Plant Genera

(Biological Classification)

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Chapter 1

Chamelaucium and Lophophora

Chamelaucium

Chamelaucium

Chamelaucium uncinatum

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Rosids
Order:	Myrtales
Family:	Myrtaceae
Tribe:	Chamelaucieae
Genus:	***Chamelaucium*** Desf.

Type species
Chamelaucium ciliatum Desf.

Diversity
About 30. species.

Chamelaucium, also known as **waxflower**, is a genus of shrubs endemic to south western Western Australia. They belong to the myrtle family Myrtaceae and have flowers similar to those of the tea-trees (*Leptospermum*). The most well-known species is the Geraldton Wax, *Chamelaucium uncinatum*, which is cultivated widely for its large attractive flowers.

Taxonomy

The genus was first defined by French botanist René Louiche Desfontaines in 1819. The derivation of the name is unclear. They are commonly known as waxplants, or wax flowers from the waxy feel of the petals. Fourteen species are currently recognised within the genus. It gives its name to a number of closely related genera, collectively known as the Chamelaucium alliance within the family Myrtaceae; larger members include *Verticordia*, *Calytrix*, *Darwinia*, *Micromyrtus*, *Thryptomene* and *Baeckea*.

Description

Plants of the genus *Chamelaucium* are woody evergreen shrubs ranging from 15 cm (6 in) to 3 m (10 ft) high. The leaves are tiny to medium-sized and arranged oppositely on the stems. They contain oil glands and are aromatic, often giving off a pleasant aroma when crushed. The flowers are small and have five petals, ten stamens, and are followed by small hardened fruit.

Distribution and habitat

Restricted to the southwest of Western Australia, *Chamelaucium* species grow most commonly in heathland communities growing on sand near the coast or inland, and in granite outcrops. Some grow in more semi arid climates.

Cultivation

In cultivation, they do well in dryer climates with good drainage and sunny aspect. They are hardy to frost and drought, although sensitive to *Phytophthora cinnamomi*. The best known and most widely cultivated member of the genus by far is *C. uncinatum*, which is widely grown in gardens across southern Australia, and for the cut flower indistry in the USA and Israel.

Chamelaucium uncinatum

Chamelaucium ciliatum

Lophophora

Lophophora

Lophophora williamsii cluster

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Core eudicots
Order:	Caryophyllales
Family:	Cactaceae
Subfamily:	Cactoideae
Tribe:	Cacteae
Genus:	***Lophophora*** J.M.Coult.

Species

Lophophora diffusa
Lophophora williamsii - Peyote

Lophophora is a genus of spineless, button-like cacti native to the southwestern United States (Texas and New Mexico) through Northeast Mexico and South to Querétaro in central Mexico.

The species are extremely slow growing, sometimes taking up to thirty years to reach flowering age (at the size of about a golf ball, excluding the root) in the wild. Cultivated specimens grow considerably faster, usually taking between three to ten years to reach from seedling to mature flowering adult. The slow rate of reproduction and over-harvesting by collectors render the species under threat in the wild.

Taxonomy

Lophophora means "crest-bearing", referring to the tufts of trichomes that adorn each tubercle. The name is derived from the two Ancient Greek words *λοφος* (*lophos*, the crest

of a hill or helmet) and φορεω (*phoreo*, to carry). *Lophophora* has been reported to comprise everything from one species, *L. williamsii* with varieties, to the four species *L. diffusa*, *L. fricii*, *L. diffusa ssp. viridescens*, and *L. williamsii*. Most modern authorities consider *Lophophora* to be a genus of two species, *L. diffusa* and *L. williamsii*. Recent DNA sequencing studies (Butterworth et al. 2002) have shown that *L. diffusa* and *L. williamsii* indeed are distinct species. DNA evidence from the alleged species *L. fricii* and *L. viridescens* would allow for more accurate classification.

Below is given a key for the currently accepted species along with the "species" and varieties that must be considered synonymous. Detailed arguments for this classification can be found in *Peyote: The Divine Cactus* (Anderson 1996, pp. 210-219).

Species

- *Lophophora diffusa* (Croizat) Bravo : The plants are yellow-green, usually lacking well-defined ribs and furrows. The podaria are rarely elevated, but are broad and flat. The tufts of hair are usually spread unequally on the prominent podaria. The flowers are commonly whitish to yellowish-white. *L. diffusa* occurs at the south end of the range of the genus in Querétaro state, Mexico. This species contains zero to trace amounts of mescaline; pellotine is the principal alkaloid.

Several people have reported that this cactus is psychoactive if ingested, though the experience is not unlike peyote. This species looks almost identical to peyote, though it is legal to possess in the United States.

- *Lophophora williamsii* (Lemaire ex Salm-Dyck) J.M.Coult. The plants are blue-green, usually with well-defined ribs and furrows. The tufts of hair are usually equally spaced on the ribs. The flowers are pinkish or rarely whitish. *L. williamsii* occurs in the full range of the genus except in Querétaro state, Mexico. The mescaline content in dried "Peyote" can reach almost 7%.

Description

Lophophora cacti have thigmotactic anthers, which are touched they curl over, depositing their pollen. This movement can be seen by gently poking the anthers of an open *Lophophora* flower.

Ethnobotany

Lophophora williamsii, commonly known as peyote, is noted for its psychotropic alkaloids. These alkaloids are absent or only found in extremely small amounts in the other species *Lophophora diffusa*. While *L. diffusa* is known for having psychoactive effects, these effects are described not so much as "visionary", like peyote, but rather a delirious high such as those associated with the use of *Datura* and *Belladonna*. The stem is used as a spiritual hallucinogen, and is applied topically as a galactogogue, or lactation aid.

Cultivation

Lophophora species easily adapt to cultivation. Although a cactus, most of the range this genus is found is within a subtropical climate for some portion of the year. In habitat plants in this genus are subject to seasonal monsoons within their range and the plants live in areas where they may be underwater for several weeks during heavy rains and can tolerate a lot of water when the temperatures are above 100 degrees. These plants are heat adapted and grow rapidly when exposed to temperatures of 110 to 120 degrees and watered heavily in the summer. In habitat, plants from areas which experience seasonal monsoons and high temperatures such as southern Texas can reach flowering size in five years. During the fall and winter months, the plants receive almost no water in habitat and are subjected to temperatures which can drop into the upper 20's during the winter. The plants should not be watered during the winter rest or watered sparingly when they begin to shrink and wrinkle only enough to keep them turgid. Lophophora plants must be kept completely dry if they are subjected to temperatures below 40 degrees as watering plants and subjecting them to below freezing temperatures will typically result in the death of the plant.

Seedlings grow most rapidly when enclosed in a sealed terrarium environment, having been germinated in trays of shallow sand covered with plastic wrap with several small pin sized holes in the plastic wrapping. This may seem strange for a cactus, but Lophophora seedlings are adapted to germinate and grow during the seasonal monsoons. Plants grown this way can reach 5 cm (2 in) diameter in just over a year and can be removed from their hyper-humid environment and will typically reach flowering size in just under three years.

Lophophora are closely related to the genera *Ariocarpus*, *Aztekium*, and *Obregonia* and like its relatives possesses a large taproot system with the majority of the plant's mass underground for water storage. *Lophophora* is more tolerant of soil types than its relatives, and typically grows in areas which have decomposed limestone present in the soil. In cultivation, *Lophophora* does best in a fast draining mineral based soil which is about 2/3 sand. Abundant water is beneficial in the summer months when the temperatures are over 90 degrees and exposed to full sunlight for maximum growth, but must be allowed to dry out completely between waterings. They should also be fertilized twice a year. Over fertilizing will typically result in the Lophophora developing cracks and splitting. At times, some varieties of Lophophora will develop a corky material on the plant body if exposed to pesticides or insecticidal soap. This corky condition will usually heal in a manner very similar to human skin if the plants are exposed to full sunlight.

When overwatered during the winter months, Lophophora plants can succumb to soil-bourne fungus infections. Pyroclay (Pyrophyllitic Clay) is an effective preventative and soil additive which increases their resistance. Due to the large amount of alkaloids produced by this plant and stored in its tissues, *Lophophora* roots are highly alkaline and are known to harbor *Clostridium botulinum* bacteria and should not be used for human consumption and have been found to contain botulinum toxin in nature.

Lophophora are free flowering in cultivation and although they can withstand temperatures into the 10's during winter they do not require a cold shocking in order to initiate flowering.

Chapter 2

Ptisana and Sagina

Ptisana

Ptisana

King fern, *Ptisana salicina*
Scientific classification
Kingdom: Plantae
Subkingdom: Tracheobionta (Vascular plants)
Division: Pteridophyta
Class: Marattiopsida
Order: Marattiales
Family: Marattiaceae
Genus: ***Ptisana*** Murdock

Ptisana is a genus in the eusporangiate fern family Marattiaceae, comprising species historically treated in the genus *Marattia*. The establishment of this genus follows the 2008 work by Andrew G. Murdock, which supported recognition of this group on the basis of genetic analysis and morphology. *Ptisana* can be distinguished from *Marattia* by the presence of distinct sutures at the point of leaflet attachment, deeply cut synangia, and the absence of labiate sporangial apertures. The name *Ptisana* is derived from the Latin word for pearl barley, an allusion to the shape of the synangia.

Ptisana has a palaeotropical distribution, with the westernmost extreme of the range in Ascension Island and extending eastward through tropical Africa, Asia, and Oceania. The basal chromosome number for this genus is *2n=78*, whereas the one count for *Marattia* in the strict sense is *2n=80*. The type species is *Ptisana salicina*.

Species

- *Ptisana fraxinea* (Sm.) Murdock -- Africa to India, including Indian Ocean islands
- *Ptisana salicina* (Sm.) Murdock -- king fern; South Pacific islands, including New Guinea
- *Ptisana attenutata* (Labill.) Murdock -- New Caledonia
- *Ptisana sambucina* (Blume) Murdock -- Malesia and Vietnam
- *Ptisana sylvatica* (Blume) Murdock-- Malesia
- *Ptisana pellucida* (C. Presl) Murdock -- Malaysia and the Philippines
- *Ptisana mertensiana* (C. Presl) Murdock -- Micronesia
- *Ptisana ternatea* (de Vriese) Murdock -- Moluccas, New Guinea, the Philippines
- *Ptisana purpurascens* (de Vriese) Murdock -- Ascension Island
- *Ptisana smithii* (Mett. ex Kuhn) Murdock -- Vanuatu, Fiji, Samoas, Tonga
- *Ptisana melanesica* (Kuhn) Murdock -- New Guinea and nearby islands
- *Ptisana obesa* (Christ) Murdock -- New Guinea
- *Ptisana squamosa* (Christ) Murdock -- New Guinea
- *Ptisana grandifolia* (Copel.) Murdock -- New Guinea
- *Ptisana novoguineensis* (Rosenst.) Murdock -- New Guinea
- *Ptisana oreades* (Domin) Murdock -- northern Australia
- *Ptisana howeana* (W.R.B. Oliver) Murdock -- Lord Howe Island
- *Ptisana rigida* (Alderw.) Murdock -- New Guinea, Sulawesi
- *Ptisana platybasis* (Copel.) Murdock -- New Guinea
- *Ptisana costulisora* (Altson) Murdock -- New Guinea and nearby islands

Sagina

Sagina

Sagina procumbens

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Core eudicots
Order:	Caryophyllales
Family:	Caryophyllaceae
Genus:	***Sagina*** L.

Sagina (like *Colobanthus* called **"pearlworts"**) is a genus of 20–30 species of flowering plants in the family Caryophyllaceae. These are flowering herbs native to temperate regions of the Northern Hemisphere extending south to tropical mountain areas at high altitudes, reaching just south of the equator in Africa. They are small annual or perennial herbaceous plants, erect or prostrate, growing to 5–15 cm tall or broad. The leaves are opposite, often in tight whorl-like clusters, simple linear, typically 5–20 mm long. The flowers are solitary or in small cymes, with four or five green sepals and an equal number of white petals; the petal size relative to the sepal size is useful in species identification. The fruit is a small capsule containing several seeds.

Species

- *Sagina abyssinica*
- *Sagina afroalpina*
- *Sagina apetala* - Annual Pearlwort
- *Sagina boydii* - Boyd's Pearlwort
- *Sagina brachysepala*
- *Sagina caespitosa*
- *Sagina maxima* - Stickystem Pearlwort
- *Sagina melitensis*
- *Sagina muscosa*
- *Sagina nivalis* - Snow Pearlwort
- *Sagina nodosa* - Knotted Pearlwort
- *Sagina pilifera*
- *Sagina procumbens* - Procumbent Pearlwort

- *Sagina decumbens* - Trailing Pearlwort
- *Sagina glabra*
- *Sagina japonica* - Japanese Pearlwort
- *Sagina maritima* - Sea Pearlwort
- *Sagina sabuletorum*
- *Sagina saginoides* - Alpine or Arctic Pearlwort
- *Sagina subulata* - Heath Pearlwort (syn. *S. pilifera*)

Chapter 3

Cattleya

Cattleya

Cattleya labiata

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Monocots
Order:	Asparagales
Family:	Orchidaceae
Subfamily:	Epidendroideae
Tribe:	Epidendreae
Subtribe:	Laeliinae
Alliance:	Cattleya
Genus:	***Cattleya*** Lindl.

Cattleya elongata

Cattleya is a genus of 113 species of orchids from Costa Rica to tropical South America. The genus was named in 1824 by John Lindley after William Cattley who received and successfully cultivated specimens of *Cattleya labiata* that were used as packing material in a shipment of other orchids. The genus is abbreviated **C** in trade journals.

They are widely known for their large, showy flowers, and were used extensively in hybridization for the cut-flower trade until quite recently. This genus and the numerous hybrids come close, through their beauty, to the idealized picture we have of the orchids. The flowers of the hybrids can vary in size from 5 cm to 15 cm or more. They occur in all colors except true blue and black.

The typical flower has three rather narrow sepals and three usually broader petals : two petals are similar to each other, and the third is the quite different conspicuous lip, featuring various markings and specks and an often frilly margin. At the base, the margins are folded into a tube. Each flower stalk originates from a pseudobulb. The number of flowers varies; it can be just one or two, or sometimes up to ten.

Species

Originally, the concept *Cattleya* included a requirement that the pollinarium contain only four pollinia. Starting some time after December, 2000, the Royal Horticultural Society (RHS) began re-organizing the generic boundaries with respect to hybrid registration. This has led to multiple senses of the term *Cattleya*, not only with respect to species, but also with respect to hybrids.

