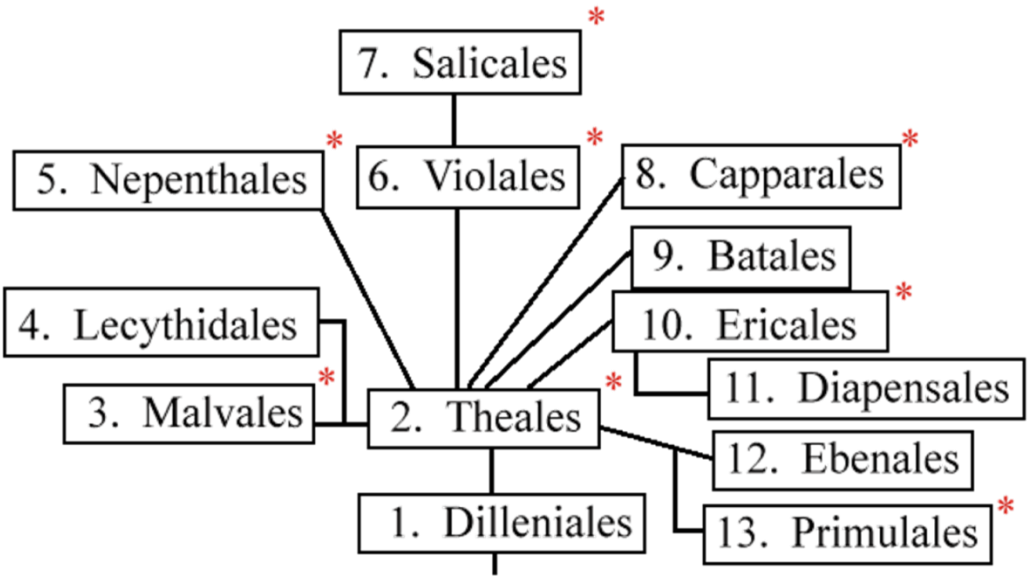
## SUBCLASS DILLENIIDAE

- Consist of 13 orders, 78 families, 25 000 species
- Mostly trees with showy flowers - hermaphrodite, with united carpels, and adapted to insect pollination
- Mostly syncarpous carpels (made up with compound pistil of two or more fused carpels)




### *Malvaceae* - The Mallow Family

- The Mallow Family contains over 1000 species - mostly herbaceous plants, shrubs or trees. The species of most economic importance is Cotton, the fruits of *Hibiscus esculentus* (Okra) are eaten, and many (*Hibiscus, Abutilon, Hollyhock*) are grown as garden flowers.
- Leaves, Stem & Roots ~ The leaves are alternate, with leafy growths where they join the stem, and they are often hairy. The calyx is composed of five sepals, sometimes joined, with another row of false sepals beneath them - an epicalyx or involucel. The leaves are often palmate and lobed or divided (Hollyhock), or undivided and toothed (*Hibiscus*).
- Flowers ~ The flowers of this family are large and composed of five separate petals, usually rolled up together in bud or dying. The stamens and style form a long tube protruding from the centre of the flower, and the stigma at the end of the tube is divided into numerous fingers.

- Seeds ~ The seed capsule is inside the flower, with five or more parts joined together. The seeds may be hairy (Cotton), rounded (Hibiscus), flat discs (Hollyhock) or even a berry (Malvaviscus).
- The fruit is typically a capsule (a dry fruit with cavities containing the seeds), or a schizocarp (a fruit which is broken up into several smaller pieces).
- Sources of fibers for clothing, cordage, weaving, and housewares: *Abutilon avicenne* - Velvetweed; *Hibiscus cannabinus* - Deccan hemp; *Corchorus hirtus* - jute

  Members of this Family usually have:

  - Large flowers with five unjoined petals
  - Stamens and divided style protruding from the centre of the flower
  - Calyx of five parts with another false calyx below it - an epicalyx.

