Ethnobotany

Slides prepared for a Toronto Botanical Garden tour of the ROM Green Plant Herbarium (TRT)

17 October 2017
Ethnobotany

- The choices of plant-derived foods available to us where we shop.
- The choices people have made in planting their gardens.
- Hans Christian Andersen’s story, *The wild swans*.
- Note that we don’t have to travel to exotic locales to encounter ethnobotany; it’s everywhere that people interact with plants.
- But, in an exotic, poorly known locale it may be extremely important to understand how people interact with the plants around them.
Naming plants

- Traditional names
  - Folk taxonomy

- Linnaean (scientific) names
  - Seen as originally based on European folk taxonomy
  - Species grouped in genera
  - Genera grouped in families
  - Families grouped in orders

- Ethnobotany relates these systems of names
Ethno-

• “Derived from the Greek word ἔθνος ethnos, normally translated as ‘nation’. The terms refer currently to people thought to have common ancestry who share a distinctive culture.” Wikipedia

• “...from the 14th through the middle of the 19th century ... used in English in the meaning of ‘pagan, heathen’, as ethnikos (Greek: ἔθνικός, literally ‘national’) was used as the [Greek Old Testament] translation of Hebrew goyim ‘the nations, non-Hebrews, non-Jews’.” Wikipedia
Ethno-

• “Ethnic group” - Max Weber: “[T]hose human groups that entertain a subjective belief in their common descent because of similarities of physical type or of customs or both, or because of memories of colonization and migration; this belief must be important for group formation; furthermore it does not matter whether an objective blood relationship exists.” Wikipedia

• Ethnobotany thus the botany of individual ethnic groups, however defined. We may encounter ethnobotany in many ways in our daily life...
Botany

• The scientific study of plants
  – “traditionally” (i.e. up until the 1990s) this has included not only the green land plants, but also the algae (photosynthetic aquatic and marine organisms) and fungi (sedentary heterotrophic organisms).
  – Data from DNA sequence variation and ultrastructure tell us, however, that these organisms actually represent diverse clades and symbiotic relationships.
How to cure warts...
... greater celandine
Ethnobotany

• Naming plants
• Using plants (green plants, algae, fungi)
  – Food
  – Medicine
  – Artifacts (utensils, tools, etc.)
  – Fuel
  – Fiber
  – Construction
HYACINTHACEAE (formerly included in Liliaceae)
Camassia spp.

Camassia qamash - In the Pacific northwest and the Rocky Mountains the bulbs of camas were an important source of carbohydrate for First Nations, and the wet meadows where these plants grow remain an important resource. On a sunny day in May or June when the camas are in flower such meadows can be extraordinarily beautiful. In Ontario C. qamash does not occur, but C. scilloides can be found. Source: Mabberley (1997).
Catharanthus rosea (above); Digitalis purpurea (right); Crataegus chrysocarpa (below; photo: M. Zarrei, © ROM)
Constructing Traditional Métis Baskets

By Joan Penizza, MNO Community Wellness Coordinator, Thunder Bay MNO Office

On June 6th a group of Métis crafters visited Centennial Park in Thunder Bay. The city was very accommodating in allowing our group to go to the park and collect birch bark from fallen trees. Spruce roots were also collected and cleaned, then split and soaked prior to being used as cordage to sew the birch bark baskets together.

The weather was ideal and the bugs were few. Within an hour we had more than enough bark to complete a couple of baskets each. It was superb to sit outside and clean and prepare the bark for the basket making. The warm sunshine and fresh breeze contributed to the stories and laughter. "This setting is good for all of me," one of the women commented. We all agreed that being outside in the fresh air and making something useful with our hands is indeed "good for all of our parts". No open fires are allowed at Centennial Park, but we were able to bring a small briquette style BBQ for a lunch of delicious "smokies".