Sensu MCMXCIX

- *C. aclandiae* : Lady Ackland's Cattleya (Brazil)
- *C. amethystoglossa* : Amethyst-lipped Cattleya (Brazil)
- *C. araguaiensis* : Cattleya from Araguaia river (Brazil) == *Cattleyella araguaiensis* (Pabst) van den Berg & M.W.Chase.
- *C. aurantiaca* : Orange Cattleya (Mexico to C. America) == *Guarianthe aurantiaca*
- *C. aurea* : Golden-yellow Cattleya (S. Panama to Colombia). Pseudobulb epiphyte
- *C. bicolor* : Bicolored Cattleya (SE. Brazil)
  - *Cattleya bicolor* subsp. *bicolor* (Brazil). Pseudobulb epiphyte
  - *Cattleya bicolor* subsp. *canastrensis* (Brazil) . Pseudobulb epiphyte
  - *Cattleya bicolor* subsp. *minasgeraiensis* (Brazil). Pseudobulb epiphyte
- *C. bowringiana* : Bowring's Cattleya (Mexico to Honduras) == *Guarianthe bowringiana*
- *C. candida* (Colombia).
- *C. dormaniana* : Dorman's Cattleya (Brazil)
- *C. dowiana* : Queen of the Cattleyas, Dow's Cattleya (Costa Rica).
- *C. elongata* : Cattleya with the Elongated Stalk (Brazil). $2n = 80$
- *C. forbesii* : Forbes' Cattleya (Brazil)
- *C. gaskelliana* : Gaskell's Cattleya (Colombia to Trinidad).
- *C. granulosa* : Granulose Cattleya (Brazil)
- *C. guttata* : Spotted Cattleya (Brazil).
- *C. harrisoniana* : Harrison's Cattleya (SE. Brazil).
- *C. intermedia* : Intermediate Cattleya (SE. & S. Brazil, Paraguay, Uruguay).
  - *C. intermedia* var. *orlata*
- *C. iricolor* : Rainbow-colored Cattleya (Ecuador to Peru).
- *C. jenmanii* : Jenman's Cattleya (Venezuela to Guyana).
- *C. kerrii* : Kerr's Cattleya (Brazil).
- *C. labiata* : Crimson Cattleya, Ruby-lipped Cattleya, named for the large labellum (Brazil)

- *C. lawrenceana* : named for Sir Trevor Lawrence (Venezuela, Guyana, N. Brazil).
- *C. loddigesii* : named for the Loddiges brothers (SE. Brazil to NE. Argentina).
    - *Cattleya loddigesii* subsp. *loddigesii* (SE. Brazil to NE. Argentina). Pseudobulb epiphyte
    - *Cattleya loddigesii* subsp. *purpurea* (Brazil). Pseudobulb epiphyte
- *C. lueddemanniana* : Lueddemann's Cattleya (N. Venezuela).
- *C. luteola* : named for the pale yellow flowers (N. Brazil, Ecuador to Bolivia).
- *C. maxima* : Christmas Flower, named for the large flowers (Venezuela to Peru).
- *C. mendelii* : named for Mendel (NE. Colombia).
- *C. mooreana* : named for Moore (Peru).
- *C. mossiae* : Easter Orchid, named for Mrs. Moss (N. Venezuela)
- *C. nobilior* : More noble Cattleya (WC. Brazil to Bolivia).
- *C. patinii* : named for Patin (Costa Rica to Venezuela, Trinidad) == *Guarianthe patinii*
- *C. percivaliana* : Christmas orchid, named for Percival (Colombia to W. Venezuela).
- *C. porphyroglossa* : Purple-lipped Cattleya (Brazil).
- *C. rex* : King of the Cattleyas (Colombia to N. Peru).
- *C. schilleriana* : named for Consul Schiller (Brazil).
- *C. schofieldiana* : named for Schofield (Brazil)
- *C. schroederae* : Easter Orchid, named for Baroness Schröder (NE. Colombia).
- *C. skinneri* : Flower of San Sebastian, Skinner's Cattleya (SE. Mexico to C. America) == *Guarianthe skinneri*
- *C. tenuis* : Slender-stemmed Cattleya (NE. Brazil).
- *C. tigrina* (SE. & S. Brazil).
- *C. trianae* : Dr. Triana's Cattleya (Colombia).
- *C. velutina* : Velvety Cattleya (Brazil) $2n = 40$
- *C. violacea* : Superba of the Orinoco, Brazil, Guyana, Violet Cattleya (S. Trop. America).
- *C. walkeriana* : Walker's Cattleya (WC. & SE. Brazil).
- *C. wallisii: "Wallis' Cattleya"* (N. Brazil).
- *C. warneri* : Warner's Cattleya (E. Brazil).
- *C. warscewiczii* : Warscewicz's Cattleya (Colombia).

Sensu MMX

In 2009, the genus *Sophronitis* was merged into *Cattleya*, adding the following species (some of which belong to the genus *Sophronitis* sensu MCMXCIX, and many of which belong to the genus *Laelia* sensu MCMXCIX:

Cattleya (Sophronitis) coccinea

- *C. acuensis* (Fowlie) Van den Berg, 2008: **Açu Sophronitis** (Brazil - Rio de Janeiro).
- *C. alaorii* (Brieger & Bicalho 1976) Van den Berg 2008: **Alaor's Laelia** (Brazil - Bahia).
- *C. alagoensis* (V.P.Castro & Chiron) Van den Berg 2008: (Brazil - Alagoas)
- *C. alvaroana* (F.E.L.Miranda 1999) Van den Berg 2008: (Brazil - Rio de Janeiro).
- *C. angereri* (Pabst 1975) Van den Berg 2008: **Angerer's Laelia** (Brazil - Minas Gerais).
- *C. bicalhoi* (Rchb.f. 1876) Van den Berg 2008: **Day's Laelia** (Brazil - S. Minas Gerais to Rio de Janeiro).

- *C. blumenscheinii* (Pabst 1975) Van den Berg 2008: **Blumenschein's Sophronitis** (Brazil - Minas Gerais).
- *C. bradei* (Pabst 1973) Van den Berg 2008: **Brade's Laelia** (Brazil - Minas Gerais).
- *C. brevicaulis* (H.G.Jones 1972) Van den Berg 2008: **Short stemmed Hoffmannseggella** (Brazil).
- *C. brevipedunculata* ((Cogn. 1902) Fowlie 1972)Van den Berg 2008 : **Short-stalked Sophronitis** (Brazil - Minas Gerais).
- *C. briegeri* (Blumensch. ex Pabst 1973) Van den Berg 2008: **Laelia Briegeri** (Brazil - Minas Gerais).
- *C. britoi* (K.G.Lacerda & V.P.Castro) Campacci: **Brito's Sophronitis** (Brazil - Minas Gerais) == *S. crispata* x *S. neomirandae*
- *C. caulescens* (Lindl.1841) Van den Berg 2008: **Laelia crispilabia** (Brazil - Minas Gerais).
- *C. cernua* (Lindl. 1828) Beer 1854: *Sophronitis cernua'* (Brazil to NE. Argentina). This was the type species for the now defunct genus *Sophronitis*
    - *Sophronitis cernua* var. *alagoensis* (Gomes Ferreira 1998) (Brazil - Alagoas).
    - *Sophronitis cernua* Lindl. var. *cernua* (Brazil to NE. Argentina) Lindley published this in 1828 as *Sophronitis modesta*.
- *C. cinnabarina* (Bateman ex Lindl. 1839) Van den Berg 2008: **Cinnabar Sophronitis** (Brazil - S. Minas Gerais, Rio de Janeiro).
- *C. coccinea* (Lindl. 1836!)Rchb.f. 1861): **Scarlet Cattleya** (Brazil to Argentina - Misiones).
- *C. colnagoi* (Chiron & V.P.Castro 2005) Van den Berg 2008: **Colnago's Hoffmannseggella** (Brazil - Minas Gerais).
- *C. conceicionensis* (V.P.Castro & Campacci 2002) Van den Berg 2008: **Hoffmannseggella of Conceição do Mato Dentro** (Brazil - Minas Gerais)
- *C. crispa* (Lindl.! 1828)Rchb.f. 1853: **Crisped Laelia** (SE. Brazil)
- *C. crispata* (Thunb.1818) Van den Berg 2008: **Crisped Cymbidium** (Brazil - Minas Gerais), Accepted for many decades by the RHS as *Laelia flava* Lindl.1839.

Cattleya (Laelia) purpurata

- *C. dichroma* (F.E.L.Miranda 1991) Van den Berg 2008: **Two-colored Sophronitis** (Brazil - Rio de Janeiro).
- *C. duveenii nom. illeg.* (Fowlie 1988) Van den Berg & M.W.Chase: **Duveen's Laelia** (Brazil - Minas Gerais: Serra do Cipó). This is not to be confused with *C. x duveenii* Pabst & A.Ferreira(1977) == *C. guttata* x *C. harrisoniana*
- *C. endsfeldzii* (Pabst) Van den Berg 2008: **Endsfeldz's Laelia** (Brazil - Minas Gerais).
- *C. esalqueana* (Blumensch. ex Pabst 1973) Van den Berg 2008: **ESALQ's Laelia** (Brazil - Minas Gerais).
- *C. fidelensis* (Pabst 1967) Van den Berg 2008: **São Fidélis Laelia** (Brazil - Rio de Janeiro).

- *C. flavasulina* (F.E.L.Miranda & K.G.Lacerda 2003) Van den Berg 2008: **Southern Yellow Hoffmannseggella** (Brazil - Minas Gerais)
- *C. fournieri* (Cogn. 1897) Van den Berg 2008: **Fournier's Laelia longipes** (Brazil - Minas Gerais)
- *C. ghillanyi* (Pabst 1973) Van den Berg 2008: **Ghilany's Laelia** (Brazil - Minas Gerais).
- *C. gloedeniana* (Hoehne 1934) Van den Berg 2008: **Gloeden's Laelia** (Brazil - São Paulo).
- *C. gracilis* (Pabst 1979) Van den Berg 2008: **Delicate Laelia** (Brazil - Minas Gerais: Serra do Cipó).
- *C. grandis* (Lindl. 1859) A.A.Chadwick 2006: **Large Laelia** (Brazil - SE. Bahia to N. Espírito Santo).
- *C. harpophylla* (Rchb.f. 1873) Van den Berg 2008: **Sickle-leaf Laelia** (Brazil - Minas Gerais to Espírito Santo).
- *C. hispidula* (Pabst & A.F.Mello 1978) Van den Berg 2008: **Finely Bristled Laelia** (Brazil - Minas Gerais).
- *C. hoehnei* Van den Berg 2008: **Hoehn's Cattleya** (Brazil - Espírito Santo). Hoehn originally described this (in 1938) as *Laelia mixta*
- *C. itambana* (Pabst 1973) Van den Berg 2008: **Itambé Laelia** (Brazil - Minas Gerais).
- *C. jongheana* (Rchb.f. 1872) Van den Berg 2008: **Jonghe's Laelia** (Brazil - Minas Gerais).
- *C. kautskyana* (V.P.Castro & Chiron 2003) Van den Berg 2008: **Kaustsky's Hoffmannseggella** (Brazil - Espírito Santo).
- *C. kettieana* (Pabst 1976) Van den Berg & M.W.Chase: **Kettie's Laelia** (Brazil - Minas Gerais)
- *C. lietzelburgii* (Schltr. 1921) Van den Berg 2008: **Bahian Sophronitis** (Bahia Laelia).
- *C. liliputana* (Pabst 1973) Van den Berg 2008: **Dwarf Laelia** (Brazil - Minas Gerais: Serra do Ouro Branco).
- *C. lobata* Lindl. 1848: **Lobed Cattleya** (SE. Brazil.) Known for decades as *Laelia lobata*
- *C. longipes* (Rchb.f. 1863) Van den Berg 2008: **Long-foot Laelia** (SE. Brazil - Serra do Cipó).
- *C. lundii* (Rchb.f. & Warm. 1881) Van den Berg 2008: **Lund's Laelia** (Bolivia to Argentina - Misiones, Salta).
    - *Sophronitis lundii* f. *alba* (L.C.Menezes) Van den Berg & M.W.Chase
- *C. mantiqueirae* (Fowlie 1972) Van den Berg 2008: **Mantiqueira Sophronitis** (SE. Brazil).
- *C. marcaliana* (Campacci & Chiron 2002) Van den Berg 2008: **Marçal's Dungsia** (Brazil - Bahia).
- *C. milleri* (Blumensch. ex Pabst 1973) Van den Berg 2008: **Miller's Sophronitis** (Brazil - Minas Gerais).

Cattleya (Laelia) sincorana

- *C. munchowiana* (F.E.L.Miranda 1999) Van den Berg 2008: **Munchow's Laelia** (Brazil - Espírito Santo).
- *C. mirandae* (K.G.Lacerda & V.P.Castro 2005) Vam dem Berg 2008: **Miranda's Hoffmannseggella** (Brazil - Minas Gerais).
- *C. neokautskyi* (Pabst 1970) Van den Berg 2008: **Kautsky's Laelia** (SE. Brazil)
- *C. pabstii* (F.E.L.Miranda & K.G.Lacerda 2003) Van den Berg 2008: **Pabst's Hoffmannseggella** (Brazil - Minas Gerais)
- *C. pendula* (R.C.Mota, P.L.Viana & K.G.Lacerda 2003) Van den Berg 2008: **Hanging Hoffmannseggella** (Brazil - Minas Gerais)
- *C. perrinii* Lindl. 1838: **Perrin's Cattleya** (SE. Brazil)

- *C. pfisteri* (Pabst & Senghas 1975) Van den Berg 2008: **Pfister's Laelia** (Brazil - Bahia).
- *C. praestans* (Rchb.f. 1857) Van den Berg 2008: **Spectacular Laelia** (SE. Brazil)
- *C. presidentensis* (Campacci 2005) Van den Berg 2008: **President's Hoffmannseggella** (Brazil - Minas Gerais).
- *C. pumila* Hook. 1838: **Dwarf Cattleya** (SE. & S. Brazil)
- *C. purpurata* (Lindl. & Paxton 1852) Van den Berg 2008: **Purple Laelia** (SE. & S. Brazil)
- *C. pygmaea* (Pabst 1976) Van den Berg 2008: **Small Orange Sophronitis** (Brazil - Espírito Santo).
- *C. reginae* (Pabst 1975) Van den Berg 2008: **The Queen's Laelia** (Brazil - Minas Gerais).
- *C. sanguiloba* (Withner 1990) Van den Berg 2008: **Red-lobed Laelia** (Brazil – Bahia)
- *C. sincorana* (Schltr 1917) Van den Berg 2008: **Sincorá Laelia** (Brazil - Bahia).
- *C. tenebrosa* (Rolfe 1893) A.A.Chadwick 2006: **Dark Laelia** (Brazil - SE. Bahia to Espírito Santo).
- *C. verboonenii* (F.E.L.Miranda 1993) Van den Berg 2008: **Verboonen's Laelia** (Brazil - Rio de Janeiro).
- *C. virens* (Lindl. 1844) Van den Berg 2008: **Green Laelia** (SE. Brazil)
- *C. wittigiana* (Barb. Rodr. 1878) Van den Berg 2008: **Wittig's Sophronitis** (Brazil - Espírito Santo).
    - *C. wittigiana* f. *candida* (Roeth & O.Gruss 2005) Van den Berg 2008
- *C. xanthina* (Lindl. 1859) Van den Berg 2008: **Yellow Laelia** (Brazil - Bahia to Espírito Santo).

