

Ethnobotany. Lecture 37

Alexey Shipunov

Minot State University

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Outline

- 1 Harmful plants
 - Stinging plants
- 2 Technical plants



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 - Stinging plants
- 2 Technical plants



Harmful plants

Stinging plants



Stinging plants

- Covered with “glassy”, silica-tipped hairs (like nettles, *Urtica* spp., *Laportea* spp. and others from nettle family, Urticaceae) containing acetylcholine, histamine, serotonin, formic acid or even stronger toxins (like giant stinging tree, *Dendrocnide excelsa*, same family, from Australia)
- Plants from other families like Loasaceae (*Eucnide*, desert rock nettle), Euphorbiaceae (*Cnidoscolus*, spurge nettle) and even Leguminosae (*Mucuna*, velvet beans) are similar to nettles.



Nettle stinging hairs



Giant stinging tree



Giant stinging tree leaves



Desert rock nettle



Spurge nettle



Velvet beans



Poisonous plants

- Allergic like poison ivy (*Toxicodendron radicans* from Anacardiaceae, rich of urushiol)
- Phototoxic like giant hogweed (*Heracleum* spp. from Umbelliferae)
- Digestively poisonous like *Strychnos* from Loganiaceae (source of curare), rosary pea *Abrus precatorius* (Leguminosae, contain abrin protein toxin) and castor beans (*Ricinus communis*, Euphorbiaceae) which both deactivate eukaryotic ribosomes, and most poisonous U.S. plant water hemlock (*Cicuta* spp., Umbelliferae, contains terpene cicutoxin which blocks GABA receptors)
- Almost all Solanaceae and Ranunculaceae are poisonous



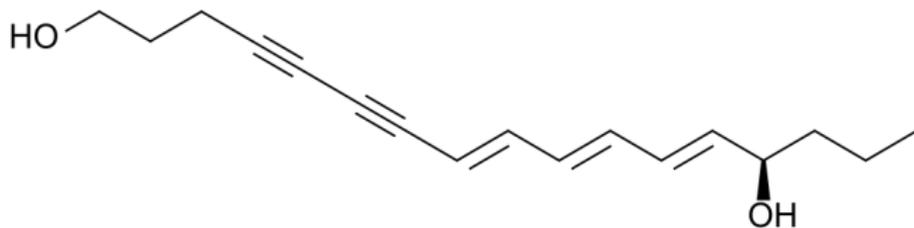
Rosary pea



Water hemlock



Cicutoxin



Parasitic plants

- Half-parasites (like root half-parasite *Comandra*, bastard toad-flax or stem half-parasite mistletoe) have chlorophyll, mycoparasites (like *Pterospora*) interact with fungi
- Full parasites: root (like *Pholisma*), or internal (only flowers will appear on surface, like *Pilostyles*)
- Full stem parasites dodder (*Cuscuta* spp., Convolvulaceae) and *Cassytha* (Lauraceae) are harmful for many cultivated plants, especially from legume and aster families



Bastard toadflax



Pterospora



Pholisma



Pilostyles



Dodder



Cassytha



Weeds

- Plants which interfere in agro-ecosystems
- In North Dakota, most noxious **native** weeds are common ragweed (*Ambrosia artemisiifolia* from Compositae) and different milkweeds (*Asclepias* spp. from Apocynaceae); first is also highly allergic, seconds are poisonous.



Common ragweed



Milkweed



Invasive plants

- Invasive plants are normally not harmful in their native range, but in exotic range they start to spread uncontrollably
- Nice reciprocal examples are spotted knapweed (*Centaurea stoebe*) and boxelder (*Acer negundo*) in Eurasia and North America
- Leafy spurge (*Euphorbia esula*) is the most problematic invasive plant in North Dakota
- Despite of numerous hypotheses formulated (e.g., presence of symbionts, epigenetic evolution), the reason of invasiveness is still not known



Invasive vs. native knapweed



Invasive weed: leafy spurge, *Euphorbia esula*, Euphorbiaceae, East Europe



Forage plants

- Need to contain balanced diet: not only carbohydrates, but also proteins, fats and vitamins
- Most important are different Gramineae (like oats, corn and sorghum) and Leguminosae (like clovers, vetches and alfalfa)
- Green parts of grasses are most often used as silage—fermented (with *Lactobacillus plantarum*) cellulose