We started a few baskets that afternoon but talking and story-telling being what they are, we ran out of time to complete our work. Everything was brought back to the Métis Nation of Ontario Thunder Bay Métis Council office where the basket-making project will be completed.


http://www.mammothcavebasketmakers.com/
Malagasy pirogue
Traditional shipbuilding
Wooden aircraft:
Spruce Goose - built out of birch
DeHavilland Mosquito (below)
Compare with the use of wood in domestic construction in places like the Canadian maritimes, rural Québec and Ontario, or New England.
Ethnobotany

- Naming plants
- Using plants
- Methodology
  - Botanical
  - Ethnographic
Ethnobotany

• Naming plants
• Using plants
• Methodology
  – Botanical
  – Ethnographic
    • **Emic** knowledge - within a culture
    • **Etic** knowledge - supposedly universal; outside cultural terms of reference?
Ethnobotany and Herbaria

- Intimately related
- Resource for identification
- Depository for voucher specimens
- Make possible comparisons with related plants, other geographic regions, etc.
- Herbaria document the floras of the world
Great Herbaria

Some

...and what about MO, NYBG, E, SING, and many others?

RBG Kew (K)

St. Petersburg (WIR)

Berlin (B)
Important Canadian Herbaria

- ACAD Acadia University (*Vaccinium*)
- QFA Université Laval (N Québec)
- CAN Canadian Museum of Nature (Arctic)
- DAO Agriculture and Agri-Food Canada
- TRT Royal Ontario Museum (*Crataegus*)
- WIN University of Manitoba (*Carex*)
- ALTA University of Alberta
- UBC University of British Columbia
Roles of herbaria

• Herbaria house and curate specimens
  – voucher specimens provide the documentary link between plants in the field and derived floristic, taxonomic, or ethnobotanical syntheses

• Floristic studies
  – specimens document the flora and vegetation units

• Monographic studies
  – taxonomic research, in which taxon concepts are refined, and (phylogenetic) relationships are clarified ...
Review of *Ethnobotany: Evolution of a Discipline*¹

- Just ...when ethnobotany has finally convinced the modern world of the relevance of "the study of human evaluation and manipulation of plant materials, substances, and phenomena, ...in primitive or unlettered societies," both the plants and the unlettered societies are being wiped out by the modern world.

¹ Reeds, K. *Bulletin of the History of Medicine* 72(3): 595-596
• Xavier,

• Please go to the herbarium and see if you can find a fruit collection of Couroupita guianensis with two or more fruits in good shape. Then get permission from Barbara Thiers to send one fruit as a gift to Deb Metsger at the address below..... I checked Emu and it does not seem that the fruits of Couroupita have been imaged. Make sure that you write down the collector and number so I can make sure that there are not any "ghost" fruits in Emu. Because the fruits of this species are all round cannon balls, taking a single fruit from a collection that has multiple fruits will have little if any negative impact on the collection.

• This will be part of an exhibit of the pollination and dispersal biology of the Brazil nut family at the Royal Ontario Museum. This exhibition will be do a great deal to educate the public about tropical biodiversity and, in my opinion is worth giving up a single fruit.

• I attach several pictures of the models they have done based on my research just to show you and Barbara what a fantastic exhibit this will be.

• Thanks,

• Scott

Cannonball Tree
*Couroupita guianensis*

Slide courtesy Deb Metsger
Brazil nut *Bertholletia excelsa*
Red Rumped Agouti
*Dasyprocta agouti*
Fowl’s cox comb
*Tabernaemontana*

*Paired with silver-beaked tanager*
Schultes’ students: noted ethnobotanists

- Michael Balick
- Paul Alan Cox
- Wade Davis
- Robert Bye
- Mark Plotkin
- Tim Plowman
- And many others

One River: Science, Adventure and Hallucinogenics in the Amazon Basin by Wade Davis (New York: Simon & Schuster 1997)
Ontario’s Tallgrass Prairie

Tailgrass Prairies and Savannas are the most endangered habitats in Ontario.