Natural Hybrids

- *Cattleya* × *brasiliensi* (= *C. bicolor* × *C. harrisoniana*) (Brazil) .
- *Cattleya* × *brymeriana* (= *C. violacea* × *C. wallisii*) (N. Brazil).
- *Cattleya x calimaniorum* Chiron & V.P.Castro (NE Brazil)
- *Cattleya* × *colnagiana* (Brazil).
- *Cattleya* × *dayana* (= *C. forbesii* × *C. guttata*) (Brazil).
- *Cattleya* × *dolosa* (= *C. loddigesii* × *C. walkeriana*): Dolose Cattleya, Crafty Cattleya, Deceitful Cattleya (Brazil).
- *Cattleya* × *dukeana* (*C. bicolor* × *C. guttata*) (SE. Brazil).
- *Cattleya* × *duveenii* (= *C. guttata* × *C. harrisoniana*) (SE. Brazil).
- *Cattleya* × *gransabanensis* (= *C. jenmanii* × *C. lawrenceana*) (Venezuela).
- *Cattleya* × *gravesiana* (= *C. lueddemanniana* × *C. mossiae*) (Venezuela).
- *Cattleya* × *guatemalensis* (= *C. aurantiaca* × *C. skinneri*) : Guatemalan Cattleya (SE. Mexico to C. America)
- *Cattleya* × *hardyana* (= *C. dowiana var.aurea* × *C. warscewiczii*): Hardy's Cattleya (Colombia).
- *Cattleya* × *hybrida* (= *C. guttata* × *C. loddigesii*) (SE. Brazil).
- *Cattleya* × *imperator* (= *C. granulata* × *C. labiata*) (NE. Brazil).
- *Cattleya* × *intricata* (=. *C. intermedia* × *C. leopoldii*) (S. Brazil).

- *Cattleya* × *isabella* (.= *C. forbesii* × *C. intermedia*) (SE. Brazil).
- *Cattleya* × *itatiayae* (SE. Brazil).
- *Cattleya* × *joaquiniana* (= *C. bicolor* × *C. walkeriana*) (Brazil) .
- *Cattleya* × *kautskyi* (= *C. harrisoniana* × *C. warneri*) (SE. Brazil).
- *Cattleya* × *lucieniana* (= *C. forbesii* × *C. granulosa*) (SE. Brazil).
- *Cattleya* × *measuresii* (= *C. aclandiae* × *C. walkeriana*) (E. Brazil).
- *Cattleya* × *mesquitae* (= *C. nobilior* × *C. walkeriana*) (Brazil).
- *Cattleya* × *mixta* (= *C. guttata* × *C. schofieldiana*) (Brazil).
- *Cattleya* × *moduloi* (*C. schofieldiana* × *C. warneri*) (Brazil).
- *Cattleya* × *patrocinii* (= *C. guttata* × *C. warneriana*): Patrocinio's Cattleya (SE. Brazil).
- *Cattleya* × *picturata* (= *C. guttata* × *C. intermedia*) (SE. Brazil).
- *Cattleya* × *resplendens* (= *C. granulosa* × *C. schilleriana*) (NE. Brazil)
- *Cattleya* × *scita* (= *C. intermedia* × *C. tigrina*) (S. Brazil).
- *Cattleya* × *tenuata* (= *C. elongata* × *C. tenuis*) (Brazil) .
- *Cattleya* × *undulata* (= *C. elongata* × *C. schilleriana*) (Brazil).
- *Cattleya* × *venosa* (= *C. forbesii* × *C. harrisoniana*) (Brazil).
- *Cattleya* × *victoria-regina* (*C. guttata* × *C. labiata*) (NE. Brazil).
- *Cattleya* × *wilsoniana* (= *C. bicolor* × *C. intermedia*). (Brazil).
- *Cattleya* × *zayrae* V.P.Castro & Cath (Bahia, Brazil)

Hybrids

Cattleyas have been hybridized both within the genus and with related genera for more than a century, but the last several decades have seen a remarkable increase in both the quantity and quality of the hybrids within the *Cattleya* alliance. Among the most popular are the Brassolaeliocattleya (Blc.) and Sophrolaeliocattleya (Slc.) hybrids. The vast majority of the Blc. hybrids have recently been moved into the new nothogenus Rhyncholaeliocattleya (Rlc.); the Slc. mostly into *Cattleya*, with a few in Laleliocattleya (Lc.)

Laelia (L.): Breeding with this genus refines the lip of the orchid, producing a more elongated closed "cone" that gracefully opens into the full lip of the blossom. Some species of *Laelia* also contribute an intense violet shade. *Laelia* + *Cattleya* = Laeliocattleya, the basis for many more complex and highly popular hybrids. Most species of *Laelia* (the "Brasilian *Laelias*") were merged into *Cattleya* in the first decade of the third millennium, after a brief sojourn in *Sophronitis*.

Brassavola (B.): Most crosses with *Brassavola* are actually done with the *Ryncholaelia digbyana*, which was moved out of the *Brassavola* genus but was still considered such in naming the hybrid for many years. This cross is made in order to effect the fabulous "fringed", "feathered" or "ruffled" lip of the bloom; it also expands the lip of the blossom and the most imposing cattleya hybrids almost always have this species in their ancestry. These are usually the largest of the major cattleya hybrids. *Brassavola* + *Cattleya* = Brassocattleya, *Brassavola* + *Laelia* + *Cattleya* = Brassolaeliocattleya. Most, but not all, of these hybrids are now placed in Rhyncholaeliocattleya.

Sophronitis (Soph.): A tiny, flame-colored orchid that introduces the most intense red color to its descendants. Many crimson and scarlet cattleya hybrids betray sophronitis in their ancestry. *Sophronitis* is also used to miniaturize cattleya hybrids. *Sophronitis* + *Laelia* + *Cattleya* = Sophrolaeliocattleya. *Sophronitis* was recently merged into *Cattleya*, after being expanded to include most of the *Laelia* species.

Potinara (Pot.): The combination of all three of the above with a *Cattleya*. Potinaras are not as popular as Blc's or Slc's, but there are some incredible examples coming in all ranges of colors from light green to magenta. Although it is not a rule, they are generally smaller than Blc's but larger than Slc's. The recent merging of *Sophronitis* into *Cattleya* extinguished the nothogenus Potinara; most former Potinaras are now in the nothogenus Rhyncholaeliocattleya (Rlc.)

Yamadara (Yam.): The cross of the Blc combination with an [*Epidendrum*]. The addition of *Epidendrum* appears to increase flower yield, and some Yamadaras are intensely colored. With the recent discovery that the first Yamadara was registered as Adamara, the nothogeneric epithet Yamadara has been extinguished and replaced with Adamara.

Hawkinsara (Hknsa.): The Slc combination crossed with *Broughtonia*. Smaller, often magenta/reddish flowers. Many of these are now classified in the nothogenus Cattleytonia (Ctna.)

Cattleyas can be crossed with a large number of other allied genera, including *Cattleyopsis*, *Caularthron*, *Schomburgkia*, *Tetramicra*, etc. Hybridization can go all the way up to eight parent genera, such as *Brassavola* x *Broughtonia* x *Cattleya* x *Cattleyopsis* x *Caularthron* x *Epidendrum* x *Laelia* x *Sophronitis* in Gladysyeeara.

Marcel Proust

The phrase "to do a cattleya" is used as a cryptic metaphor for lovemaking by the characters Odette and Swann in Marcel Proust's *Remembrance of Things Past*.

Chapter 4

Abutilon

Abutilon

Abutilon indicum

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Rosids
Order:	Malvales
Family:	Malvaceae
Subfamily:	Malvoideae
Tribe:	Malveae
Genus:	***Abutilon*** Mill.

Synonyms

Abortopetalum O.Deg.

Abutilon × *hybridum* cultivar 'Patrick Synge'

Abutilon is a large genus of approximately 150 species of broadleaf evergreens in the mallow family, Malvaceae. The genus includes annuals, perennials, shrubs, and small trees from 1–10 m tall, and is found in the tropical and subtropical regions of all continents. The leaves are alternate, unlobed or palmately lobed with 3-7 lobes. The flowers are conspicuous, with five petals, mostly red, pink, orange, yellow or white.

Common names include **Abutilon**, **Chinese Bell Flower**, **Chinese Lantern**, **Mallow**, **Indian Mallow**, and **Flowering Maple** (for the maple-like leaves of some species, although the genus is not related to the true maples). The generic name is derived from the Arabic word *aubutilun*.

Abutilon species are used as food plants by the larvae of some lepidoptera species including Yellow-banded Skipper (which feeds exclusively on *A. avicennae*) and *Chionodes mariona*.

Species

- *A. abutiloides* (Jacq.) Garcke – Bushy Abutilon
- *A. albescens* Miq.
- *A. auritum* (Wall. ex Link) Sweet – Asian Indian Mallow
- *A. bedfordianum* (Hook.) A.St.-Hil. – Bedford's Mallow
- *A. berlandieri* Gray ex S.Watson – Berlandier's Indian Mallow
- *A. bidentatum* A. Rich.
- *A. buchii* Urb.
- *A. darwinii* Hook.f. – Darwin's Mallow
- *A. eremitopetalum* Caum – Hiddenpetal Indian Mallow (Lānaʻi in Hawaii)
- *A. fruticosum* Guill. & Perr. – Texas Indian Mallow
- *A. giganteum* (Jacq.) Sweet
- *A. grandiflorum* G.Don
- *A. grandifolium* (Willd.) Sweet – Hairy Indian Mallow
- *A. greveanum* (Baill.) Hochr.
- *A. hirtum* (Lam.) Sweet – Hairy Abutilon
- *A. hulseanum* Torr. ex A.Gray
- *A. hypoleucum* A.Gray – Whiteleaf Indian Mallow
- *A. incanum* (Link) Sweet – Hoary Abutilon, Pelotazo (Southwestern United States, northern Mexico, Hawaii)
- *A. indicum* (L.) Sweet – Indian Mallow
- *A. insigne* Planch.
- *A. julianae* Endl.
- *A. lauraster* Hochr.
- *A. leonardi* Urb. – Woolly Abutilon
- *A. leucopetalum* (F.Muell.) F.Muell. ex Benth.
- *A. listeri* Baker f.
- *A. longicuspe* Hochst. ex A. Rich.
- *A. malacum* S. Watson – Yellow Indian Mallow
- *A. mauritianum* (Jacq.) Medik.
- *A. megapotamicum* A.St.-Hil. & Naudin – Trailing Abutilon
- *A. menziesii* Seem. – *Koʻoloaʻula* (Hawaii)
- *A. mollicomum* (Willd.) Sweet – Sonoran Indian Mallow
- *A. mollissimum*
- *A. muticum*
- *A. niveum* Griseb. – White-flowered Abutilon
- *A. palmeri* A.Gray – Palmer's Indian Mallow
- *A. parishii* A.Watson – Parish's Indian Mallow
- *A. parvulum* A.Gray – Dwarf Indian Mallow
- *A. pauciflorum* A.St.-Hil. – Woolly Abutilon
- *A. permolle* (Willd.) Sweet (Velvety Abutilon

- *A. pictum* (Gillies ex Hook.) Walp. – Redvein Abutilon, Red Vein Indian Mallow (syn. *A. striatum*)
- *A. purpurascens* (Link) K.Schum.
- *A. reflexum* (Juss. ex Cav.) Sweet
- *A. ramiflorum* A.St.-Hil.
- *A. reventum* S.Watson – Yellowflower Indian Mallow
- *A. sachetianum* Fosberg
- *A. sandwicense* (O.Deg.) Christoph. – Greenflower Indian Mallow (Oahʻu in Hawaii)
- *A. sellowianum* (Klotzsch) Regel
- *A. theophrasti* Medik. – Velvetleaf, Indian Mallow, Butterweed
- *A. thurberi* A.Gray – Thurber's Indian Mallow
- *A. thyrsodendron* Griseb.
- *A. trisulcatum* (Jacq.) Britton & Millsp.
- *A. venosum* Lem.
- *A. virginianum* Krapov. – Virgin Islands Abutilon
- *A. wrightii* A.Gray

Hybrids

- *Abutilon* × *hybridum* – Chinese Lantern (unknown parentage)
- *Abutilon* × *milleri* (*A. megapotamicum* × *A. pictum*)
- *Abutilon* × *suntense* (*A. ochsenii* × *A. vitifolium*)

Formerly placed here

- *Bakeridesia integerrima* (Hook.) D.M.Bates (as *A. chittendenii* Standl.)
- *Briquetia spicata* (Kunth) Fryxell (as *A. spicatum* Kunth)
- *Corynabutilon ochsenii* (Phil.) Kearney (as *A. ochsenii* (Phil.) Reiche)
- *Corynabutilon vitifolium* (Cav.) Kearney (as *A. vitifolium* (Cav.) C.Presl)

Cultivation and uses

Abutilons are popular garden plants in subtropical areas. The hardiest species, *A. vitifolium* from Chile, is hardy in warm temperate areas with moderate frost down to about −10 °C (14.0 °F)

Abutilon × *hybridum* is a popular group of hybrids that are semi-tropical, frost-tender shrubs typically growing 2–3 m tall. The lantern-like buds open to solitary, pendulous, bell- to cup-shaped flowers to 8 cm diameter with five overlapping petals and significant staminal columns typical of the mallow family. Flowers come in red, pink, yellow, white and pastel shades. Lobed, maple-like, light green leaves are often variegated with white and yellow.

Abutilon hirtum

A. incanum (Hoary Abutilon)

Flower of *A. megapotamicum*

A. menziesii (Kooloaula)

A. menziesii flowers

A. pictum

Houseplant with tag "Bella Red Flowering Maple"

Chapter 5

Amborella and Barclaya

Amborella

Amborella

Amborella buds

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
Order:	Amborellales
Family:	Amborellaceae
Genus:	***Amborella*** Baill.
Species:	***A. trichopoda***

Binomial name
Amborella trichopoda Baill.

