Poisonous Plants
Lecture (4)
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سنقوم بأختيار نبات عراقي واحد فقط من كل عائلة

Key

Overview over toxic European plants, their toxins and toxicology. Class I a: extremely hazardous; Ib: highly hazardous; II: moderately hazardous; III: slightly hazardous. IN=inflammatory; CT= cytotoxic; NT= neurotoxic; HP= heart poison, MA= mind altering; MP= medicinal plant; GI= disturbance of GI tract; AP= animal poison; MU= mutagenic,

Description of Common Poisonous Plants in Iraq

Poisonous Vascular Plants

1. Lower Vascular Plants

Ferns and related plants reproduce by dispersing spores rather than seeds. Spores are found in either cone-like structures at the tip of the stems or in clusters on the back of the leaves. These plants are herbaceous and are usually less than 3-4 ft tall.

- **Equisetaceae - Horsetail Family**

***Equisetum* spp. - Horsetail, Scouring-rush**

Description: (Fig.1) Stem erect, jointed, vertically ribbed, hollow; leaves whorled, minute, and fused into a sheath with terminal teeth; cones terminal, formed of shield-shaped sporangia-bearing structures. Two species grow in North Carolina .

***E. arvense* L. - Field Horsetail. (Iraq)**

Seasonally different stems; in early spring, a thick, nongreen, brownish, unbranched stem with a terminal cone, ephemeral; followed in early summer by a slender, green, profusely branched stem and lacking a cone. Stream banks, low wet floodplains, railroad embankments. Mainly mountains and piedmont, infrequently in the coastal plain.

Fig : E. arvense

E. hyemale L. - Scouring-rush.

Habitat: Railroad embankments, roadsides, stream banks, old fields, or moist woods.

Distribution: Mainly mountains and piedmont; less frequent in the coastal plain .

Group number: 2. (Dangerous, but rarely eaten(

Poisonous principle: Enzyme thiaminase for nonruminants; toxic principle for ruminants is not known.

Parts of plant: Aboveground parts; green or dried in hay. Hay containing 20% or more causes poisoning in horses in 2-5 weeks.

Poisonous Principle: Thiaminase and small amounts of pyridine alkaloids, Nicotine. The herb contains 10–20% minerals, of which over 60% are silicic acids and silicates; alkaloids, including nicotine, palustrine and palustrinine; flavonoids, such as iso-quercitrin and equicertin; sterols, including cholesterol, isofucosterol, campesterol; a saponin equisitonin, dimethyl-sulphone, thiaminase and aconitic acid. Diuretic action of the herb is attributed to its flavonoid and saponin constituents, Silicic acid strengthens connective tissue and helps in healing bones.

Periodicity: Spring through fall.

Animals poisoned: Horses, with sheep and cows less affected.

Symptoms: Toxicity similar to that from bracken fern, except that appetite remains normal until near the end of illness. Ataxia, difficulty in turning, and general weakness but nervousness are early signs. In later stages, animals may be constipated and muscles rigid, pulse rate increases and weakens, extremities become cold, cornea of eye may become opaque. Calm and eventually coma precede death.

Treatment: Parenteral thiamine (10 mg/kg body weight). Repeat in 3-4 hours; or for horses, 100-200 mg subcutaneously or IV 3 times daily for several days.

•Dennstaedtiaceae - Bracken Family

***Pteridium aquilinum* (L.) Kuhn** - Bracken fern, Brake

Description: (Fig. 2) Leaves (fronds) usually 10-40 in. tall, arising annually from a perennial underground creeping rhizome (stem). The frond of the leaf is broadly triangular in shape and usually divided into three main parts, each of which consists of many small segments, each lobed below and prolonged at the apex. The frond itself is often inclined to one side. The reproductive spores line the margin of the fertile segments and are partially covered by the narrow recurved margins. The plants are spread by the branching of the underground rhizome.

Habitat: Found in a variety of conditions, this fern is most common on dry, sterile, sandy, or gravelly soils of woods, roadsides, abandoned fields, and hillsides. It is most abundant in the open pine woods of the coastal plain, but it can be found from the mountains to the dunes.

Distribution: Found commonly throughout the state.

Group number: 1. Dangerous, Ib-II, CT, NT, GI, MU

Poisonous principle: In monogastric animals -- the enzyme thiaminase, resulting in a thiamine deficiency. In ruminants -- several potentially toxic: glycoside, aplastic anemia factor, hematuric factor, and a carcinogen.