Silage

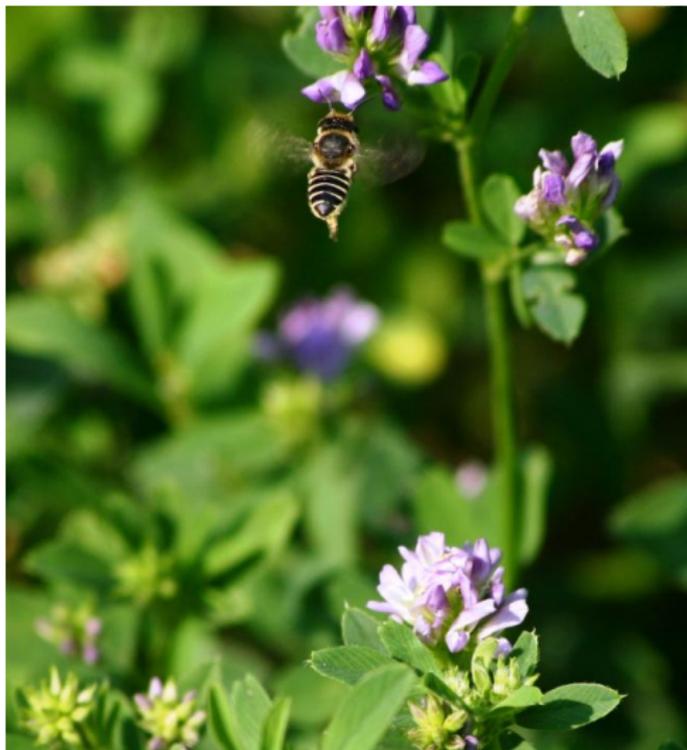


Alfalfa, *Medicago sativa*, Leguminosae, Eurasia

- Root nodules contain nitrogen-fixing bacteria, providing plant with nitrogen
- Up to 12 harvests a year
- High in proteins, vitamins C, K, E and some B



Alfalfa pollination

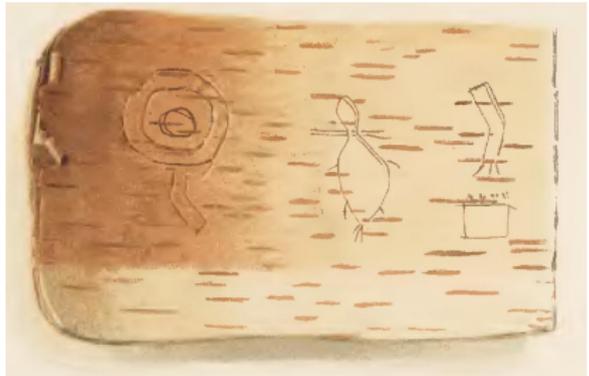


Lumber, paper and basket plants

- Mostly trees which give hardwood (rosids/asterids) and softwood (conifers)
- For the paper, birch (*Betula* spp.) bark was used by ancient Russians and Ojibwe people (“Wiigwaasabak”), papyrus sedge (*Cyperus papyrus*, Cyperaceae) was used in ancient Egypt, and pulpwood is used now
- For baskets and similar things (like bast shoes), gourd (*Lagenaria* spp.) fruits, birch and linden (*Tilia* spp.) bark and willow (*Salix* spp.) twigs were used most frequently in our latitudes



Russian and Ojibwe bark documents



Bast shoes



Baskets



Hybrid poplar, *Populus deltoides* hybrids, Salicaceae, North America

- Sometimes referred as *Populus* × *euroamericana*
- One of the fastest growing trees
- Accept wide range of soils, but require moist habitats, with high water level in soil
- Used for making pulpwood