Amborella trichopoda is a rare understory shrub or small tree found only on the island of New Caledonia. Its wood lacks the vessels characteristic of most flowering plants. It is of great interest in flora taxonomy because modern molecular phylogenetics data place it at or near the base of the flowering plants. That is, it represents a line of flowering plants

that diverged very early on (about 130 million years ago) from all the other extant species of flowering plants. Comparing characteristics of this extant basal angiosperm, more derived flowering plants, and the fossil flowering plants may provide clues about the characteristics of early flowering plants and how they have evolved, or changed through time.

Amborella trichopoda is a sprawling shrub or small tree with two-ranked leaves without stipules. The leaves are alternately arranged, evergreen, simple, with serrated and rippled margins, and about 8–10 cm long. The plant is dioecious: each flower produces both stamens and carpels, but only one sex develops fully and is fertile in the flowers of an individual plant, the structures of the other sex remaining undeveloped. The small flowers, 4–8 mm across, are in terminal cymose inflorescences or clusters, each flower with a perianth of undifferentiated tepals arranged in a spiral, rather than in the whorls of more derived flowers. The fruit is a red berry containing a single seed, 5–8 mm long.

It is placed alone in family Amborellaceae. In the most recent APG system, APG III, the Amborellaceae is placed in the monotypic order Amborellales at the base of the angiosperm cladogram.

Individuals of this species in the wild are being reduced by habitat destruction due to overgrazing, fire, mining (one of the most pervasive causes of ecosystem loss in New Caledonia), and urban expansion.

Amborella trichopoda Plant

Amborella trichopoda Branch and leaves

Amborella trichopoda Branch and leaves

Amborella trichopoda Branch and leaves

Amborella trichopoda Leaf

Amborella trichopoda Branch and leaves

Amborella trichopoda Flowers

Amborella trichopoda Flowers

Amborella trichopoda Flowers

Amborella trichopoda Flowers

Amborella trichopoda Flowers

Amborella trichopoda Flowers and leaves

Barclaya

Barclaya	
Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
Order:	Nymphaeales
Family:	Nymphaeaceae
Genus:	***Barclaya*** Wallich

Barclaya is a genus of 3 - 4 species of flowering plants usually included in the family Nymphaeaceae but sometimes given their own family status as Barclayaceae on the basis of an extended perianth tube (combined sepals and petals) arising from the top of the ovary and by stamens that are joined basally. *Barclaya* are aquatic plants native to tropical Asia. The genus was named in honour of the English gardener and plant collector G. W. Barclay.

Synonym

Hydrostemma is a name that takes precedence over the name *Barclaya*, on account of having been published 6 months earlier. However, the name *Barclaya*, being much better known than *Hydrostemma*, has been "conserved" and *Hydrostemma* is therefore a synonym of *Barclaya*.

Taxonomy

Recent morphological and genetic studies support the view that *Barclaya* should be retained in the family Nymphaeaceae.

Description

Plants grow from egg-shaped tubers that produce short runners and a basal rosette of leaves. All leaves are submerged.

Species

- *Barclaya longifolia* Hochst. ex A.Rich.
- *Barclaya kunstleri* (King) Ridley
- *Barclaya motleyi* Hook.f.
- *Barclaya rotundifolia* Hotta

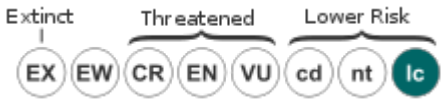
Chapter 6

Darlingtonia Californica

Cobra Lily

Darlingtonia's translucent leaves confuse insects trying to escape

Conservation status



Least Concern (IUCN 2.3)

Scientific classification

Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Asterids
Order:	Ericales
Family:	Sarraceniaceae
Genus:	***Darlingtonia***
Species:	***D. californica***

Binomial name

Darlingtonia californica
Torr. (1853)

Darlingtonia distribution

Synonyms

- *Chrysamphora californica*
  (Torr.) Greene (1891)

Darlingtonia californica also called the **California Pitcher plant**, **Cobra Lily**, or **Cobra Plant**, is a carnivorous plant, the sole member of the genus *Darlingtonia* in the family Sarraceniaceae. It is native to Northern California and Oregon, growing in bogs and seeps with cold running water. This plant is designated as uncommon due to its rarity in the field.

The name Cobra Lily stems from the resemblance of its tubular leaves to a rearing cobra, complete with a forked leaf - ranging from yellow to purplish-green - that resemble fangs or a serpent's tongue.

The plant was discovered in 1841 by the botanist William D. Brackenridge at Mount Shasta. In 1853 it was described by John Torrey, who named the genus *Darlingtonia* after the Philadelphian botanist William Darlington (1782-1863).

Biology

Note the small entrance to the trap underneath the swollen 'balloon', and the colourless patches that confuse prey trapped inside

The cobra lily is not only restricted to nutrient-poor acidic bogs and seepage slopes, but many colonies actually thrive in Ultramafic soils, which are in fact basic soils, within its range. In common with most carnivorous plants, the cobra lily is adapted to supplementing its nitrogen requirements through carnivory which helps to compensate for the lack of available nitrogen in such habitats.

The cobra lily is unique among the three genera of American pitcher plants. It does not trap rainwater in its pitcher. Instead, it regulates the level of water inside physiologically by releasing or absorbing water into the trap that has been pumped up from the roots. It was once believed that this variety of pitcher plant did not produce any digestive enzymes and relied on symbiotic bacteria and protozoa to break down the captured insects into easily absorbed nutrients. Recent studies have indicated that *Darlingtonia* secretes at least one proteolytic enzyme that digests captured prey. The cells that absorb nutrients from the inside of the pitcher are the same as those on the roots that absorb soil nutrients. The efficiency of the plants trapping ability is attested to by its leaves and pitchers which are, more often than not, full of insects and their remains.

In addition to the use of lubricating secretions and downward-pointing hairs common to all pitcher plants to force their prey into the trap, this species carefully hides the tiny exit hole from trapped insects by curling it underneath and offering multiple translucent false exits. Upon trying many times to leave via the false exits, the insect will tire and fall down into the trap. The slippery walls and hairs prevent the trapped prey from escaping. The only other species that utilizes this technique is the Parrot Pitcher Plant, *Sarracenia psittacina*.

A remaining mystery surrounding the cobra lily is its means of pollination. Its flower is unusually shaped and complex, typically a sign of a close pollinator-plant specialization, but none have been identified. The flower is yellowish purple in color and grows on a stalk with a similar length to the stalk. It has five sepals, green in color, which are longer than the red-veined petals. While pollination has not yet been observed in action, it is generally expected that the pollinator is either a fly attracted to the flower's unpleasant smell or some nocturnal insect, as no extensive study has been performed to observe potential nighttime pollinators.

Care in cultivation

Plants in cultivation

The *Darlingtonia californica* can be one of the most difficult carnivorous plants to keep in cultivation, but this depends on the area in which they are cultivated. They prefer cool

to warm day-time temperatures and cold or cool night-time temperatures. The problem is that cobra lilies typically grow in bogs or streambanks that are fed by cold mountain water, and grow best when the roots are kept cooler than the rest of the plant. It is best to mimic these conditions in cultivation, and water the plants with cold, purified water. On hot days, it helps to place ice cubes of purified water on the soil surface. They prefer sunny conditions if in a humid, warm location, and prefer part-shade if humidity is low or fluctuates often. Plants can adapt to low humidity conditions, but optimum growth occurs under reasonable humidity.

A single plant in cultivation, clearly showing the first pitcher of the season. The first few pitchers at the beginning of each growing season are much larger than the others

Growing cobra lilies from seed is extremely slow and cobra seedlings are difficult to maintain, so these plants are best propagated from the long stolons they grow in late winter and spring. When a minute cobra plant is visible at the end of the stolon (usually in mid to late spring), the whole stolon may be cut into sections a few inches long, each with a few roots attached. Lay these upon cool, moist, shredded long-fibered sphagnum moss and place in a humid location with bright light. In many weeks, cobra plants will protrude from each section of stolon.

Northernmost natural population

Like many other carnivorous plants, cobra lilies require a cold winter dormancy in order to live long-term. Plants die down to their rhizomes in frigid winters and will maintain their leaves in cool winters during their dormancy period. This period lasts from 3 to 5

months during the year, and all growth stops. As spring approaches, mature plants may send up a single, nodding flower, and a few weeks later the plant will send up a few large pitchers. The plant will continue to produce pitchers throughout the summer, however much smaller than the early spring pitchers.

Many carnivorous plant enthusiasts have succeeded in cultivating these plants, and have developed or discovered three color morphs: all green, all red, and red-green bicolor.

Chapter 7

Euryale Ferox and Nuphar

Euryale ferox

Euryale ferox

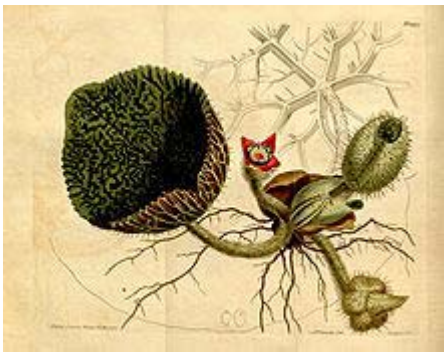
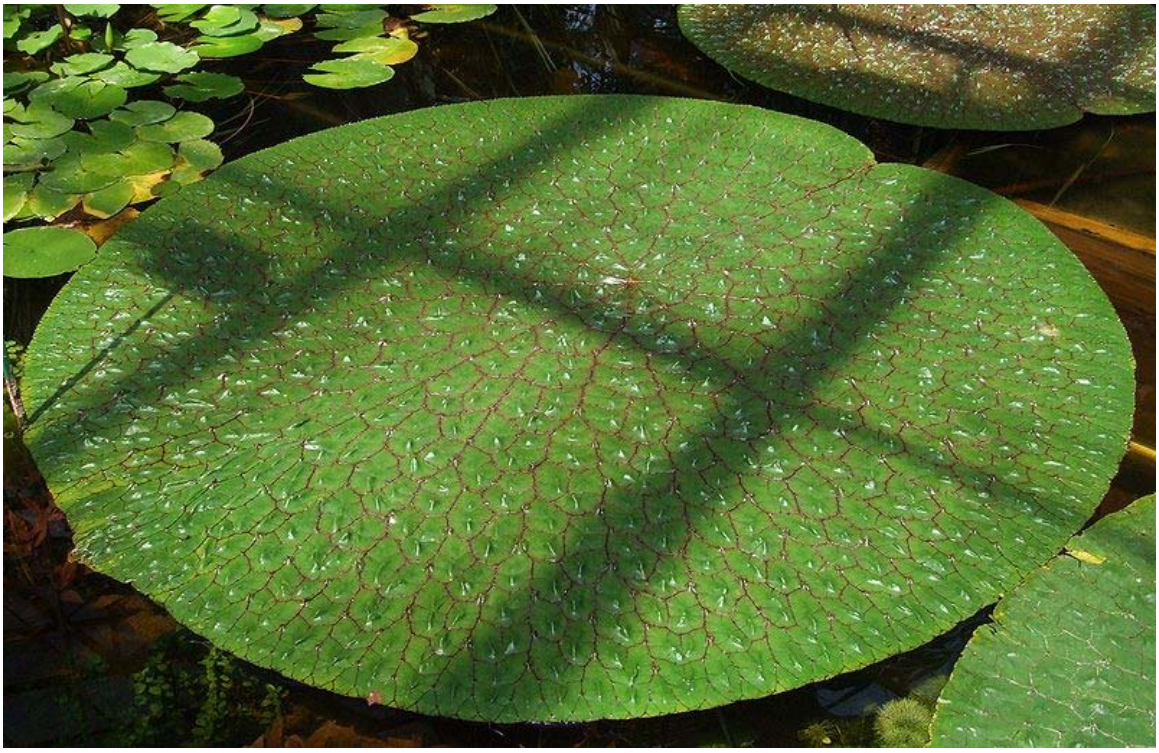


Illustration of *Euryale ferox* from *Curtis's Botanical Magazine* (1812).

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
Order:	Nymphaeales
Family:	Nymphaeaceae
Genus:	***Euryale*** Salisb.
Species:	***E. ferox***

Binomial name
Euryale ferox Salisb.



Leaves *Euryale ferox*

A pond of cultivated *Euryale* in northern India

Euryale ferox (also known as **fox nut**, **foxnut**, **makhana**, or **gorgon plant**) is the only species in the genus ***Euryale***. It is a flowering plant classified in the water lily family, Nymphaeaceae, although it is occasionally regarded as a distinct family **Euryalaceae**. Unlike other water lilies, the pollen grains of *Euryale* have three nuclei.

Growth

Euryale is an annual plant native to eastern Asia, and is found from India to Korea and Japan, as well as parts of eastern Russia. It grows in water, producing bright purple flowers. The leaves are large and round, often more than a meter (3 feet) across, with a leaf stalk attached in the center of the lower surface. The underside of the leaf is purplish, while the upper surface is green. The leaves have a quilted texture, although the stems, flowers, and leaves which float on the surface are covered in sharp prickles. Other leaves are submerged.

Uses

Food uses

The plant produces starchy white seeds, and the seeds are edible. The plant is cultivated for its seeds in lowland ponds in India, China, and Japan. The Chinese have cultivated the plant for over 3000 years. More than 96,000 hectares of Bihar, India, were set aside for cultivation of *Euryale* in 1990-1991. The plant does best in locations with hot, dry summers and cold winters. Seeds are collected in the late summer and early autumn, and may be eaten raw or cooked.

In India, particularly in the northern and western parts of the country, *Euryale ferox* seeds are often roasted or fried, which causes them to pop like popcorn. These are then eaten, often with a sprinkling of oil and spices. In Mithila culture of Mithilanchal,Bihar makhana is an auspicious ingredient in offerings to the Lord festivals and is used in cooking, specially to make a porridge/pudding called kheer of makhana or 'makhaanak kheer' or 'makhaanak payasam'.

Evidence from archaeobotany indicates that *Euryale ferox* was a frequently collected wild food source during the Neolithic period in the Yangtze region, with large numbers of finds coming from the sites of Kuahuqiao, Hemudu, and Tianluoshan

Medicinal uses

In Chinese, the plant is called *qiàn shí* (simplified Chinese: 芡实; traditional Chinese: 芡實). Its edible seeds are used in traditional Chinese medicine, where they are often cooked in soups along with other ingredients, and believed to strengthen male potency and retard aging.

Etymology

The name *Euryale* comes from the mythical Greek Gorgon by the same name. The Soviet Union issued a postage stamp featuring this species.

Nuphar

Nuphar

Nuphar lutea

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
Order:	Nymphaeales
Family:	Nymphaeaceae
Genus:	***Nuphar*** Sibth. & Sm.