Parts of plant: Blade of the leaf and rhizome; fresh or dry. all parts, young Shoots.

Poisonous Principle: cyanogenic glucosides، ptaquiloside, sesquiterpene، thiaminase

Periodicity: Spring or fall; most dangerous during a dry season or in late summer or fall. Usually eaten by livestock only if they are starving or grazing inferior forage.

Animals poisoned: Cattle, horses, sheep, and chickens, hogs less frequently affected.

MODE OF ACTION, SYMPTOMS : ptaquiloside alkylates DNA and is a strong mutagen, it causes stomach and bladder cancer (mostly cattle, also humans), thiaminase destroys vitamin B1 leading to CNS isturbances in animals.

Symptoms: Cattle -- high fever, loss of appetite, weight loss, difficult breathing, salivation, ataxia, opisthotonos, convulsions, internal bleeding; often mistaken for anthrax and other infectious diseases of cattle. Death in 4-8 days. **Horses** -- unsteady gait, nervousness, timidity, congestion of visible mucous membranes, and constipation; later staggering, dilated pupils, opisthotonos, and death.

Treatment: Supplemental feeding in dry season; nerve sedatives, heart and respiratory stimulants. Massive doses of thiamine for horses (see treatment of Equisetum.(

Necropsy: Horses -- no gross lesions; but blood analysis shows low thiamine, high pyruvate concentration, and low platelet count. Ruminants -- hemorrhages throughout, laryngeal edema, intestinal ulcers, low platelet count, and hypoplasia of bone marrow.

Related plants: Of doubtful importance is *Onoclea sensibilis* L. (sensitive fern). This is fairly common in the state in wet habitats and is sometimes associated with hay, causing disturbances when fed to horses.

2. Gymnosperms

The gymnosperms are characterized by "naked" seeds in cones, or red or blue "berries," and usually evergreen, needle-like or scale-like leaves.

- Taxaceae - Yew Family

***Taxus spp.* – Yew** (*Taxus baccata)*

Several species are cultivated as ornamentals in North Carolina, but T. canadensis Marsh. is found naturally in North Carolina only in the extreme northwestern counties. These are evergreen shrubs with alternate, linear leaves and scarlet "berries"; only the outer red coat (aril) is edible.

Group number: 3. (Dangerous but uncommon, Ia , CT, NT, MP

Poisonous principle: ephedrine and HCN. Alkaloid taxine A,B,C, taxicin I, II (*T. baccata*), taxol (*T. brevifolia*), cyanogenic glucosides.

Parts of plant: Leaves bark, seeds. Fresh or dry.

MODE OF ACTION : taxins inhibit K+ and Ca++ channels.

Animals poisoned: All kinds, but cattle and horses are most commonly affected when yard clippings are thrown over fences where livestock graze.

Symptoms: Nervousness, trembling, ataxia, collapse, and dyspnea. Bradycardia is pronounced and progresses to sudden death without a

struggle. A subacute poisoning may occur 1-2 days after ingestion; acute poisoning is accompanied by gastroenteritis.

Necropsy: Acute: no lesions. Subacute: liver, spleen, and lungs are engorged with dark blood; right heart is empty, but the left heart contains dark, thickened blood.

- **Pinaceae and Cupressaceae - Pine and Cedar Family**

Pinus - Pine
Picea - Spruce
Juniperus - Cedar
Thuja - Arbor-Vitae

These conifers are seldom eaten, but may be harmful if eaten in large quanities, or when eaten exclusively when other forage is not available.

3. Flowering Plants

These plants' seeds are enclosed by the fruit, and the reproductive parts plus modified leaves (sepals and petals) form a "flower." Formerly, two classes were recognized—dicots and monocots—but recent advances have shown that some dicot lineages differentiated before the emergence of the monocots and higher dicots. Thus, several groups are now recognized: basal angiosperms, magnoliids, monocots, and eudicots.

- **Calycanthaceae - Strawberry-shrub Family**

***Calycanthus floridus* L. - Allspice, Carolina allspice, Sweetshrub, Bubby-bush**

Description: Shrub to 10 ft. tall; leaves opposite, glabrous or pubescent, simple, entire margined, ovate to oblong. Flowers with many brownish maroon parts, aromatic. Seeds (fruits) enclosed by a fibrous, elongated, sac-like husk.