What are Tailgrass Prairies and Savannas?
They are grasslands made up of grasses, sedges, and wildflowers. Prairie vegetation is taller than 1 meter. They flourish where it is too dry for tobacco, grasses, and other perennials are also growing.

Where are Ontario’s Tailgrass Prairies and Savannas at risk?
Many are threatened due to development, agriculture, and conversion to other uses. As a result, the remaining prairies are under threat.

Prairie Prairie
The Ojibway consider the strawberry to be the "red moon" because it is the first to appear each year.

Les Ojibway considèrent le fraise comme le "cheveu des plantes à fruits". C'est, chaque année, le premier à produire ses fruits.

Some Aboriginal peoples use representations of the strawberry in their artwork because of the importance of this plant in their lives.

En raison de l'importance de cette plante dans leur existence, certains groupes des Premières nations l'utilisent dans leur art.

Wild strawberry
Fraisier des champs
Fragaria virginiana

Ojibway people name this plant Odeiminidi’ bik, or heart berry root. The month of June has a similar name, Odeiminii Gitisii, or heart berry moon, because it is in this "sixth moon of creation" that the red fruits of the wild strawberry ripen. Strawberries grow close to the ground among the stalks of other, larger prairie plants. The fruits are not only sweet and tasty but also rich in vitamins and minerals. As well, all parts of the plant can be gathered for medicinal purposes.

Developed in collaboration with the Walpole Island Heritage Centre, Walpole Island First Nation.


Protection d’information en collaboration avec le Centre-patrimonial de Walpole Island, Première nation de Walpole Island.
Jane Ash Poitras

• Canadian artist
• ROM owns pieces from her installation, “Consecrated Medicine,” including
  – Buffalo Seed
  – Potato Peeling 101 to Ethnobotany 101 (triptych)
• Visit the ROM's Daphne Cockwell Gallery of Canada: First Peoples to see how plants (and fungi) enter into the composition of these pieces
Consecrated Medicine
Three examples (1, 2)

• Araliaceae
  – Family closely related Apiaceae (caraway, celery, cumin, dill, fennel, parsley, parsnips, etc.)
  – *Tetrapanax papyrifer*, the source of pith paper
  – *Panax species*, including *P. ginseng* and *P. quinquefolius*; ginseng
Tetrapanax images courtesy of the ROM Far Eastern collections, and their curator Wen-chien Cheng (also: Janet Cowan, ROM Paper Conservator)
Ginseng

- Medicinal use in China since 2\textsuperscript{nd} c. CE
- European “discovery” by Jesuit Pierre Jartoux on cartographic survey in Manchuria 1709-1710 and described by him in print 1711 in the Order’s annual \textit{Lettres édifiant et curieuses}
Jartoux’s illustration of ginseng (Thomas Fisher Rare Book Library, University of Toronto)
Ginseng

• Jartoux (1711) speculated that ginseng might also be found in Canada

• A Jesuit missionary to the Iroquois and Mohawks, Joseph-François Lafitau, found Jartoux’s report on a visit to Québec and sought and found ginseng growing near his mission

• Lafitau saw parallels between North American and Chinese names and uses
Cet vaste Continent, divisé, selon la commune opinion, en deux grandes Peninsules, à qui l'on a donné le nom d'Amerique Septentrionale & Meridionale, s'étend des deux côtes bien avant vers l'un & vers l'autre Pôle, & forme comme un autre Monde qu'on peut appeler nouveau, parce que les deux vastes Mers du Nord & du Sud, qui l'environnent tout entier ou partout, en avoient par leur valeté et dû dérobé la connaissance, jusqu'à ces derniers temps, aux Peuples de l'ancien Monde, qu'ils connoissent pas encore les bornes de celui qu'ils habitent.

Ce ne fut que vers la fin du quinzième siècle que ces Régions immenses furent découvertes un de ces événemens qui semblent naitre de la providence, & qui fut comme le mome neux marqué par la grace du Redempteur.
The value placed on ginseng in China (worth its weight or more in silver) led to Europeans trading North American ginseng to the Far East. Despite well-documented accounts of its value as a tonic, western consumption was limited.