Species

About 10-15 species, including:
Nuphar advena
Nuphar lutea
Nuphar pumila
Nuphar variegata

Nuphar is genus of aquatic plants in the family Nymphaeaceae, with a temperate Northern Hemisphere distribution. The common name, shared with some other genera in the same family, is **water lily** or **waterlily**.

There are from 1 to 25 species in the genus. Some botanists treat the genus as just a single variable species (for which the European name *N. lutea* has priority), but 10-12 species are typically accepted by most authorities. Recent molecular work has shown that there is some difference between the European and American species.

Nuphar pumila

The genus is closely related to *Nymphaea*. *Nuphar* differs in having its petals being much smaller than its 4-6 bright yellow-coloured sepals, whereas in *Nymphaea*, the petals are much larger than the sepals. The fruit maturation also differs, with *Nuphar* fruit being held above water level to maturity, whereas *Nymphaea* fruit sink below the water level immediately after the flower closes. Both genera share leaves with a radial notch from the circumference to the petiole (leaf stem) in the center.

The etymology of the word is: medieval Latin *nuphar*, from medieval Latin *nenuphar*, thence from Arabic *nīnūfar*, thence from Persian *nīlūfar*, thence from Sanskrit *nīlōtpala* = blue lotus flower.

Selected species

- *Nuphar advena* (Aiton) W.T.Aiton
- *Nuphar japonica* DC.
- *Nuphar kalmiana*
- *Nuphar lutea* (L.) Sm. – Yellow Water-lily
- *Nuphar microphylla* (Pers.) Fernald
- *Nuphar orbiculata*
- *Nuphar polysepala*
- *Nuphar pumila* – Least Water-lily

- *Nuphar rubrodisca*
- *Nuphar saggitifolia*
- *Nuphar shimadae*
- *Nuphar ulvacea*
- *Nuphar variegata*

Chapter 8

Nymphaea and Castor Oil Plant

Nymphaea

Nymphaea

Nymphaea 'Peach Glow'

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
Order:	Nymphaeales
Family:	Nymphaeaceae
Genus:	***Nymphaea*** L.

Species

About 50 species, including:
Nymphaea alba - European White Water-lily
Nymphaea amazonum
Nymphaea ampla

Nymphaea blanda
Nymphaea caerulea - Egyptian Blue Water-lily
Nymphaea calliantha
Nymphaea candida
Nymphaea capensis - Cape Blue Water-lily
Nymphaea citrina
Nymphaea colorata
Nymphaea elegans
Nymphaea fennica
Nymphaea flavovirens
Nymphaea gardneriana
Nymphaea gigantea - Australian Water-lily
Nymphaea heudelotii
Nymphaea jamesoniana
Nymphaea leibergii - Dwarf Water-lily
Nymphaea lotus - Egyptian White Water-lily
Nymphaea lotus var. termalis
Nymphaea macrosperma - Native to Australia's Top End
Nymphaea mexicana - Yellow Water-lily
Nymphaea micrantha
Nymphaea nouchali - Red and blue water lily (National flower of Sri Lanka)
Nymphaea odorata - Fragrant Water-lily
Nymphaea pubescens - Hairy water lily (National flower of Bangladesh)
Nymphaea rubra - India Red Water-lily
Nymphaea rudgeana
Nymphaea stuhlmannii
Nymphaea sulfurea
Nymphaea tetragona - Pygmy Water-lily
Nymphaea thermarum

Nymphaea is a genus of aquatic plants in the family Nymphaeaceae. There are about 50 species in the genus, which has a cosmopolitan distribution.

Name

The common name, shared with some other genera in the same family, is Water Lily.

The name *Nymphaea* comes from the Greek term "Νυμφαία", possibly related to "Νύμφη" meaning "nymph". The nymphs in Greek mythology were supernatural feminine beings associated with springs, so the application of the name to delicately flowered aquatic plants is understandable.

Description

Nymphaea leaves have a radial notch from the circumference to the petiole (leaf stem) in the center.

Classification

Despite their name, water-lilies are not related to the true lilies (family Liliaceae). The name "lily" is applied to a number of plants that are not at all closely related, such as day lilies, spider lilies and arum lilies, in addition to the water lilies. *Nymphaea* (Egyptian lotuses) are also not related to the Chinese and Indian lotus of genus *Nelumbo*, which are used in Asian cooking and sacred to Hinduism and Buddhism.

However, the genus *Nymphaea* is closely related to *Nuphar*, another genus commonly called "lotus". In *Nymphaea*, the flower petals are much larger than the sepals, whereas in *Nuphar* the petals are much smaller than its sepals. The fruit maturation also differs, with *Nymphaea* fruit sinking below the water level immediately after the flower closes, whereas *Nuphar* fruit are held above water level to maturity. Both genera share leaves with a radial notch from the circumference to the petiole (leaf stem) in the center.

Cultural significance

Blue lotus symbol (*Nymphaea caerulea*) among other ancient Egyptian symbols on an 18th Dynasty jar. Found at Amarna in the 19th century.

The ancient Egyptians revered the Nile water-lilies, or **lotuses** as they were also called. The lotus motif is a frequent feature of temple column architecture.

The Egyptian Blue Water-lily, *N. caerulea*, opens its flowers in the morning and then sinks beneath the water at dusk, while the Egyptian White Water-lily, *N. lotus*, flowers at night and closes in the morning. This symbolizes the Egyptian separation of deities and is a motif associated with Egyptian beliefs concerning death and the afterlife. The recent discovery of psychedelic properties of the blue lotus may also have been known to the

Egyptians and explain its ceremonial role. Remains of both flowers have been found in the burial tomb of Ramesses II.

A syrian terra-cotta plaque from the 14th-13th century B.C.E. shows the goddess Asherah holding two lotus blossoms. An ivory panel from the 9th-8th century B.C.E. shows the god Horus seated on a lotus blossom, flanked by two Cherubs.

The French painter Claude Monet is famous for his paintings of water lilies.

Cultivation

Many of the water-lilies familiar in water gardening are hybrids.

Taxonomy

Nymphaea pubescens in Hyderabad, India.

Subdivisions of genus Nymphaea:

Subgenus:
Anecphya
Brachyceras

Hydrocallis
Lotos
Nymphaea:
Nymphaea Chamaenymphaea
Nymphaea Nymphaea
Nymphaea Xanthantha

Nymphaea alba

Nymphaea ampla

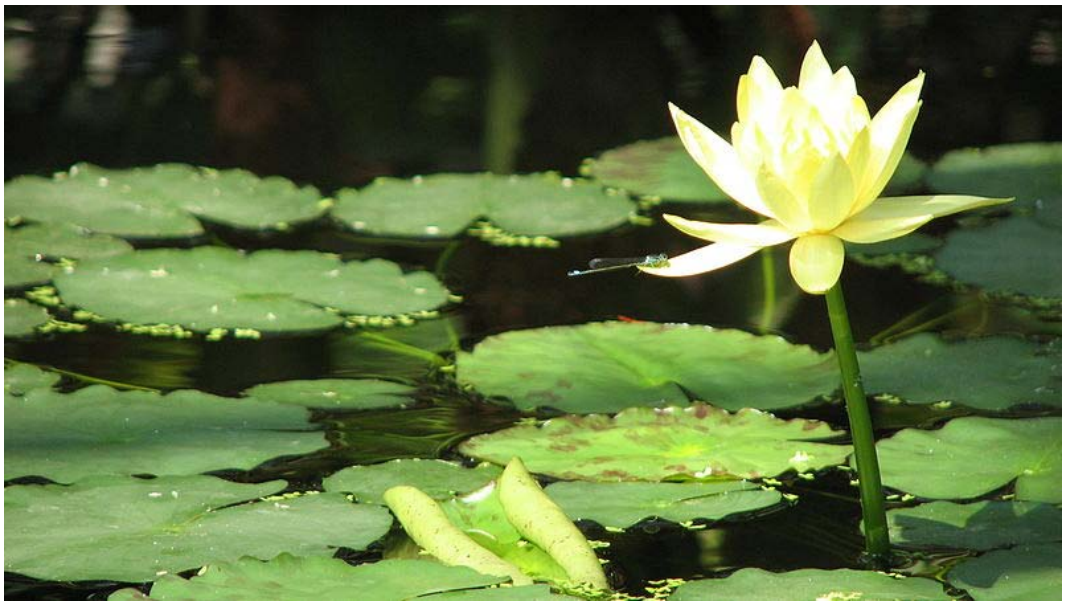
Nymphaea capensis

Nymphaea colorata

Nymphaea × daubenyana

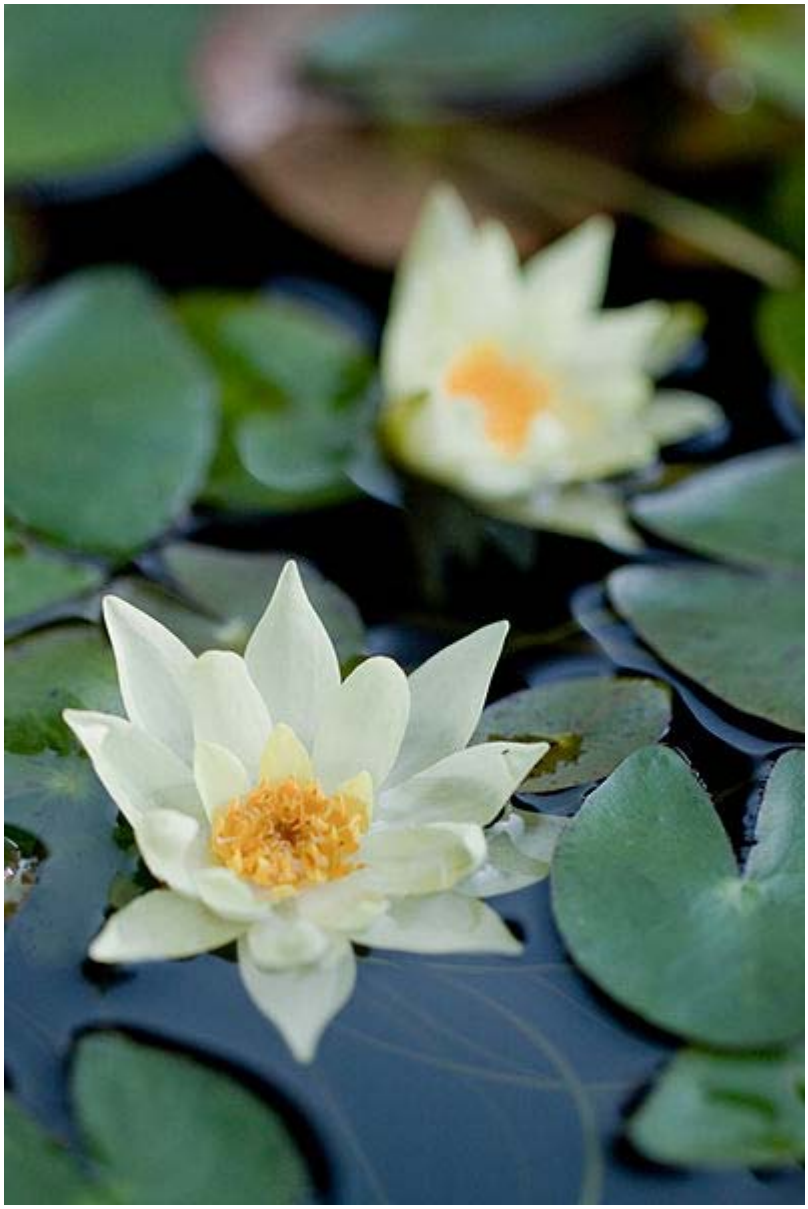
Nymphaea gigantea

Nymphaea lotus



Nymphaea mexicana

Nymphaea nouchali



Nymphaea pygmaea

Castor oil plant

Ricinus communis **Castor oil plant**

Castor bean in disturbed area

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Rosids
Order:	Malpighiales
Family:	Euphorbiaceae
Subfamily:	Acalyphoideae
Tribe:	Acalypheae
Subtribe:	**Ricininae**
Genus:	***Ricinus***
Species:	***R. communis***

Binomial name

Ricinus communis
L.

The **castor oil plant**, ***Ricinus communis***, is a species of flowering plant in the spurge family, Euphorbiaceae. It belongs to a monotypic genus, *Ricinus*, and subtribe, Ricininae. The evolution of castor and its relation to other species is currently being studied.

Its seed is the castor bean which, despite its name, is not a true bean. Castor is indigenous to the southeastern Mediterranean Basin, Eastern Africa, and India, but is widespread throughout tropical regions (and widely grown elsewhere as an ornamental plant).

Castor seed is the source of castor oil, which has a wide variety of uses. The seeds contain between 40% and 60% oil that is rich in triglycerides, mainly ricinolein. The seed contains ricin, a toxin, which is also present in lower concentrations throughout the plant.

Another plant species, *Fatsia japonica*, is similar in appearance and is known as the *false castor oil plant*.

Description

Female (top) and male flowers

The castor oil plant can vary greatly in its growth habit and appearance. The variability has been increased by breeders who have selected a range of cultivars for leaf and flower colours, and for oil production. It is a fast-growing, suckering perennial shrub which can reach the size of a small tree (around 12 metres / 39 feet), but it is not cold hardy.

The glossy leaves are 15–45 centimetres (5.9–18 in) long, long-stalked, alternate and palmate with 5–12 deep lobes with coarsely toothed segments. In some varieties they start off dark reddish purple or bronze when young, gradually changing to a dark green, sometimes with a reddish tinge, as they mature. The leaves of some other varieties are green practically from the start, whereas in yet others a pigment masks the green colour of all the chlorophyll-bearing parts, leaves, stems and young fruit, so that they remain a dramatic purple-to-reddish-brown throughout the life of the plant. Plants with the dark leaves can be found growing next to those with green leaves, so there probably is only a single gene controlling the production of the pigment in some varieties at least. The stems (and the spherical, spiny seed capsules) also vary in pigmentation. The fruit capsules of some varieties are more showy than the flowers.

The flowers are borne in terminal panicle-like inflorescences of green or, in some varieties, shades of red monoecious flowers without petals. The male flowers are yellowish-green with prominent creamy stamens and are carried in ovoid spikes up to 15 centimetres (5.9 in) long; the female flowers, born at the tips of the spikes, have prominent red stigmas.

The fruit is a spiny, greenish (to reddish purple) capsule containing large, oval, shiny, bean-like, highly poisonous seeds with variable brownish mottling. Castor seeds have a warty appendage called the caruncle, which is a type of elaiosome. The caruncle promotes the dispersal of the seed by ants (myrmecochory).