Hybrid poplar plantation

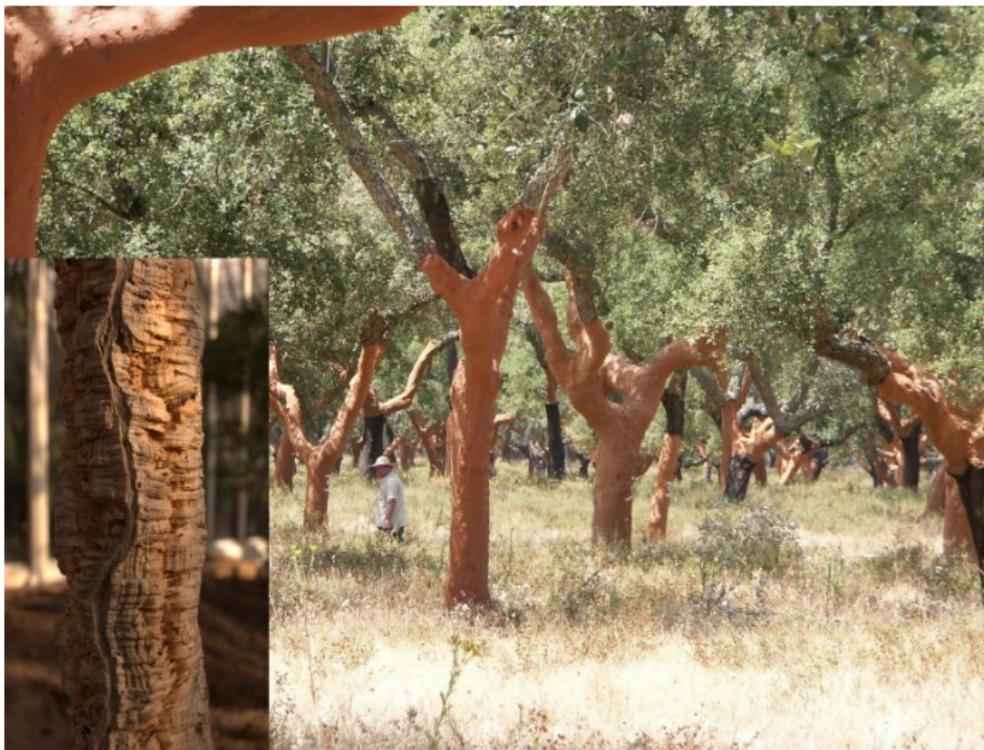


Cork oak, *Quercus suber*, Fagaceae, Mediterranean

- Evergreen oak with extremely thick cork
- Used mostly for stoppers in wine bottles and in chemical labs
- Main producer is Portugal



Cork oak



Bamboos, Gramineae, East Asia (mostly)

- Subfamily of grasses, Bambusoideae
- Woody but temporary stems, plants often monocarpic
- Resistant to fungi and termites



Bamboo house



Fiber plants

- Normally, bast (phloem) is used for fibers
- Most important stem fibers are flax (*Linum usitatissimum*), jute (*Corchorus* spp., Malvaceae, South Asia) and hemp (*Cannabis sativa*); fruit fibers are cotton, coir (outer part of coconut, *Cocos nucifera*) and kapok (*Ceiba pentandra*, Malvaceae, Central America); leaf fibers are abaka (*Musa textilis*, Musaceae, Philippines), sisal (*Agave sisalana*, Asparagaceae, Mexico), snake plant (*Sansevieria* spp., Asparagaceae, Africa) and New Zealand flax (*Phormium tenax*, Xnanthorrhoeaceae)
- Native Americans used “Indian hemp” (*Apocynum cannabinum*) stems



Kapok



Indian “hemp”



Cotton, *Gossypium* spp., Malvaceae, West Asia

- Several species which were domesticated independently in Old and New Worlds, now the most cultivated species is American *Gossypium hirsutum*
- Requires high temperatures, humidity and (for best result) manual harvesting
- Biggest producers are China, India and U.S.



Vegetable lamb of Tartary



Cotton



Dye plants

- Most of these cultures are declined after invention of artificial dyes in 1920s
- Examples are: “bloodwood” *Haematoxylum campechianum* (Leguminosae, Central America, red haematoxylin); achiote *Bixa orellana* (Bixaceae, South America, yellow annatto), true indigo *Indigofera tinctoria* (Leguminosae, blue indigotin), safflower



Achiote fruits



True indigo



Cochineal, *Dactylopius coccus*/Homoptera + *Opuntia* spp./Cactaceae, North America

- Almost unique combinational culture of scale insect and opuntia (similar to mulberry/silkworm): cultivated ecosystem
- For several centuries, have been Mexican most valued export
- Insect produces carminic acid
- Another similar “combination” is kermes scale insect (*Kermes* spp., Homoptera) and Kermes oak (*Quercus coccifera*) in Mediterranean which used to produce crimson dye.



Cochineal



Latex plants

- Latex is a stable dispersion (emulsion) of polymer (mostly terpenes) microparticles
- Occur in many plants, but frequently used only several species, e.g., guayule *Parthenium argentatum* (Compositae, Mexico), Panama rubber tree *Castilla elastica* (Moraceae, Central America), little elastic and bio-inert Gutta-percha *Palaquium* spp. (Sapotaceae, South Asia), chewing gum tree *Manilkara chicle* (Sapotaceae, Central America)



Rubber tree, *Hevea brasiliensis*, Euphorbiaceae

- Large tropical tree originated in Amazonian but cultivated mainly in Southeastern Asia
- Natural rubber is extremely elastic but fragile at low temperatures
- In 1839, Charles Goodyear invented vulcanization (hyper-polymerization with sulfur)



Para rubber tree



Summary

- Main groups of harmful plants: prickly, stinging, poisonous, parasitic, weed/invasive
- Main groups of technical plants: forage, wood, fiber, dye, latex, incense



For Further Reading



A. Shipunov.

Ethnobotany [Electronic resource].

2011—onwards.

Mode of access:

http://ashipunov.info/shipunov/school/biol_310