North American ginseng was an economical alternative to Manchurian ginseng in Japan, until the Japanese succeeded in establishing cultivation of the plant.

Ginseng in the 18th c.

Sources:


The Empress of China arrived in Canton harbor 23 August 1784, carrying nearly 30 tons of ginseng collected mainly from First Nations across the northeastern U.S., and valued at $240,000.
Ginseng today

Google image search, “ginseng products” (partial)
Three examples (3)

- **Rosaceae**
  - Rose family
  - *Crataegus* species; hawthorns
    - Fruits used as food
    - Eastern Asia; *C. pinnatifida*
    - Europe; *C. azarolus* (azarole), *C. germanica* (medlar)
    - Mexico; *C. mexicana* (tejocote)
    - SE USA; *C. opaca* (mayhaw)

- Widely used in traditional herbal medicine (Europe, Asia), notably for cardiotonic effect
Just for the record, medlars (above) and hawthorns (right) are pretty much the same thing; species of *Crataegus* L., that all have fruits like little apples, within which each seed is enclosed in a wooden box.
Crataegus L.

Rosaceae
tribe Pyreae

Crataegus suksdorffii

Photos: Keir Morse
Food uses of hawthorns worldwide include:
Crataegus mexicana (tejocote)
C. pinnatifida (shān zhā, 山楂)
C. germanica (medlar)
The smaller red form at right is sweeter than the orange form at left.

**Where to Find Tejocote Trees and Fresh Fruit**

**AJ Produce**
(Alfredo Juárez), Wholesale distributor of Serrato Farms tejocotes. 1838 Conway Pl., Los Angeles, CA 90021; (213) 488-9540; ajproduceca.com.

**Atkins Nursery**
(Victor Gonzalez), Tejocote trees. 3129 Reche Road, Fallbrook, CA 92028; (760) 728-1610.

**California Tropical Fruit Tree Nursery**
(Perry Cole), Most wholesale, but open to the public on Sat., 2081 Elado Road, Vista, CA 92084; (760) 434-5085; tropicalfruittrees.com.

**Exotica Rare Fruit Nursery**
(Steve Spangler), Tejocote trees. 2508 B East Vista Way, Vista, CA 92084; (760) 724-9093.

**Gonzalez Northgate Markets**
Fresh Serrato Farms tejocotes, at 29 stores in Southern California. northgatemarkets.com.

**Maddock Nursery**
(Concho Hernandez, foreman), Tejocote trees. 1163 Ranger Road, Fallbrook, CA 92028; (760) 728-1172; maddocknursery.com.

**Rancho Charanda Citrus Ranch**
(Pablo Rodriguez), Fresh tejocotes. 11654 Walnut St., Redlands, CA 92374; (909) 283-5132; redlandsfruit.com.

**Rancho Mexico Lindo**
(Louis & Carmen Diaz), Grows red and yellow tejocotes in Valley Center, sells at Beverly Hills, Santa Monica Pico, South Pasadena, Del Mar and Escondido (Thru) Farmers markets.

**Superior Grocers**
Fresh Serrato Farms tejocotes, at 33 stores in Southern California. superforgrocers.com.

**Tapia Produce**
Fresh tejocotes. 1248 E. Olympic Blvd., Los Angeles, CA 90021; (213) 624-5638.

...Whole milk is a good source of calcium (118 mg/100 g). Many of the plant materials listed contain several times this level. Wild foods exceeding milk in their Ca content are maple syrup and sugar, greens of \textit{Amaranthus retroflexus}, \textit{Taraxacum officinale}, \textit{Chenopodium album}, \textit{Brassica} spp., \textit{Nasturtium officinale}, hazelnuts (\textit{Corylus} spp.), beechnuts (\textit{Fagus grandifolia}), mint (\textit{Mentha} spp.), \textbf{haws (\textit{Crataegus crus-galli})}, beach plums (\textit{Prunus maritima}), rose hips, poplar, or aspen buds (\textit{Populus tremuloides}), the algae Irish moss, and dulse (\textit{Rhyodymenia palmata}).