Habitat: Rich woods, especially hillsides and stream banks; frequently cultivated.

Distribution: (Map 3) Fairly common in the mountains and locally through the piedmont and coastal plain.

Group number: 2. (Dangerous, but rarely eaten(

Poisonous principle: Calycanthin and related alkaloids.

Parts of plant: Primarily the "seeds".

Animals poisoned: Cattle.

Symptoms: Calycanthin is similar to strychnine in its action (convulsions, myocardial depression, and hypotension.(

- **Ranunculaceae - Crowfoot Family**

***Delphinium spp.* - Larkspur, Staggerweed (Iraq)**

Description: Annuals, or herbaceous perennials, with alternate, long-stalked, palmately lobed or divided leaves. Flowers in terminal racemes; sepals 5, the upper one prolonged at the base into a spur; blue to purple or nearly white. Fruit of many-seeded follicles.

Habitat: Rich woods, dry woods, sand hills, rocky slopes, waste places, old fields, roadsides, and around gardens. Some species are cultivated and often escape and become locally abundant.

Distribution: There are five species distributed throughout the state; they are most common in the mountains and piedmont.

Group number: 3. (Dangerous but uncommon, Ib, CT, NT, GI

Poisonous principle: The alkaloids delphinine, ajacine, and others. delphinine, nudicauline, staphisine, ajacine and other terpenoids alkaloids

Parts of plant: Young plant, including the roots; seeds.

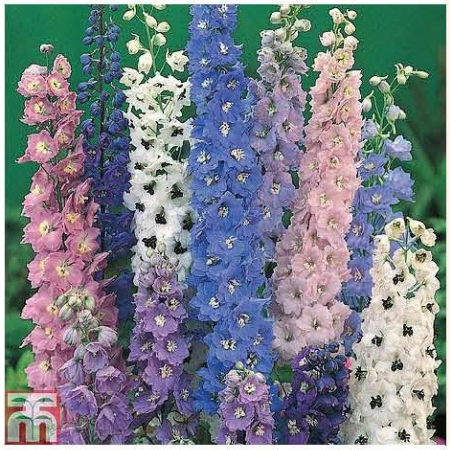
Periodicity: Entire growing season; toxicity decreases with maturity.

Animals poisoned: Cattle; this is one of the most important plants in the western states but it is not common enough in North Carolina to be very important as a poisonous plant. Sheep are more resistant.

Symptoms: See Aconitum. Death from respiratory and cardiac failure. delphinine resembles aconitine in toxicity, inhibition of neuronal transmission (Na+ channel opener), skin irritation, nausea, disturbance of GI tract and kidneys, dyspnoea, death from cardiac arrest.

Treatment: Toxic effects are so rapid that treatment is most likely futile. Physostigmine, 1 grain; pilocarpine, 2 grains; strychnine, 1/2 grain. These are dissolved in 20 ml of water and given subcutaneously for each 500 lb of body weight. Sheep require 1/4 the above dosage.

Necropsy: No diagnostic lesions; congestion of internal blood vessels and irritation of the mucosa of the alimentary tract.



***Ranunculus* spp. - Buttercups, Crowfoot (Iraq)**

Description: Low annual or perennial herb with a basal rosette of leaves; stem-leaves alternate, simple, lobed or divided. Flowers solitary or in clusters; sepals usually about 5, green or yellow; petals lacking or 5, yellow; stamens many. Fruit a head of achenes.

Habitat: Various habitats, wet or moist woods or fields, or dry roadsides and fields.

Distribution: Entire state; some species locally quite abundant.

Group number: 4. (Of minor importance(

Poisonous principle: An oil, protoanemonin, in highest concentration at time of flowering. ranunculin is enzymatically converted to the active protoanemonin

Parts of plant: Top leaves and stems; dry parts not toxic.

Periodicity: Spring, summer, and fall.

Animals poisoned: Cattle mostly, but all animals. Ib-II, CT, IN, MU, GI

MODE OF ACTION: protoanemonin can bind to various

Symptoms: proteins Salivation, loss of appetite, gastrointestinal irritation, colic, diarrhea, and slow pulse; milk of cows will be quite bitter and reddish in color.

Treatment: Purgative, demulcents, and heart stimulants.

Necropsy: Inflammation and lesions throughout digestive system; in ruminants, extensive hyperemia in abomasum and small intenstine.