Nomenclature

The name *Ricinus* is a Latin word for tick; the seed is so named because it has markings and a bump at the end which resemble certain ticks. The common name "castor oil" probably comes from its use as a replacement for castoreum, a perfume base made from the dried perineal glands of the beaver (*castor* in Latin). It has another common name, **palm of Christ**, or *Palma Christi*, that derives from castor oil's reputed ability to heal wounds and cure ailments.

Medicinal Uses (other than oil)

Alcoholic extract of the **leaf** was hepatoprotective in rats .,

Methanolic extracts of the **leaves** of *Ricinus communis* were used Antimicrobial testing against eight pathogenic bacteria in rats and showed antimicrobial properties. The extract was not toxic.

Pericarp of Castor bean showed CNS stimulant effects in mice at low doses. At lower doses, the extract improved memory consolidation. At high doses mice quickly died.

A water extract of the **root bark** showed analgesic activity in rats.

Antihistamine and anti-inflammatory properties found in ethanolic extract of Ricinus communis **root bark**.

Other uses

Extract of Ricinus communis, exhibited acaricidal and insecticidal activities against the adult of Haemaphysalis bispinosa Neumann (Acarina: Ixodidae) and hematophagous fly Hippobosca maculata Leach (Diptera: Hippoboscidae).

Habitat, growth and horticultural uses

In Greece it is hardy enough to grow as a small tree. In northern countries it is grown instead as an annual.

The first leaves ("teething leaves") produced are round, completely unlike all subsequent leaves which are severely serrated. This castor oil plant is about four weeks old.

Although castor is indigenous to the southeastern Mediterranean Basin, Eastern Africa, and India, today it is widespread throughout tropical regions. In areas with a suitable climate, castor establishes itself easily as an apparently "native" plant and can often be found on wasteland.

It is also used extensively as a decorative plant in parks and other public areas, particularly as a "dot plant" in traditional bedding schemes. If sown early, under glass, and kept at a temperature of around 20 °C (68 °F) until planted out, the castor oil plant can reach a height of 2–3 metres (6.6–9.8 ft) in a year. In areas prone to frost it is usually shorter, and grown as if it were an annual. However, it can grow well outdoors in cooler climates, at least in Southern England, and the leaves do not appear to suffer frost damage in sheltered spots, where it remains evergreen. It was used in Edwardian times in the parks of Toronto, Ontario, Canada.

Cultivars

Selections have been made by breeders for use as ornamental plants (heights refer to plants grown as annuals) and for commercial production of castor oil

Ornamental varieties:

- 'Gibsonii' has red-tinged leaves with reddish veins and pinkish-green seed pods;
- 'Carmencita Pink' is similar, with pinkish-red stems;
- 'Carmencita Bright Red' has red stems, dark purplish leaves and red seed pods;

(all the above grow to around 1.5 metres (4.9 ft) tall as annuals)

- 'Impala' is compact (only 1.2 metres / 3.9 feet tall) with reddish foliage and stems, brightest on the young shoots;
- 'Red Spire' is tall (2–3 metres/6.6–9.8 feet) with red stems and bronze foliage;
- 'Zanzibarensis' is also tall (2–3 metres/6.6–9.8 feet), with large, mid-green leaves (50 centimetres / 20 inches long) that have white midribs.

Varieties for oil production:

- 'Hale' was launched in the 1970s for the State of Texas, USA. It is short (up to 1.2 m) and has several racemes.
- 'Brigham' is a variety with reduced ricin content adapted for Texas, USA. It grows up to 1.8m and has 10% of the ricin content of variety Hale.
- 'BRS Nordestina' was developed by Embrapa (Brazil) 1990 for hand harvest and semi-arid environments.
- 'BRS Energia" was developed by Embrapa (2004) for mechanized or hand harvest.
- 'GCH6' was developed by Sardarkrushinaga Dantiwada University (India), 2004. It is resistant to root rot and tolerant to fusarium wilt.
- 'GCH5' was developed by Sardarkrushinaga Dantiwada University (India), 1995. It is resistant to fusarium wilt.
- 'Abaro' was developed by Ethiopian Institute of Agricultural Research, EORC(Ethiopia) for hand harvest.

Plant-animal interactions

Ricinus communis is the host plant of the Common Castor butterfly (*Ariadne merione*), the Eri silkmoth (*Samia cynthia ricini*), and the Castor Semi-Looper moth (*Achaea janata*). It is also used as a food plant by the larvae of some other species of Lepidoptera, including *Hypercompe hambletoni* and the Nutmeg (*Discestra trifolii*).

Toxicity

The toxicity of raw castor beans due to the presence of ricin is well-known. Although the lethal dose in adults is considered to be 4 to 8 seeds, reports of actual poisoning are relatively rare. According to the 2007 edition of the Guinness Book of World Records, this plant is the most poisonous in the world.

If ingested, symptoms may be delayed by up to 36 hours but commonly begin within 2–4 hours. These include a burning sensation in mouth and throat, abdominal pain, purging and bloody diarrhea. Within several days there is severe dehydration, a drop in blood

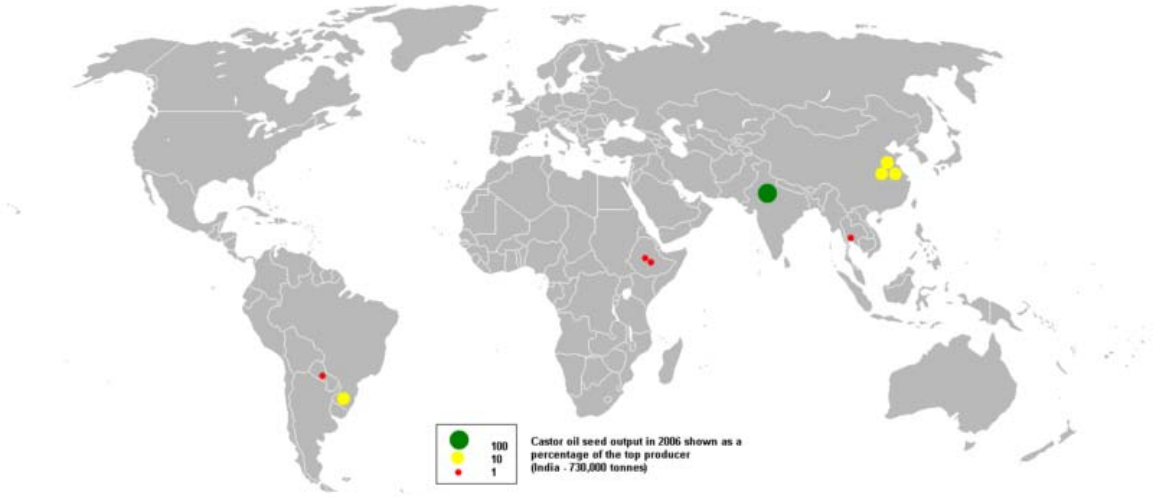
pressure and a decrease in urine. Unless treated, death can be expected to occur within 3–5 days, however in most cases a full recovery can be made.

Poisoning occurs when animals ingest broken seeds or break the seed by chewing: intact seeds may pass through the digestive tract without releasing the toxin. Toxicity varies among animal species: 4 seeds will kill a rabbit, 5 a sheep, 6 an ox or horse, 7 a pig, and 11 a dog. Ducks have shown incredible resistance to the seeds: it takes an average of 80 to kill them. The toxin provides the castor oil plant with some degree of natural protection from insect pests, such as aphids. In fact, ricin has been investigated for its potential use as an insecticide. The castor oil plant is also the source for undecylenic acid, a natural fungicide.

Chemistry

Three terpenoids and a tocopherol-related compound have been found in the **aerial parts** of *Ricinus communis*. Compounds named (3E,7Z,11E)-19-hydroxycasba-3,7,11-trien-5-one, 6α-hydroxy-10β-methoxy-7α,8α-epoxy-5-oxocasbane-20, 10-olide, 15α-hydroxylup-20(29)-en-3-one, and (2R,4aR, 8aR)-3,4,4a,8a-tetrahydro-4a-hydroxy-2,6,7,8a-tetramethyl-2-(4,8, 12-trimethyltridecyl)-2H-chromene-5,8-dione were isolated from the MeOH extracts of the of Ricinus communis L. by chromatographic methods.

Modern commercial usage



Castor oil seed output in 2006

Global castor seed production is around 1 million tons per year. Leading producing areas are India (with over 60% of the global yield), China and Brazil, and it is widely grown as a crop in Ethiopia. There are several active breeding programmes.

Production

India is the world leader in castor bean production, followed by China and then Brazil.

Top ten castor oil seed producers — 11 June 2008		
Country	**Production (Tonnes)**	**Footnote**
India	830 000	*
People's Republic of China	210 000	*
Brazil	91 510	
Ethiopia	15 000	F
Paraguay	12 000	F
Thailand	11 052	
Vietnam	5 000	*
South Africa	4 900	F
Philippines	4 500	F
Angola	3 500	F
World	*' 1 209 756 '*	**A**

No symbol = official figure, P = official figure, F = FAO estimate, * = Unofficial/Semi-official/mirror data, C = Calculated figure A = Aggregate (may include official, semi-official or estimates);

Other modern uses

In Brazil, castor oil (locally known as mamona oil) is now being used to produce biodiesel. In rural areas, the abundant seeds are used by children for slingshot balls, as they have the right weight, size, and hardness.

The attractive castor seeds are used in jewelry, mainly necklaces and bracelets. This practice is highly dangerous, due to the extreme toxicity of the seeds, especially if the seedcoat is drilled for stringing.

Castor oil in a processed form, called Polyglycerol polyricinoleate--or PGPR, is currently being used in chocolate bar manufacture as a less expensive substitute to cocoa butter.

Historical usage

Castor seeds have been found in Egyptian tombs dating back to 4000 BC; the slow burning oil was used mostly to fuel lamps. Herodotus and other Greek travelers noted the use of castor seed oil for lighting, body ointments, and improving hair growth and texture. Cleopatra is reputed to have used it to brighten the whites of her eyes. The Ebers Papyrus is an ancient Egyptian medical treatise believed to date from 1552 BC. Translated in 1872, it describes castor oil as a laxative.

The use of castor bean oil ("eranda") in India has been documented since 2000 BC in lamps and in local medicine as a laxative, purgative, and cathartic in Unani, Ayurvedic and other ethnomedical systems. Traditional Ayurvedic medicine considers castor oil the king of medicinals for curing arthritic diseases.

Castor seed and its oil have also been used in China for centuries, mainly prescribed in local medicine for internal use or use in dressings.

It was used in rituals of sacrifice to please the gods in early civilizations.

Castor oil is known to have been used as an instrument of coercion by the paramilitary Blackshirts under the regime of Italian dictator Benito Mussolini. Dissidents and regime opponents were forced to ingest the oil in large amounts, triggering severe diarrhoea and dehydration, which could ultimately cause death. This punishment method was originally thought of by Gabriele D'Annunzio, the Italian poet and Fascist supporter, during the First World War.

Common names

- Arabic: Khirwa' عرخ
- Brazil: mamona, carrapateira, rícino
- Chinese: 蓖麻
- Colombia: higuerilla
- El Salvador: higuerillo
- Ethiopia: Gulo
- Greece: Retsinoladia, Ρετσινολαδιά
- Hebrew:Kikayon, ויקיק
- India:
    - Assamese - Era-gach
    - Bangla - Erando, Veranda
    - Gujarati - Divel,
    - Hindi - Arandi,
    - Kannada - Haralenne,
    - Malayalam - Chittamankku or Avanakkanna
    - Marathi - Errand,
    - Oriya - Jada,
    - Telugu - Aavadam,
- Indonesia: Jarak (Java), Dulang/ Gloah (Sumatra)
- Iran: Karchak, کرچک
- Japan: 唐胡麻 Tougoma, 篦麻 Hima
- Kurdish: Gerchek, کەرچەگ
- Korean: 아주까리 Ajukari, 피마자(蓖麻子) Pimaja
- Maltese: Żejt ir-Riegnu
- Mexico: Higuerilla
- Nicaragua: Higuera or higueria
- Poland: Rącznik
- Portugal: Figueira do Diabo
- Puerto Rico: higuereta
- Seri: hehe caacoj
- Sinhala: endaru, thel-endaru
- Turkish: Hint yağı bitkisi
- Thai: ละหุ่ง

Aamudalu

- Venezuela: tártago

Chapter 9

Schisandra and Victoria (Plant)

Schisandra

Schisandra

Scientific classification
Kingdom: Plantae
(unranked): Angiosperms
Order: Austrobaileyales
Family: Schisandraceae
Genus: ***Schisandra***
Species

- *Schisandra chinensis*

Schisandra (Magnolia Vine) is a genus of shrub commonly grown in gardens. It is a hardy deciduous climber which thrives in virtually any soil; its preferred position is on a sheltered shady wall. It may be propagated by taking cuttings of half-matured shoots in August. Species include *S. chinensis*, *S. glaucescens*, *S. rubriflora* and *S. rubrifolia*.

Description

Flowers of Schisandra rubriflora at Royal Botanic Gardens, Kew, UK

It is native to East Asia, and its dried fruit is used medicinally. The berries of *S. chinensis* are given the name *wu wei zi* in Chinese (五味子; pinyin: wǔ wèi zi), which translates as "five flavor fruit" because they possess all five basic flavors in Chinese herbal medicine: salty, sweet, sour, pungent (spicy), and bitter. In traditional Chinese medicine it is used as a remedy for many ailments: to resist infections, increase skin health, and combat insomnia, coughing, and thirst.

Species

Over 19 species of the genus are said to be used in Chinese medicine, mostly as sedatives and tonic agents. Schisandra may also aid in the treatment of Irritable Bowel Syndrome (IBS) when combined with wormwood, ginger, buplerum, and *Codonopsis pilosula*. However, there is insufficient evidence to support this claim at this time.

Medicinal uses

Modern Chinese research suggests that schisandra and other lignans have a protective effect on the liver and an immunomodulating effect. Two human trials in China (one double-blind and the other preliminary) have shown that schisandra may help people with chronic viral hepatitis reports Liu KT from *Studies on fructus Schizandre cinensis*. Schisandra lignans appear to protect the liver by activating the enzymes that produce glutathione.

Recently, the extract of *S. rubriflora*, a native of the Yunnan province, was found to contain complex and highly oxygenated nortriterpenoids. The discoverers named those molecules **Rubriflorins A-C**.