\textbf{Medicinal uses...}

\textbf{\textit{Crataegus} sp.} (hawthorn, thornapple; aubepine)

- \textit{Iroquois} \textit{o-hik-ia} (Swelling of stomach: infusion, branches with \textit{Inula helenium} roots: Rousseau 1945)

- \textit{Ojibwa} \textit{mine'saga'wûnj} (Pain in back, female weakness: root decoction: Densmore 1974)

- \textit{Ojibwa} \textit{minesga-winj} (Consumption: root decoction: Gilmore 1933)

- \textit{Ojibwa} \textit{minesaga'wûnj} (Women: fruit, bark: Smith 1932)

### Food uses...

<table>
<thead>
<tr>
<th>Family</th>
<th>Scientific and common name (English; French)</th>
<th>Culture</th>
<th>Native name</th>
<th>Use</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Crataegus mollis</strong> (T. &amp; G.) Scheele.</td>
<td>Iroquois</td>
<td><em>djigahe‘dis</em> (On.) <em>djuda’hi’des</em> (Ca.)</td>
<td>Berries used or preserved</td>
<td>Waugh 1916</td>
</tr>
<tr>
<td></td>
<td>(haws, red haw; aubépine subsoyeuse)</td>
<td>Ojibwa</td>
<td><em>minesaga’wënj</em></td>
<td>Berries used or preserved</td>
<td>Smith 1932</td>
</tr>
<tr>
<td></td>
<td><strong>Crataegus oxyacantha L.</strong> (hawthorn, white thorn)</td>
<td>Ojibwa</td>
<td>—</td>
<td>Fruit eaten occasionally</td>
<td>Reagan 1928</td>
</tr>
<tr>
<td></td>
<td><strong>Crataegus punctata</strong> Jacq. (punctate hawthorn; aubépine ponctuée)</td>
<td>Iroquois</td>
<td><em>o’ngwe’u’hai</em> (Ca.)</td>
<td>Berries used fresh or preserved</td>
<td>Waugh 1916</td>
</tr>
<tr>
<td></td>
<td><strong>Crataegus</strong> spp. (thornapple, hawthorn; pommettes, cenellier)</td>
<td>Iroquois</td>
<td><em>o-hik-ta</em></td>
<td>Fruit used</td>
<td>Waugh 1916; Rousseau 1945</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Iroquois</td>
<td><em>dwe’owek</em> (Se.)</td>
<td>Haws eaten raw, boiled whole, cut up in a sauce or baked in ashes; dried and stored for winter</td>
<td>Parker 1910</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ojibwa</td>
<td><em>mine’saga’wënj</em></td>
<td>Haws squeezed into cakes without cooking; dried and stored for winter</td>
<td>Densmore 1928</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ojibwa</td>
<td><em>minesaga’wënj</em></td>
<td>Haws used</td>
<td>Smith 1932</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Algonquin</td>
<td>—</td>
<td>Fruit used</td>
<td>Black 1980</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abenaki</td>
<td><em>ti’ginasak</em></td>
<td>Fruit eaten by children</td>
<td>Rousseau 1947</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Micmac and Malecite</td>
<td><em>min-oz-i-uk</em></td>
<td>Fruit used</td>
<td>Speck and Dexter 1951, 1952; Adney 1944</td>
</tr>
</tbody>
</table>
In addition to using their wood for hammers, tool handles and digging sticks (Turner 2014b), coastal and interior First Nations in British Columbia used the fruits of native hawthorns for food, often smashed so as to break up the pyrenes (and the seeds inside; Turner 2014b). First Nation names for both black- and red-fruited hawthorns are documented for the southern half of British Columbia and the adjacent USA, the latter species (C. chrysocarpa) mainly in the southern and interior portion of this range (Turner 2014a, b).