Main species: *Althaea officinalis* - Marsh-mallow; *Malva sylvestris* - common mallow; *Hibiscus esculentus* - Lady's fingers;

***Toxity**: Gossypium hirsutum* (Upland cotton) - include phenol gossypol - chelate iron in the liver and interfere the synthesis of hemoglobin an respiratory enzymes. Gossypol react with amino acids and proteins , lowering the nutrition value of the diet and affects many physiologically active enzymes. Most poisonous are the seeds - in adult ruminant livestock small amounts of gossypol in the diet are tolerated, but high doses of gossypol may produce respiratory difficulty, cyanosis and convulsions, which may lead to death within 30 minutes. Hogs are particularly sensitive to the toxin and may show serious swelling and congestion of the liver when the diet contains 2 parts per 10, 000 of gossypol. Sows rooting in harvested cotton fields often abort. Calves and lambs become unthrifty, develop anemia, and die after chronic exposure. Acute exposure produces blood in the urine, bloody diarrhea, jaundice and muscular weakness.

**BAS**: The plants contain natural gums called mucilage (in roots and seeds), pectin, and asparagin, which gives them a slimy texture when crushed.

**Action and use**: The primary effect of most mallows is to soothe and heal mucus surfaces - heal irritations and infections in organs of digestive and respiratory system.

## *Tiliaceae* - The Linden family

- The family include are trees, shrubs, or rarely herbs comprising about 50 genera and 450 species that are further characterized by the presence of branched or stellate hairs.
- The leaves are simple and nearly always alternate, stipules are present.
- The flowers are actinomorphic and nearly always bisexual. The perianth consists of a valvate calyx with usually 5 distinct or basally connate sepals and a corolla of an equal number of petals or sometimes the corolla is sepaloid or absent. The androecium consists of usually many stamens that are distinct or basally connate or in fascicles. The gynoecium is a single compound pistil of 2-10 carpels, an equal number of stigmas, and a 2-10-loculed superior ovary with 1-several axile ovules in each locule.
- fruits a dry or fleshy capsule or schizocarp, the seeds rarely arillate
- 50 genera and more than 450 species. Temperate or more commonly subtropical and tropical regions, mainly in tropical America, Asia and Africa.

Main species: Tilia cordata - Small-leaved Linden; *Tilia tomentosa*-Silver lime; *Tilia platyphyllus* - Broad-leaved lime

**BAS**: flavonoids (quercitin, kaempferol), mucilage, tannins, derivatives of caffeic acid , essential oils

**Action and use**: in traditional medicine – as non - narcotic sedative remedy for sleep disorders or anxiety. The bract and flower infusion (tea) is also employed against ailments of the upper respiratory tract, due to the expectorant and antiseptic action of its constituents. The carbon (charcoal) made from the twigs and inner bark is considered as extremely adsorbent and useful against diarrhea and intoxications, as it acts in the same fashion as activated charcoal, adsorbing some of the toxins. Honey made from nectar of the Linden tree is pretended to be the most prized in the world, being used as part of medicinal preparations and liqueurs.

## *Sterculiaceae* - The Cola Family

* In Roman mythology Sterculius was the god of manure, reference to the unpleasant aroma of the flowers of this genus.

- Trees, shrubs or lianas, pubescent mainly with stellate hairs or peltate scales
- leaves alternate, deciduous or occasionally evergreen, simple and entire or lobed or sometimes palmately compound, with deciduous or sometimes persistent stipules;
- inflorescences mainly panicles, sometimes cymes or racemes, rarely reduced to a solitary flower;
- flowers small to mid - sized, bisexual or infrequently unisexual, actinomorphic or slightly zygomorphic, hypogynous, often with an epicalyx, the sepals 3-5, connate basally, valvate, the petals lacking or 5 when present, free, convolute, frequently clawed or infrequently hooded, sometimes adnate to the filament column; stamens mostly 5-15 or more arranged in two cycles with the outermost reduced to staminodes or nearly to quite suppressed and the innermost fertile, free or connate into a tube surrounding the ovary, developing centrifugally and borne on an androgynophore, sometimes reduced to staminodes; gynoecium superior, the carpels (1) 5-many
- fruits usually a dry or fleshy schizocarp, occasionally dehiscent or at least separating into mericarps; the seeds sometime arillate
- More than 65 genera and some 1500 species. Warm temperate or more commonly subtropical and tropical regions throughout the world.