Victoria (plant)

Victoria

A flowering Victoria in the Amsterdam Hortus Botanicus Ellie Swindells

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
Order:	Nymphaeales
Family:	Nymphaeaceae
Genus:	***Victoria*** Lindley
Species	

Victoria amazonica (Poepp.)
Sowerby
Victoria cruziana A. D. Orb

Victoria is a genus of water lilies, in the plant family Nymphaeaceae, with very large leaves that float on the water's surface. *Victoria amazonica* has a leaf that is up to 3 m (9.8 ft) in diameter, on a stalk 7–8 m (22.9-26.2 ft) in length. The genus name was given in honour of Queen Victoria of the United Kingdom.

Victoria amazonica is native to the shallow waters of the Amazon River basin, such as oxbow lakes and bayous. It is depicted in the Guyanese coat of arms. The flowers are white the first night they are open and become pink the second night. They are up to 40 cm in diameter, and are pollinated by scarab beetles.

Another species, *Victoria cruziana*, in the Parana-Paraguay basin, is only slightly smaller, with the underside of the leaves purple rather than the red of *V. amazonica*, and covered with a peachlike fuzz lacking in *V. amazonica*. *V. cruziana* opens its flowers at dusk.

The first published description of the genus was by John Lindley in 1837, based on specimens returned from British Guiana by Robert Schomburgk. Lindley named the genus after the new Queen, Victoria, and the species *Victoria regia*. An earlier account of the species, *Euryale amazonica* Poeppig, in 1832 described an affinity with *Euryale ferox*. A collection and description was also made by the French botanist Aimé Bonpland in 1825.

The leaf of *Victoria* is able to support quite a large weight due to the plant's structure, although the leaf itself is quite delicate: so much so that "a straw held 6 inches above and dropped perpendicularly upon it would readily pass through it". To counter the fragile nature of the leaf, the weight needs to be distributed across the surface through mechanical means, such as a sheet of plywood. This allows the leaf to support up to 70 pounds.

Leaves of *Victoria cruziana*

Flower of *Victoria cruziana*

The leaves of *Victoria cruziana*

A leaf of *Victoria cruziana*

A woman standing on a leaf of Victoria cruziana in the lily pond in front of the Linnaean House of the Missouri Botanical Garden. A wooden plank and a towel is placed on the pad to prevent damage to the plant.

Chapter 10

Acoelorrhaphe and Amaryllis

Acoelorrhaphe

Acoelorrhaphe wrightii

Stand of fruiting specimens

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Monocots
(unranked):	Commelinids
Order:	Arecales
Family:	Arecaceae
Subfamily:	Coryphoideae
Tribe:	Corypheae
Genus:	***Acoelorrhaphe*** H.Wendl.
Species:	***A. wrightii***

Binomial name

Acoelorrhaphe wrightii
(Griseb. & H.Wendl.) H.Wendl. ex

Becc.

Acoelorrhaphe is a genus of palms, comprising the single species ***Acoelorrhaphe wrightii*** (**Paurotis palm**, also known as the **Everglades palm**, **Madiera palm** and **Silver saw palmetto**).

It is native to Central America, southeastern Mexico, the Caribbean, the Bahamas, and extreme southern Florida where it grows in swamps and periodically flooded forests. It is a small to moderately tall palm that grows in clusters to 5–7 metres (16–23 ft), rarely 9 m (30 ft) tall, with slender stems less than 15 centimetres (5.9 in) diameter. The leaves are palmate (fan-shaped), with segments joined to each other for about half of their length, and are 1–2 m (3 ft 3 in–6 ft 7 in) wide, light-green above, and silver underneath. The leaf petiole is 1–1.2 m (3 ft 3 in–3 ft 10 in) long, and has orange, curved, sharp teeth along the edges. The flowers are minute, inconspicuous and greenish, with 6 stamens. The trunk is covered with fibrous matting. The fruit is pea-sized, starting orange and turning to black at maturity.

The genus name is often cited as *Acoelorraphe*, a grammatical error to be corrected under the provisions of the ICBN. The genus name is a combination of three Greek words meaning *a-* 'without', *koilos* 'hollow', and *rhaphis* 'needle', an allusion to the form of the fruit. The species is named after the American botanist Charles Henry Wright.

Cultivation and uses

Cultivated specimen in a greenhouse at Missouri Botanical Garden

The Paurotis palm was formerly plentiful in Florida, but many plants were taken for the nursery trade. The palm is now protected in the wild by Florida law. Trees propagated from seed or by sawing apart the base of a cluster are available in nurseries. It is hardy in most of the Florida peninsula, and salt-tolerant.

Amaryllis

Amaryllis

"Naked Lady" flowers in the Sinkyone Wilderness State Park, California.

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Monocots
Order:	Asparagales
Family:	Amaryllidaceae
Tribe:	Amaryllideae
Subtribe:	**Amaryllidinae**
Genus:	***Amaryllis***

Species

2, including:
Amaryllis belladonna
Amaryllis paradisicola

Amaryllis is also known as the **belladonna lily** or **naked lady**. The genus has two species and the more famous of the two, *Amaryllis belladonna*, is a native of South

Africa, particularly the rocky southwest region near the Cape. It should not be confused with *Hippeastrum,* a flowering bulb commonly sold in the winter months for its ability to bloom indoors.

Characteristics

Amaryllis belladonna flowers

Amaryllis is a bulbous plant, with each bulb being 5–10 cm in diameter. It has several strap-shaped, green leaves, 30–50 cm long and 2–3 cm broad, arranged in two rows. The leaves are produced in the autumn or early spring in warm climates depending on the onset of rain and eventually die down by late spring. The bulb is then dormant until late summer. The plant is not frost-tolerant, nor does it do well in tropical environments since they require a dry resting period between leaf growth and flower spike production.

From the dry ground in late summer (August in zone 7) each bulb produces one or two leafless stems 30–60 cm tall, each of which bears a cluster of 2 to 12 funnel-shaped flowers at their tops. Each flower is 6–10 cm diameter with six tepals (three outer sepals, three inner petals, with similar appearance to each other). The usual color is white with

crimson veins, but pink or purple also occur naturally. The common name "naked lady" stems from the plant's pattern of flowering when the foliage has died down.

The species was introduced into cultivation at the beginning of the eighteenth century. They reproduce slowly either by bulb division or seeds and have gradually naturalized from plantings in urban and suburban areas throughout the lower elevations and coastal areas in much of the West Coast of the USA since these environments mimic their native South African habitat.

Many bulbs sold as Amaryllis and described as 'ready to bloom for the holidays' actually belong to the allied genus Hippeastrum, despite being labeled as 'Amaryllis' by sellers and nurseries. Adding to the name confusion, some bulbs of other species with a similar growth and flowering pattern are also sometimes called this plant's common name "naked ladies". Some of those species have their own more widely used and accepted common names, such as the Resurrection Lily (*Lycoris squamigera*).

There is an *Amaryllis belladonna* × *Crinum moorei* cross, called × *Amarcrinum* , which has named cultivars.

The name

The botanic name *Amaryllis* is taken from a shepherdess in Virgil's pastoral "Eclogues", from the Greek ἀμαρύσσω (Latin *amarysso*) meaning "to sparkle." It is also used as a given name for girls.

The plant is also sometimes known as the "Jersey Lily".

International Bulb Society

The Herbert Medal is offered annually by the International Bulb Society and is considered the highest honor that a person can receive for noteworthy achievements in advancing the knowledge of bulbous plants. In 1951 this award was given to Mulford B. Foster for his outstanding work with amaryllis.

Chapter 11

Ammandra and Anastatica

Ammandra

Ammandra
Scientific classification
Kingdom: Plantae
(unranked): Angiosperms
(unranked): Monocots
(unranked): Commelinids
Order: Arecales
Family: Arecaceae
Subfamily: Ceroxyloideae
Tribe: Phytelephanteae
Genus: ***Ammandra***
Species: ***A. decasperma***
Binomial name
Ammandra decasperma O.F.Cook

Ammandra is a monotypic genus of flowering plant in the palm family found in South America where it is endangered. The sole species is ***Ammandra decasperma***, although another species has been recognized. They are a pinnate-leaved, dioecious palm whose seeds and petioles are used in button and basket making, respectively. It is commonly called **Ivory palm** or **cabecita**.

Description

A. decasperma grows in multi-headed clusters, the trunks usually remaining underground or prostrate upon it. Despite the negligible trunk size, the leaves reach over 6 m long, slightly arching, on 2 m petioles. The linear leaflets are dark green, 60-90 cm long, and

emerge from the rachis in the same plane. In male plants the inflorescence is a long spike covered in short branches of white to yellow flowers, the female's being much shorter and more compact. The round fruit grows in clusters of 3-6 and is covered in pointed warts, each fruit containing six or more kidney shaped seeds.

Taxonomy

The type species described by Cook was *Ammandra decasperma*; a similar population was found being geographically separated and with minor flower differences and was designated *A. dasyneura* (Burret). In September 2001 Bernal et al. published the discovery of an *Ammandra* population located between the other two with floral characteristics represented in both groups. They, and other taxonomists since, concluded that the three populations were of a single species.

Separately, the only species in the closely related *Aphandra* genus, *Aphandra natalia*, was initially described as *Ammandra natalia* but was later given its own genus.

The genus name translates from Greek to "sand man", alluding to their inflorescences which are formed at ground level, often beneath the soil, and the species epithet derives from two Latin words meaning "ten" and "seed", describing the maximum number of seeds per fruit.

Distribution and habitat

These palms grow in the foothills of the Andes mountains, along Colombia's west coast as well as inland Ecuador up to 450 m in elevation. In either case, they are an understory plant usually receiving only filtered light and nearly year-round rainfall.

Cultivation and uses

Ammandra is not common in cultivation outside its natural range but when grown requires wet and warm conditions resembling the rain forest and will not tolerate full sun when young. It also prefers free-draining, highly organic soil. In Colombia, their large, strong petioles are commonly woven into baskets and other thatched goods, while the large white seeds, commonly called "vegetable ivory", are carved into buttons and trinkets.

Anastatica

Anastatica

Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Rosids
Order:	Brassicales
Family:	Brassicaceae
Genus:	***Anastatica***
Species:	***A. hierochuntica***

Binomial name
Anastatica hierochuntica L.

Anastatica is a monotypic genus with the type species *Anastatica hierochuntica*. The genus is a member of the family *Brassicaceae* (formerly *Cruciferae*), in the division Magnoliophyta of the class Magnoliopsida. The plant is a small gray annual herb that rarely grows above 15 centimetres (6 in) high, and bears minute white flowers. It is a tumbleweed and a resurrection plant.

The most commonly used common name in English may be **rose of Jericho**; other common names include **dinosaur plant**, **Jericho rose**, **Mary's flower**, **Mary's hand**, **Palestinian tumbleweed**, **resurrection plant**, **St. Mary's flower**, **true rose of Jericho**, and **wheel**. About the name "rose of Jericho", the 16th century herbalist John Gerard is said to have remarked *The coiner of the name spoiled it in the mint; for of all plants that have been written of not any are more unlike unto the rose.*

This species is not to be confused with *Selaginella lepidophylla*, also known as rose of Jericho and false rose of Jericho.

Natural history

Anastatica is found in arid areas in the Middle East and Sahara Desert, including parts of North Africa and regions of Iran, Egypt, Palestine, Israel, Iraq, Jordan, and Pakistan .

After the rainy season, the plant dries up, dropping leaves and curling branches into a tight ball, and dies. Within the ball, the fruits remain attached and closed, protecting the seeds and preventing them from being dispersed prematurely. The seeds are very hardy and can remain dormant for years. Wetted again in a later rainy season, the ball uncurls and the capsular fruits open (dehisce) to disperse the seeds. If water is sufficient, the dispersed seeds germinate within hours. A fraction of the seeds are dispersed in the vicinity of the parent plant by raindrops hitting a spoon-like appendix on the seeds. The seeds have a sticky coat that helps them adhere to the soil, but they also may be carried downstream by surface wash. However, seeds swept downstream do not survive.

The process of curling and uncurling is completely reversible and can be repeated many times. The ability of the plant to do this is attributed to the presence of trehalose, a disaccharide sugar involved in several mechanisms of cryptobiosis. Although the rehydrated plant sometimes is described as putting out new leaves, flowers, and fruits, this is disputed; instead, the seeds may sometimes germinate and sprout new plants while still seated in the fruit on the dead parent plant.

Anastatica has been described as *the most famous tumble weed*. Once dry, the ball is said to become detached and is dispersed by wind. This tumbleweed habit has been interpreted as a mechanism of avoiding burial in dunes. However, *Anastatica* may possess this habit only in the literature, or tumble only rarely, if uprooted by accident.

Chapter 12

Anemopsis and Austrocedrus

Anemopsis

Yerba mansa

Scientific classification

Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Magnoliids
Order:	Piperales
Family:	Saururaceae

Genus: ***Anemopsis***

Species: ***A. californica***

Binomial name

Anemopsis californica
(Nutt.) Hook. & Arn.

Yerba mansa or **lizard tail** (*Anemopsis californica*) is a perennial flowering plant within the family Saururaceae. It is the only species in the monotypic genus ***Anemopsis***. It is native to southwestern North America. The conic white 'flowers' (actually reduced inflorescences, or pseudanthia) are borne in early spring, and are surrounded by 4-9 large white bracts. As it matures, the visible part of the plant develops red stains, eventually turning bright red in the fall.

Common Name

" In her book on herbs of the southwestern USA, Dr. Soule discusses the common name. ". . . Yerba mansa is one of those names which confounds linguists. *Yerba* is Spanish for herb, and thus one would think that *mansa* is also from Spanish as well, but all indications point to the fact that it is not. *Mansa* means calm or tranquil in Spanish, and the plant has no sedative effect, nor did local people ever use it as a calming agent. Its primary use is as an antimicrobial, antibacterial, and antifungal. The most likely explanation is that mansa is a Spanish alteration of the original native word for the plant, now lost in the depths of time. . ." Quoted here by permission of the author.

Blooms

Yerba mansa is showy in spring when in bloom. Similar to the sunflower family, what appears to be a single bloom is in reality a dense cluster of individually small flowers borne in an inflorescence. In this species the inflorescence is conical and has five to ten large white bracts beneath it, so that along with the tiny white florets, the whole structure is quite striking when it blooms in spring. The conical structure develops into a tough capsule that can be carried downstream to spread the tiny, pepper-like seeds.

Uses

Medicinal Uses

Yerba mansa is used as an antimicrobial, an antibacterial, and to treat vaginal candidiasis.

Yerba mansa is used to treat inflammation of the mucous membranes, swollen gums and sore throat. An infusion of roots can be taken as a diuretic to treat rheumatic diseases like gout by ridding the body of excess uric acid, which causes painful inflammation of the joints. Yerba mansa prevents the buildup of uric acid crystals in the kidneys which could causes kidney stones if left untreated. A powder of dried root can be sprinkled on infected areas to alleviate athlete's foot or diaper rash.

