, green berries and leaves.
- Poisonous Principle: toxic alkaloid solanine.
- Animals Poisoned: all livestock
Black Nightshade
*(Solanum nigrum)*

- **Dangerous**
- **Parts of Plant:** leaves and especially unripe green fruit
- **Poisonous Principle:** solanine glycoalkaloids, causes death from respiratory paralysis
- **Animals Poisoned:** livestock and pets
Poison Ivy
(Toxicodendron radicans)

- Toxic Principle: phenolic compound urushiol
- Mucous and membrane irritant
- No effect on livestock.
- Breathing smoke may cause irritation.
Common Cocklebur
(Xanthium strumarium)

- Dangerous
- Parts of Plant: seeds and very young seedlings
- Poisonous Principle: Diterpenoid glycoside (animals can develop a tolerance)
- Animals Poisoned: swine, cattle, and sheep. Death occurs in 12 to 24 hours