Main species: *Cola vera* - Cola tree; *Theobroma cacao* - chocolate tree; *Sterculia rubiginosa* - Rust-colored sterculia

* The generic name is derived from the Greek words theos (god) and broma (food) - all translates to "food of the gods."

**BAS**: purine alkaloids : caffeine, colatine, theobromine; - mucilage, fat oils, amino acids, vitamins A,E; calcium, iron, rich of magnesium - detoxifying effect.

**Action and use**: Theobromine, the alkaloid contained in the beans, resembles caffeine in its action, but its effect on the central nervous system is less powerful. Its action on muscle, the kidneys and the heart is more pronounced. It

is used principally for its diuretic effect due to stimulation of the renal epithelium; it is especially useful when there is an accumulation of fluid in the body resulting from cardiac failure, when it is often given with digitalis to relieve dilatation. It is also employed in high blood pressure as it dilates the blood-vessels.

- In modern medicine, theobromine is used as a vasodilator (a blood vessel widener), a diuretic (urination aid), and heart stimulant
- In animals - Theobromine can sometimes trigger life-threatening pancreatitis several days later. The most common victims of theobromine poisoning are dogs. for which it can be fatal. The toxic dose for cats is even lower than for dogs. In dogs, the biological half-life of theobromine is 17.5 hours; in severe cases, clinical symptoms of theobromine poisoning can persist for 72 hours. The first signs of theobromine poisoning are nausea, vomiting, diarrhea, and increased urination. These can progress to cardiac arrhythmias, epileptic seizures, internal bleeding, heart attacks, and eventually death.

## *Ericaceae* - The Heath Family

- Include mainly shrubs or climbers, and almost all of them are found in acidic habitats, and are dependent on fungal mycorrhiza.
- leaves alternate or sometimes opposite or even verticillate, simple, entire, most evergreen or sometimes deciduous, without stipules;
- inflorescences of solitary and axillary or terminal flowers or more commonly in racemes;
- flowers small to large, bisexual or rarely functionally unisexual, actinomorphic to slightly zygomorphic, hypogynous to epigynous, the sepals (3) 5 (7), free, imbricate or valvate, persistent but not accrescent in fruit, the petals (3) 5 (7), free or more commonly sympetalous and campanulate to tubular or urceolate, alternate with the sepals, the lobes imbricate or convolute; stamens usually (6) 10 (20), free and on a intrastaminal ring or on the very base of the petal, rarely connate or adnate to the petal, the anthers tetrasporangiate and 2-locular, inverted, dehiscing by terminal pores or short slits, rarely longitudinal slit their entire length, typically with a pair of slender, prolonged appendages; gynoecium superior to inferior, the carpels (2) 5 (10), united to form a compound (uni-) plurilocular ovary with axile placentation, rarely seemingly up to 10-locular due to placental intrusion, the styles hollow, the stigma capitate to lobed, the ovules 1-several per carpel, anatropous or hemitropous, infrequently campylotropous, unitegmic and tenuinucellar;

- fruits a septicidal or loculicidal capsule, sometimes a berry (mostly the Vaccinioideae) or a drupe (Arbuteae),
- 116 genera and some 3500 species. Cosmopolitan and especially in the cool, temperate and subtropical regions of the world, including the high mountains in South America, southern Asia and the Malesian regions.

Main species:*Vaccinium vitis - idaea* - cowberry; *Vaccinium myrtillus* - European blueberry; *Vaccinium uliginosum* - bog bilberry; *Kalmia angustifolia* - Narrow-leaved Kalmia; genus *Rhododendron* - Rhododendron

*Several of its folk-names testify to the plant's toxicity: 'lamb-kill', 'sheep kill', 'calf-kill', 'pig laurel', 'sheep-laurel' and 'sheep-poison'

**BAS:** vitamins, sugars, organic acids, tannins – in fruits; in leaves – phenol glycosides, tannins, glycosides

**Action and use:** diuretic, antiseptic, inflammatory- for the treatment of inflammation of the urinary tract.

- In veterinary medicine - for the treatment of gastroenteritis in small animals adolescents.