Zarrei et al. (2015)
Hawthorn agroforestry

• Cochrane Review (2009)
  – Meta-analysis of published studies
  – Positive evaluation of hawthorn in treating heart disease

• NSERCC interest
  – Strategic Project competition 2009

• Successful grant application
  – Support for three years, reduced to two
  – Funding for post-docs, grad students, technical assistance, animal trials
Look for a Cochrane review if you’re reporting on a Natural Health Product!
Hawthorn extract for treating chronic heart failure (Review)

Guo R, Pittler MH, Ernst E

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in The Cochrane Library 2009, Issue 1
Hawthorn extract may be used as an oral treatment option for chronic heart failure

Hawthorn extract (made from the dried leaves, flowers and fruits of the hawthorn bush) may be used as an oral treatment option for chronic heart failure. In this review, 14 double-blind, placebo controlled randomised clinical trials (RCTs) were found. They did not all measure the same outcomes and several did not explain what other heart failure treatments patients were receiving. Those trials that could be included in a meta-analysis showed improvements in heart failure symptoms and in the function of the heart. The results, therefore, are suggestive of a benefit from hawthorn extract used in addition to conventional treatments for chronic heart failure.
Hawthorns, intercropped with herbs

Central Kootenay R.D., British Columbia
Hawthorn agroforestry

- Grower participation
  - Experimental farm trials
  - Logistic support

Experimental farm trials for growing and propagating native hawthorns. Eurasian species (*C. monogyna*, now naturalized in N.A.) also used as rootstock onto which native species can be grafted.

Growers’ Co-op provided base of operations, transport, and liaison with forest workers and others across BC (essential for fieldwork by Toronto-based personnel).
Hawthorn agroforestry

- Grower participation
  - Experimental farm trials
  - Logistic support
- Natural product chemistry
  - Labs at BCIT, UBC-Okanagan
- ROM/UofT
  - Fieldwork BC 2010, Pacific NW 2011
  - DNA sequencing, population genetics
- UofAlberta
  - Use animal model of obesity and the metabolic syndrome (JCR:LA-cp rat) that develops hyperinsulinemia, dyslipidemia, and early cardiovascular complications.
  
  BCIT: sample management, method development (identification and quantification)
Hawthorn agroforestry

• Grower participation
  – Experimental farm trials
  – Logistic support

• Natural product chemistry
  – Labs at BCIT, UBC-Okanagan

• ROM/UofT
  – DNA sequencing, population genetics, morphometrics

• UofAlberta
  – Use animal model of obesity and the metabolic syndrome (JCR:LA-cp rat) that develops hyperinsulinemia, dyslipidemia, and early cardiovascular complications to investigate hawthorn effects.

  “…we have quite good statistical power and have found a number of physical and functional improvements on leaf and berry intervention groups…”
Four treatments (groups of rats):

- **lean** and metabolically normal (+/+), fed a normal diet (lean control)
- **obese** (cp/cp), fed a normal diet (obese control)
- **obese** (cp/cp), fed a normal diet *plus* hawthorn leaf supplement (*C. monogyna*)
- **obese** (cp/cp), fed a normal diet *plus* hawthorn fruit supplement (*C. chrysocarpa*)
• Evaluated as follows:
  – **No significant difference** (any differences found could be due to chance alone (i.e. accept $H_0$: no difference))
  – **Less than one chance in 20** that a difference seen could be due to chance alone, compared to lean control (✱) or compared to obese control (#)
  – **Less than one chance in 1000** that a difference seen could be due to chance alone, compared to lean control (###) or compared to obese control (✱ ✱ ✱)
Less than one chance in 20 that a difference seen could be due to chance alone,
- compared to lean control (∗)
- compared to obese control (#)
• Conclusion: the chemicals in hawthorn preparations, regardless of plant part used (leaf and flowers, fruit) or species (introduced *C. monogyna*, native *C. chrysocarpa*), provided significant improvements in heart structure and function in these animal trials