Yerba mansa is versatile, it can be taken orally as a tea, tincture, infusion or dried in capsule form. It can be used externally for soaking inflamed or infected areas. It can be ground and used as a dusting powder. Some people in Las Cruces, NM use the leaves to make a poultice to relieve muscle swelling and inflammation.

Crafts

- Dried floral structures are used in dried arrangements.
- Dried plant parts, (leaves, floral structure) emit a spicy fragrance and are used in potpourri.

Horticulture

- In the deserts of California yerba mansa is being used as turf in public parks and ground cover in gardens.

Taxonomy

- *Anemia* Nutt., 1838 (non Sw., 1806), nom. inval.. Type species: *Anemia californica* Nutt., 1838.

- *Anemopsis californica* (Nutt., 1838) Hook. & Arn., 1840

synonyms:

- *Anemopsis berlanderi* C. DC., 1872
- *Anemopsis ludovici-salvatoris* Willk., 1877
- *Houttuynia bolanderi* Benth. & Hook.f., 1880
- *Houttuynia californica* Benth. & Hook.f., 1880
- *Anemopsis californica* var. *subglabra* Kelso, 1932

Austrocedrus

Austrocedrus

Conservation status

Vulnerable (IUCN 2.3)
Scientific classification
Kingdom: Plantae
Division: Pinophyta
Class: Pinopsida
Order: Pinales
Family: Cupressaceae
Subfamily: Callitroideae
Genus: ***Austrocedrus*** Florin & Boutelje
Species: ***A. chilensis***
Binomial name
Austrocedrus chilensis (D.Don) Pic.Serm. & Bizzarri

Austrocedrus is a genus of conifer belonging to the cypress family Cupressaceae. It has only one species, ***Austrocedrus chilensis***, native to the Valdivian temperate rain forests and the adjacent drier steppe-forests of central-southern Chile and western Argentina from 33°S to 44°S latitude. It is known in its native area as **Ciprés de la Cordillera** or **Cordilleran Cypress**, and elsewhere by the scientific name as **Austrocedrus**, or sometimes as **Chilean Incense-cedar** or **Chilean Cedar**. The generic name means "southern cedar".

It is a member of subfamily Callitroideae, a group of distinct southern hemisphere genera associated with the Antarctic flora. It is closely related to the New Zealand and New

Caledonian genus *Libocedrus*, and some botanists treat it within this genus, as *Libocedrus chilensis*, though it resembles *Libocedrus* less than the other South American cypress genus *Pilgerodendron* does.

It is a slow-growing, narrowly conical evergreen tree which grows from 10–24 m in height, with scale-like leaves arranged in decussate pairs. The leaves are unequal in size, with pairs of larger (4–8 mm) leaves alternating with pairs of smaller (2–3 mm) leaves, giving a flattened shoot. Each leaf has a prominent white stomatal stripe along the outer edge. The cones are 5–10 mm long, with four scales, two very small sterile basal scales and two large fertile scales; each fertile scale has two winged seeds 3–4 mm long.

Cordilleran Cypress is found in the evergreen mountain forests of the Andes, usually on drier sites within the rainforest, in open pure woods (where it is often locally dominant on the eastern slopes of the Andes in southwestern Argentina) or in association with *Araucaria araucana* and *Nothofagus* species.

It has been introduced to northwest Europe and the Pacific Northwest of North America, where it is occasionally grown in botanical gardens.

Chapter 13

Brasenia and Butomus

Brasenia

Brasenia

Conservation status
Rare (NCA)
Scientific classification
Kingdom: Plantae
(unranked): Angiosperms
Order: Nymphaeales
Family: Cabombaceae
Genus: ***Brasenia*** Schreb.
Species: ***B. schreberi***
Binomial name

Brasenia schreberi
J. F. Gmel.

Brasenia is a genus belonging to the family Cabombaceae, consisting of one extant species widely distributed in warm temperate and tropical regions of the world. Brasenia is an aquatic perennial plant with floating, peltate leaves and rhizomatous stems. It is identified by its bright green leaves, small purple flowers that bloom from June through September, and a thick mucilage that covers all of the underwater organs, including the underside of the leaves, stems, and developing buds. Brasenia exhibits wind pollination. The flowers have a two-day blooming period. On the first day, the functionally female, or pistillate flower, extends above the surface of the water and exposes the receptive stigmas. The flower then recedes below the water surface and on the following day emerges as a functionally male, or staminate flower. It is elevated higher than on the previous day and the anther-bearing filaments are extended beyond the female carpels. The anthers dehisce, releasing the pollen, and the flower is then withdrawn below the water where the fruit develops. Brasenia spreads rapidly once it is established and is very difficult to control. Economically, Brasenia is cultivated as a vegetable in China and Japan (where it is known as **junsai**) and the mucilage it produces has been found to have anti-algal and anti-bacterial properties that may be useful as a natural weed control. Fossil *Brasenia* is present in Europe although it does not occur there now. ***Brasenia schreberi*** (syn. *B. nymphoides*, *B. peltata*) has the common name water-shield (also watershield or water shield).

The genus commemorates the surgeon and Moravian missionary Christoph Brasen (1738-1774), who was the first superintendent of the Moravian mission at Nain in Labrador.

Butomus

Flowering rush


Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Monocots
Order:	Alismatales
Family:	**Butomaceae**
Genus:	***Butomus***
Species:	***B. umbellatus***

Binomial name
Butomus umbellatus L.

Butomus is the sole genus in the monogeneric plant family **Butomaceae**, containing the single species ***Butomus umbellatus***, also known as **flowering rush** or **grass rush**.

Description

The plant is a rhizomatous, hairless, perennial aquatic plant. Its name is derived from Greek *bous*, meaning "cow", "ox" etc and *tome*, a cut (the verb 'temnein' meaning "to cut"), which refers to the plant's swordlike leaves.

Other than suggested by its English common name, it is not a true rush. It is native to Eurasia and grows on the margins of still and slowly moving water down to a depth of about 3 m. It has pink flowers. Introduced into North America as an ornamental plant it has now become a serious invasive weed in the Great Lakes area. In Israel, one of its native countries, it is an endangered species due to the dwindling of its habitat. It can also be found in Great Britain locally, for example Butomus umbellatus at Gwent Levels SSSI on the Caldicot and Wentloog Levels

The plant has linear, pointed leaves up to 1 metre long, or more. The leaves are triangular in cross-section and arise in two rows along the rhizome/base. They are untoothed, parallel veined and twisted.

The inflorescence is umbel-like consisting of a single terminal flower surrounded by three cymes. The flowers are regular and bisexual, 2 to 3 cm across. There are three petal-like sepals which are pink with darker veins. They persist in the fruit. The three petals are like the sepals but somewhat larger. 6 - 9 stamens. Carpels superior, 6 - 9 and slightly united at the base. When ripe they are obovoid and crowned with a persistent style. Ovules are numerous and found scattered over the inner surface of the carpel wall, except on the midrib and edges. Fruit is a follicle. The seeds have no endosperm and a straight embryo. It flowers from July until September.

The flowers of Butomus umbellatus

Butomaceae

Butomaceae has been recognized by most taxonomists as a plant family; it is sometimes called the "flowering-rush family".

The APG II system, of 2003 (unchanged from the APG system, 1998), also recognizes such a family, and places it in the order Alismatales, in the clade monocots. The family counts a single species, *Butomus umbellatus*.

At the ranks of family and order this is the same placement as in the Cronquist system. However, Cronquist assumed a much smaller order and assigned the order to subclass Alismatidae, in class Liliopsida [=monocotyledons].

Uses

Frequently cultivated as an attractive ornamental plant. In parts of Russia the rhizomes are used as food.

Chapter 14

Calluna and Calypso (Orchid)

Calluna

Calluna

Flowering *Calluna vulgaris*

Scientific classification [e]	
Kingdom:	Plantae
clade:	Angiosperms
clade:	Eudicots
clade:	Asterids
Order:	Ericales
Family:	Ericaceae
Genus:	***Calluna*** Salisb.
Species:	***C. vulgaris***

Binomial name
Calluna vulgaris (L.) Hull

Calluna vulgaris (known as **Common Heather**, **ling**, or simply **heather**) is the sole species in the genus ***Calluna*** in the family Ericaceae. It is a low-growing perennial shrub

growing to 20 to 50 centimetres (7.9 to 20 in) tall, or rarely to 1 metre (39 in) and taller, and is found widely in Europe and Asia Minor on acidic soils in open sunny situations and in moderate shade. It is the dominant plant in most heathland and moorland in Europe, and in some bog vegetation and acidic pine and oak woodland. It is tolerant of grazing and regenerates following occasional burning, and is often managed in nature reserves and grouse moors by sheep or cattle grazing, and also by light burning.

Referred to *Erica* in all the old references, *Calluna* was separated from the closely related genus *Erica* by Richard Anthony Salisbury, who devised *Calluna* from the Greek *kallunein*, "to sweep up", in reference to its traditional use in besoms. The specific name *vulgaris* is Latin for 'common'. *Calluna* is differentiated from *Erica* by its corolla and calyx each being in four parts instead of five. The flowers emerge in late summer; in wild plants these are normally mauve, but white-flowered plants also occur occasionally. Unlike *Erica*, *Calluna* sometimes sports double flowers.

Cultivation

Calluna flower close-up

Despised until the 19th century for its associations with the most rugged rural poverty, heather's growth in popularity may be paralleled with the vogue for alpine plants. It is a

very popular ornamental plant in gardens and for landscaping, in lime-free areas where it will thrive, but has defeated many a gardener on less acid soil. There are many named cultivars, selected for variation in flower colour and for different foliage colour and growing habits.

Different cultivars have flower colours ranging from white, through pink and a wide range of purples, and including reds. The flowering season with different cultivars extends from late July to November in the northern hemisphere. The flowers may turn brown but still remain on the plants over winter, and this can lead to interesting decorative effects.

Cultivars with ornamental foliage are usually selected for reddish and golden leaf colour. A few forms can be silvery grey. Many of the ornamental foliage forms change colour with the onset of winter weather, usually increasing in intensity of colour. Some forms are grown for distinctive young spring foliage.

The plant was introduced to New Zealand and has become an invasive weed in some areas, notably the Tongariro National Park on the North Island and the Wilderness Reserve (Te Anau) on the South Island, overgrowing native plants. Heather beetles have been released to stop the heather, with preliminary trials successful to date.

Cultivars include ‘Beoley Crimson’ (Crimson red), ‘Boskoop’ (light purple), ‘Cuprea’ (copper), 'Firefly' (deep mauve),‘Long White’ (white).

Uses

Heather is an important food source for various sheep and deer which can graze the tips of the plants when snow covers low-growing vegetation. Willow Grouse and Red Grouse feed on the young shoots and seeds of this plant. Both adult and larva of the Heather Beetle *Lochmaea suturalis* feed on it, and can cause extensive mortality in some instances. The larvae of a number of Lepidoptera species also feed on the plant.

Formerly heather was used to dye wool yellow and to tan leather. With malt heather is an ingredient in gruit, a mixture of flavourings used in the brewing of heather-beer during the Middle Ages before the use of hops. Thomas Pennant wrote in *A Tour in Scotland* (1769) that on the Scottish island of Islay "ale is frequently made of the young tops of heath, mixing two thirds of that plant with one of malt, sometimes adding hops". The use of heather in the brewing of modern heather beer is carefully regulated. By law the heather must be cleaned carefully before brewing, as the undersides of the leaves may contain a dusting of an ergot-like fungus, which is a hallucinogenic intoxicant.

Heather honey is a highly valued product in moorland and heathland areas, with many beehives being moved there in late summer. Not always as valued as it is today,</ref> and dismissed as *mel improbum* by Dioscurides. heather honey has a characteristic strong taste, and an unusual texture, for it is thixotropic, being a jelly until stirred, when it

becomes a syrup like other honey, but then sets again to a jelly. This makes the extraction of the honey from the comb difficult, and it is therefore often sold as comb honey.

White heather is regarded in Scotland as being lucky, a tradition brought from Balmoral to England by Queen Victoria. and sprigs of it are often sold as a charm and worked into bridal bouquets.

Calypso (orchid)

Calypso orchid

Scientific classification
Kingdom: Plantae
(unranked): Angiosperms
(unranked): Monocots
Order: Asparagales
Family: Orchidaceae
Subfamily: Epidendroideae
Tribe: Calypsoeae
Genus: ***Calypso*** Salisb.
Species: ***C. bulbosa***
Binomial name
Calypso bulbosa (L.) Oakes

Calypso flower

The **Calypso orchid** (*Calypso bulbosa*), also known as the **fairy slipper** or **Venus's slipper**, is a perennial member of the orchid family found in undisturbed northern and montane forests. It has a small pink, purple, pinkish-purple, or red flower accented with a white lip, darker purple spottings, and yellow beard.

It is the only species currently classified in the genus ***Calypso***, which takes its name from the Greek signifying concealment, as they tend to favor sheltered areas on conifer forest floors. The specific epithet, *bulbosa*, refers to the bulb-like corms.

Calypso orchids are typically 10 to 14 cm in height. Their little purple blooms can be a pleasant sporadic sight on hiking trails from late March onwards, though in the more

northerly parts of their range they do not bloom until May and June. The plants live no more than five years.

This species' range is circumpolar, and includes the western states and most of the most northerly states of the United States; Canada; Scandinavia (northern Sweden and Finland), the northern part of European Russia; eastern Siberia; and Japan. Four varieties are recognized: var. *americana* and var. *occidentalis*, which are found in North America, respectively east and west of the Sierra Nevada ranges; var. *bulbosa* in most of the Eurasian range; and var. *japonica* in Japan.

Although the calypso orchid's distribution is wide, it is very susceptible to disturbance, and is therefore classified as threatened or endangered in several U. S. states and in Sweden and Finland. It does not transplant well owing to its mycorrhizal dependence on specific soil fungi. The corms have been used as a food source by North American native peoples, though this is not recommended now because the sites for these plants are now rare and easily destroyed. The Thompson River Indians of British Columbia used it as a treatment for mild epilepsy.

At least near Banff, Alberta, the calypso orchid is pollinated by queen bumblebees (*Bombus (Pyrobombus)* and *Psithyrus*). It relies on "pollination by deception", as it attracts insects to anther-like yellow hairs at the entrance to the pouch and forked nectary-like structures at the end of the pouch but produces no nectar that would nourish them. Insects quickly learn not to revisit it. Avoiding such recognition may account for some of the small variation in the flower's appearance.

Synonymy

The genera ***Calypsodium*** Link, ***Cytherea*** Salisb., ***Norna*** Wahlenb. and ***Orchidium*** Sw. are generally considered synonyms of *Calypso*.