**Toxity**: *Rhododendron , Azalea ssp*. - contain a complex mixture of toxins with main element - quinone glucoside arbutin - cause salivation, tearing, nasal discharge, vomiting, convulsion and paralysis, and loss of appetite

## *Salicaceae* - The Willow Family

- consists of bushes and trees with simple, alternate leaves.
- flowers are unisexual with male and female flowers appearing in catkins on separate plants (dioecious).
- The sepals are greatly reduced or absent, and there are no petals. Male flowers have 2 or more stamens. In the pistillate (female) flower, the ovary is positioned superior and consists of 2 to 4 united carpels (syncarpous) forming a single chamber.
- fruits are 2-4-valved capsule, the seeds minute and comose with hairs originating from the placenta.
- Worldwide, there are 2 to 3 genera and 350 to 500 species.

Main species: *Salix purpurea*- Purple Osier Willow; *Salix caprea* - Goat willow; *Salix alba* -White willow; *Salix babylonica* - Weeping willow; *Populus alba* - Silver poplar; *Populus tremula* - Common aspen

**BAS:** simple phenol glycosides populin, salicin and methyl salicylate from which the common aspirin was originally derived, tannic acid

**Action and use**: antiseptic, analgesic, anti-inflammatory, astringent and diuretic use. Like aspirin, the willow family is used for fevers, headaches, arthritis and other inflammations, particularly in the urinary tract. Members of the Willow family may also expel worms.

!!! Studies indicate that, when used as a long-term tonic, common aspirin can greatly reduce a person's risk of heart disease or colon cancer in later life. Like aspirin, large quantities of willow can irritate the stomach lining.

## *Cucurbitaceae* - The Cucurbit Family

- Include prostrate or climbing herbaceous annuals species
- 90 genera and 700 species
- 5-angled stems and coiled tendrils
- leaves are alternate and usually palmately 5-lobed or divided, stipules are absent.
- The flowers are actinomorphic and nearly always unisexual. The perianth has a short to prolonged epigynous zone that bears a calyx of 3-6 segments or lobes and 3-6 petals or more frequently a 3-6-lobed sympetalous corolla. The androecium is highly variable, consisting of basically 5 distinct to completely connate stamens that frequently are twisted, folded or reduced in number. The gynoecium consists of a single compound pistil of 2-5 carpels, generally with one style and as many style branches or major stigma lobes as carpels, and an inferior ovary with one locule and usually numerous ovules on 2-5 parietal placentae or 3 locules with numerous ovules on axile placentae.
- The fruit is a type of berry called a pepo (a leathery berry), infrequently a dry or fleshy capsule, rarely a samaroid, the seeds flattened and occasionally winged
- 120 genera and 800 to 900 species. Temperate regions of the world but more common in subtropical and tropical areas especially in Africa and South America.

Main species: *Cucurbita maxima* - Winter squash; *Cucurbita pepo* - Field pumpkin; *Lagenaria vulgaris* - long melon; *Citrulus vulgaris* - watermelon; *Melo sativus* - Melon; *Cucumis sativus* - Cucumber

**BAS**: pectins, essential amino acids, trace elements - especially potassium and phosphorus; phytosterols

**Action and use:** to cure respiratory diseases, diabetes, skin disorders, and also used as diuretic, antipyretics, antiinflammatory, antiseptic

**Toxity:** *Bryonia alba* (White bryony) - all parts contain glycoside bryonin which is poisonous and may cause illness or death. Livestock may also be poisoned by consuming the fruit and leaves. Forty berries constitutes a lethal dose for adult humans ; *Ecbalium elaterium* - Squirting cucumber

## *Theaceae* - The Tea Family

- Mostly shrubs and trees - with evergreen foliage or deciduous.
- Leaves - with toothed margins, with opposite arrangement, sessile
- Flowers - usually pink or white and large and showy, often with a strong scent. The calyx consists of five or more sepals, which are often persistent in the fruiting stage, and the corolla is five-merous, rarely numerous.
- Plants in Theaceae are multistaminate, usually with 20-100+ stamen either free or adnate to the base of the corolla, and are also distinctive because of the presence of pseudopollen. The pseudopollen is produced from connective cells, and has either rib-like or circular thickenings. The ovary is often hairy and narrows gradually into the style, which may be branched or cleft. The carpels are typically opposite from the petals;
- The fruits are loculicidal capsules, indehiscent baccate fruits or sometimes pomes. The seeds are few and sometimes winged, or in some generas covered by fleshy tissue or unwinged and nude.