• These experiments also suggest possible mechanisms for the action of these hawthorn preparations
Ethnobotany

- Naming plants
- Using plants
- Methodology
  - Botanical
  - Ethnographic
    - **Emic** knowledge - within a culture
    - **Etic** knowledge - supposedly universal; outside cultural terms of reference?
Ethnobotany in Canada

More than a list of uses:

Promoting local cultures and languages;

Encouraging the development of skills, understandings, respect, self-esteem and pride;

Reconnecting health and wellbeing with cultural and environmental integrity;

Supporting intergenerational learning about plants;

Slide courtesy A. Cuerrier
Alain Cuerrier

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Research


Plants for People and People for Plants: History of Ethnobotany in Canada

Alain Cuerrier (Institut de recherche en biologie végétale)
Nancy Turner (University of Victoria)
Dana Lepofsky (Simon Fraser University) & Vandy Bowyer (Athabasca University)
The following four slides were included in case anyone was interested in learning more about folk taxonomies.
Folk & **pre-Linnaean** taxonomy (21-Jan-03)

Folk taxonomic categories

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>DESCRIPTION</th>
<th>EXAMPLE GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unique beginner</td>
<td>Contains only a single member, namely the group that includes all other groups.</td>
<td>Plants (animals, all living things)</td>
</tr>
<tr>
<td>Life form</td>
<td>Usually only 5-10 of these, so as to include most other groups in the subordinate categories. Groups in this category are the largest that are distinguished by multiple, easily observable features.</td>
<td>Tree (vine, herb)</td>
</tr>
<tr>
<td>Generic</td>
<td>Most numerous category, usually with 500-800 entities being named. Groups in this category are the smallest that are distinguished by multiple, easily observable features. Usually monotypic; where polytypic, the organisms concerned are of great cultural importance.</td>
<td>Oak (maple, hawthorn)</td>
</tr>
</tbody>
</table>
**Specific** (adjective)  Often used as a binomial, so as to modify a generic name (see below). Where these entities are distinguished there are typically only 2 or 3, and rarely more than 10. Usually distinguished by a single feature such as color or size.

**Varietal** (adjective)  These are rare in folk taxonomies.

See example in *Berlin* (1973, p. 266) re bean varieties

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**Life forms**

Names of life forms in some folk taxonomies may be taken from the names of generics, and so are described as *polysemous* (they have more than one referent). For example (Berlin 1973), Klamath people in Oregon used the word *k’osh* (*Pinus* sp.) for pines and for trees in general. Other examples of life forms and other categories discussed in class come from fieldwork in the *John Crow Mountains of Jamaica* (cf. Kelly & Dickinson 1985).

compare Raunkiær (1907):
Generics

Some generic taxa are aberrant in the way in which they don't fit into a single life form, or are totally unlike anything else known.

Examples from Berlin (1973):

*Clusia*

The strangling epiphyte úwi (*Clusia* sp.) is not assigned by the Aguaruna Jivaro to either númi 'tree' or dáek 'liana' because of the way in which this genus develops from a liane-like strangler into a tree.

*Opuntia*

In the folk botany of the Tzeltal Maya *pehtak* (*Opuntia* sp.) is not assigned to any life form since it is unlike any other plant known to them.
Specifics

These are distinguished within generic taxa of great cultural importance. Quite apart from any mythological significance, oaks are extremely important because of the uses that can be made of their wood.

Examples from the folk botany of English-speaking Ontario:

white oak

An alternate common name for white oak is stave oak, since its wood is preeminent for making barrel staves. Even though the early wood vessels are quite large, they become blocked with tyloses, cytoplasmic protrusions from adjacent parenchyma cells, with the result that containers made from the wood of white oak are impermeable.

(Right) Transverse section through secondary xylem (wood) of white oak (Quercus alba) showing tyloses (T).

red oak

The vessels of red oak lack these tyloses, and so the wood of red oak is used for flooring and furniture instead.