

Ethnobotany. Lecture 7

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Outline

- 1 Starch-containing plants
 - Cassava, *Manihot esculenta*
 - Other cultivated starch plants
 - Starch plants of native use
 - Inulin plants



Starch-containing plants

Cassava, *Manihot esculenta*



Cassava, manioc, *Manihot esculenta*

- Belongs to the tree genus *Manihot* from spurge family Euphorbiaceae
- Third largest source of carbohydrates in the world
- It is a shrub cultivated as annual (!)
- Secondary roots (not stems!) are thickening and form tuberous parts



Cassava plantation



Cassava features

- Tuberos roots have high amount of dry mass (30%), high in starch, phosphorous and vitamin C but poor in proteins and essential amino acids
- **Toxic**, contain cyanogenic compounds which are liberating hydrogen cyanide (HCN). Consequently, should be pressed, soaked, cooked or fermented before use. Without preparation caused a *konzo* disease.
- Harvesting is manual; roots are deteriorated fast and should be processed as soon as possible



Cassava preparation: peeling



Cassava preparation: grinding



Cassava preparation: pressing



Cassava preparation: drying



Cassava history

- Domesticated in Brazil around 6,000 BC
- Went to Africa with Portuguese trades and then to south-west Asia
- Now, Nigeria and Thailand are biggest producers



Starch-containing plants

Other cultivated starch plants



Taro, *Colocasia esculenta*

- Belongs to arum family, Araceae
- African origin
- Large semi-aquatic herbs with thickened underground stem (rhizome)
- Rhizome is inedible because of calcium oxalate which must be removed by cooking



Taro, *Colocasia esculenta*



Taro harvesting



Bread tree, *Artocarpus integer*

- Large tree of mulberry family, Moraceae
- Polynesian origin
- Has a compound “fruit”—ripe inflorescence
- A common product is a cooked or fermented breadfruit mash



Breadfruit



Breadfruit fermentation place, Marshall islands



Sago palm, *Metroxylon saghu*

- Belongs to palm family, Palmae
- Tree of Indonesian origin
- Stem (!) is used for starch (sago) production



Sago palm



Sago harvesting



Sago filtering



Andean starch tuber plants

- Oca, *Oxalis tuberosus*, from Oxalidaceae, wood sorrel family
- Ulluco, *Ullucus tuberosus*, from Basellaceae family
- Mashua, *Tropaeolum tuberosum* from Tropaeolaceae, nasturtium family



Oca, *Oxalis tuberosus*



Ulluco, *Ullucus tuberosus*



Mashua, *Tropaeolum tuberosum*



Starch-containing plants

Starch plants of native use



Arrowhead, *Sagittaria latifolia*

- “Pshitola” (Dakota), “mujotabuk” (Ojibwe)
- Aquatic plant from Alismataceae family
- Rhizomes are used as a source of starch



Arrowhead, *Sagittaria latifolia*



Quamash (*Camassia quamash*)

- Famous “Quamash”, important food source of Native Americans in the West
- Belongs to lily family, Liliaceae
- Bulbs are edible and highly nutritious



Quamash, *Camassia quamash*



Quamash roots



Potato bean, groundnut, *Apios americana*

- “Mdo” in Dakota language; belongs to legume family (Leguminosae)
- Grow across all eastern part of U.S.
- Used by Native Americans as a main starch source, tubers also contain significant amounts of proteins; beans are also edible



Potato bean, *Apios americana*



Prairie turnip, breadroot, *Psoralea esculenta*

- “Tiksi” in Dakota language
- Common plant of North Dakota
- Thick main edible after cooking or making flour



Breadroot, *Psoralea esculenta*



Starch-containing plants

Inulin plants



Jerusalem artichoke, *Helianthus tuberosus*

- Belongs to Compositae (sunflower) family
- Tubers are rich of inulin, fructose polymer, useful dietary fiber
- Plan used by eastern Indian tribes and now spread to Eurasia



Jerusalem artichoke



Jerusalem artichoke tubers



Some other inulin plants

- Common chicory, or *Cichorium intybus* from the same family Compositae; this European plant became invasive in North America
- Chicory is cultivated sporadically as vegetable and as a source of chicory drink—coffee supplement; 68% of inulin in dry weight
- Dandelion, *Taraxacum officinale* is again an invasive plant; inulin-containing root is edible after cooking
- Many other Compositae (e.g., thistles) also have edible roots rich of inulin



Chichory



One of thistles, *Arctium*



Summary

- Sweet potatoes and cassava (manioc) are two largest starch sources after potato
- Multiple unrelated tuber starch-bearing species grow in Andes



For Further Reading



A. Shipunov.

Ethnobotany [Electronic resource].

2011—onwards.

Mode of access:

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



P. M. Zhukovskij.

Cultivated plants and their wild relatives [Electronic resource].

Commonwealth Agricultural Bureaux, 1962. Abridged translation from Russian.

Mode of access:

http://ashipunov.info/shipunov/school/biol_310/zhukovskij1962_cultivated_plants.pdf.