Main species: *Thea sinensis* - Tea bush

**BAS**: crystals of calcium oxalate; tannins - ellagic acid , gallic acid and common polyphenols including flavonols, flavones and proanthocyanins; Triterpenes and their glycosides (saponins) are found widely throughout the family in the seeds, leaves, wood and bark. Plants in this family are also known to accumulate aluminum and fluoride; purine alkaloids - theanine, theobromine, theophylline; essential oils.

**Action and use**: Strengthened mental activity, soothing, sweating, immune-stimulating, anti-itching, antiseptic, antiviral, antioedematous, antifungal, analgesic, insecticide, soothing aching joints, prevent tooth decay.

## *Hypericaceae (= Guttiferae )* – The St. Johnswort Family

- perennial herbs with simple, opposite leaves.
- leaves are often covered with dark glands or clear dots.
- flowers are regular and bisexual with 4 to 5 sepals, 4 to 5 petals, and 10 or more stamens - multistaminate. The petals are usually yellow, but may be tinged with red or orange spots. At least one species has pink blossoms. The ovary is positioned superior and consists of 3 to 5 united carpels (syncarpous) with the partition walls present, forming an equal number of chambers. Flowers form dense clusters at the ends of the branches.
- Fruits are capsules
- Worldwide, there are at least 3 genera and 356 species in the family, mostly of Hypericum.

Main species: *Hypericum perforatum* - Common Saint John's wort; H. rumeliacum - Rumelia Saint John's wort

* genus Hypericum name - derived from the Greek words, hyper and eikon meaning "over an apparition," alluding to the plant's ancient use to ward off evil spirits.

**Toxity:** *Hypericum perforatum* (Common Saint John's wort) - on sunny days, livestock grazing on pastures heavily infested with flowering St John's wort can develop clinical signs of hypericin poisoning in less than five hours. Early symptoms of hypericin poisoning include agitation, head-rubbing, intermittent hind limb weakness with knuckling over, panting, confusion and depression. Some animals may develop mild diarrhoea. This is followed by inflammation and swelling of the skin around the forehead and eyes. Affected animals also have abnormally high body temperatures (hyperthermia). If affected animals continue to graze St John's wort, the reddish inflammation and fluid-associated swelling of the head and ears will worsen. Affected animals will then rub their irritated heads or ears against fixed objects. Raw, weeping, bleeding areas of skin will develop, and eventually dry to form scabs.

Superfine or fine-wool adult Merino wethers or dry, non-pregnant ewes with at least four months' wool growth are recommended for grazing of St John's wort infestations. Animals with this wool type and amount of wool growth have the most protection against sunlight, and are also effective defoliators of St John's wort. Cattle can also be used, either exclusively or to supplement the role of sheep. Cattle are less effective defoliators of St John's

wort than sheep (sheep graze more closely than cattle) but they are more tolerant of hypericin. Fully coloured (pigmented) cattle, either 100% black or red, will be the most tolerant. Cattle can be put onto St John's wort pastures about six weeks earlier than sheep, and the pasture can be used to knock down heavy infestations and open it up for subsequent grazing by sheep. Cattle can also remain on St John's wort pastures much longer than sheep in spring. Sheep hypericin tolerance is influenced by their amount of wool coverage.

**Tolerance in animals**

Since hypericin only becomes poisonous after it has been activated by sunlight, an animal's hypericin tolerance is influenced by the amount of skin protection it has. Therefore, characteristics that will increase animals' tolerance of hypericin are: pigmentation rather than non-pigmentation; wool cover rather than hair cover; wool cover rather than shorn wool; dense, fine fleece or hair rather than open, coarse fleece or hair; long rather than short wool or hair; tough rather than soft skin.

In addition, an animal's tolerance of hypericin is increased in the absence of direct sunlight. For example, in trials conducted by NSW Department of Primary Industries, sheep were dosed with twice the daily intake tolerance amount of hypericin, while one group of sheep was kept indoors (out of direct sunlight) and another group outdoors (bright sunlight exposure). Only the sheep kept outdoors in bright sunlight developed clinical signs of hypericin poisoning.

This shows that preventing an animal's exposure to sunlight will increase its tolerance to hypericin. Since it is not practical to keep animals indoors, providing good shade cover in a St John's wort-infested paddock is the most practical way to minimise sunlight exposure and hence improve an animal's hypericin tolerance. Pregnant and lactating animals should always be removed from St John's wort-infested pastures. Hypericin can cross from the mother into the blood circulation of her foetus or into her milk. This can result in the birth of weak or dead progeny, and poor performance in suckling young. Adult animals are more hypericin-tolerant than suckling or young weaner animals. The softer, thinner skin of young animals, together with lighter fleece or hair cover, reduces their hypericin tolerance. Also, suckling young ingest hypericin from two sources: the St John's wort in the pasture and the hypericin in their mother's milk. Different animal species vary in their tolerance of hypericin, and there are significant differences within an animal species.

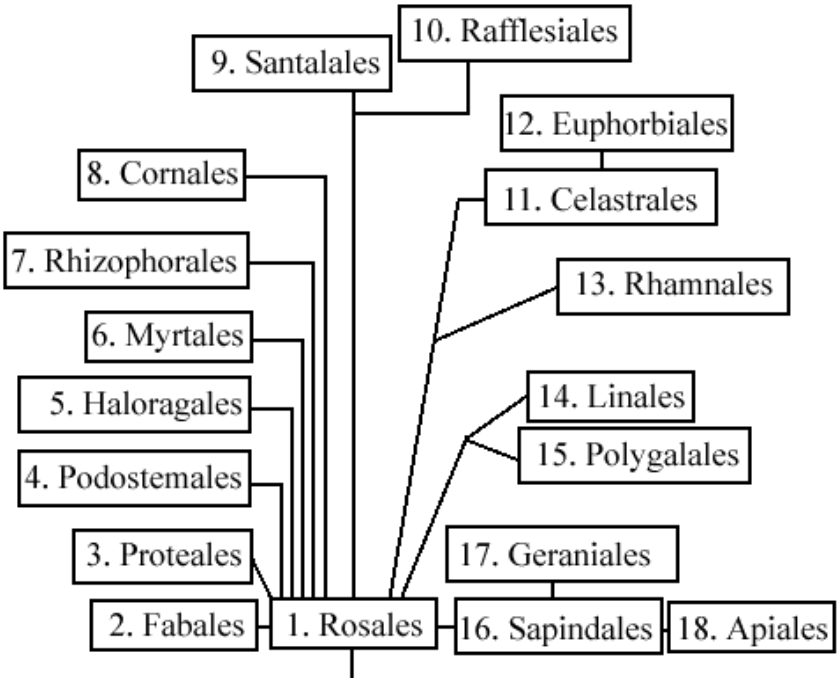
For more see http://weeds.dpi.nsw.gov.au/Weeds/Details/135

**BAS:** flavonoids, essential oils, tannins, reddish pigment hypericin - causes photosensitisation in sheep, cattle, horses and goats. The skin damage associated with this problem leads to weight loss, reduced productivity and, in extreme cases, death.

**Action and use**: treatment of depression, smoking cessation, physical symptoms due to mental disorders, antidiuretic

## SUBCLASS ROSIDAE

- 18 orders, 116 families, 60 000 species
- Trees, shrubs, grasses
- Leaves - simple and compound
- Flowers - bisexual, circular, correct or incorrect, with non - adhering flower parts, many stamens (multistaminate)
- Fussion of calyx, corolla, and the stamens in a cup-shaped tube - hypanthium
- Nectar producing glands on the flower base
- Adapted to entomophily pollination
- Main chemical compounds - cyanogenic glycosides , tannins, essential oils



# *Rosaceae* - The Rose Family

- trees , shrubs and herbs
- leaves are alternate, which vary from simple to trifoliate, palmate, or pinnate. The whole leaves or smaller leaflets are frequently more or less oval-shaped with serrated edges, which is a good secondary pattern for recognizing the Rose family.
- flowers - are typically 5 (rarely 3 to 10) separate sepals and a similar number of petals. There are a minimum of 5 stamens, but often many more, usually in multiples of five. Many flowers of the Rose family, especially those of the Rose subfamily, have several to numerous simple pistils, or the pistils may be united at the base, with the styles separate, making a single compound pistil with numerous styles. Either way, the result is a distinctive, fuzzy-looking center surrounded by lots of stamens.
- form many different fruits, varying from fleshy fruits to various false fruits, dry seeds, capsules, or follicles. Numerous, separate achenes may be dispersed within a fleshy swollen hypanthium (e.g. rose hips), a single pit may form within a fleshy drupe (e.g. cherry), the separate carpels may be dispersed together as an aggregation of drupelets (e.g. raspberries), or the separate carpels may form achenes that are dispersed together with a fleshy floral receptacle (e.g. strawberry). Other fruit types in the family include follicles and a specialized berry known as a pome (apples, pears, etc).
- Worldwide, there are about 100 genera and 3,000 species. About 50 genera are found in North America.
- divided into six subfamilies: *Rosoideae, Spiraeoideae, Maloideae (Pomoideae), Amygdaloideae (Prunoideae), Neuradoideae, and Chrysobalanoideae*

Main species:

- ***Subfamily Spiraeoideae*** (form perigynous flowers and fruits an aggregate of follicles): *Spiraea media* - Spirea ; *Quillaja saponaria* - Soap bark tree
- ***Subfamily Rosoideae*** (form perigynous flowers and aggregate single-seeded fruits): *Rosa canina* - Dog-rose; *Rosa damascena* - Damask rose; *Rubus caesius* - European dewberry; *Rubus idaeus* - Raspberry; *Fragaria vesca* - Wild strawberry; *Sanguisorba officinalis* - Great burnet; *Potentilla argentea* - Silver-leaved cinquefoil; *Geum urbanum* - Wood avens; *Agrimonia eupatoria* - Common agrimony

- ***Subfamily Maloideae*** (***Pomoideae***) (from epigynous flowers and pome fruit) - *Malus domestica* - Cultivated apple; *Malus sylvestris* - European crab apple; *Cydonia oblonga* - Quince; *Pyrus sativa* - Pear; *Pyrus piraster* - European wild pear; *Sorbus aria* - White beam; *Sorbus aucuparia* - Rowan; *Crataegus monogyna* - Common hawthorn; *Crataegus pentagyna* - Black hawthorn; *Mespil us germanica* - Common medlar
- ***Subfamily Amygdaloideae (Prunoideae)*** (from perigynous flowers and drupe fruit) - *Prunus domestica* - Greengage; *Prunus cerasifera* - cherry plum; *Prunus spinosa* - Blackthorn; *Prunus avium* - Wild cherry; *Padus mahaleb* - Mahaleb cherry; *Armeniaca vulgaris* - Apricot; *Persica vulgaris* - Peach; *Amygdalus communis* - Sweet Almond; *Laurocerasus officinalis* - cherry laurel

**BAS**: waxes, terpenoids and flavonoids, essential oils, cyanogenic glycosides

**Action and use**: astringent, antiseptic, diuretic and tonic properties; diuretic, insecticidal, vermicide action

**Toxity**: *Prunus virginiana* (Choke cherry) - contain cyanogenic glycosides (prunasin, produced in leaves and twigs, and amygdalin, produced in the pit) release hydrocyanic acid (HCN). Less than 1/4 lb of fresh leaves can be toxic to a 100 lb animal. Conflicting reports suggest wilting may increase HCN release. Wilted leaves are more toxic per unit weight due to loss of water by the leaves, which concentrates the cyanide. SYMPTOMS: Poisoning produces anxiety, staggering, falling down, convulsions, dyspnea, rolling of eyes, tongue hanging out of mouth, loss of sensation dilated pupils; the animal then becomes quiet, *bloats, and dies within a few hours of ingestion.*

* *Genus Prunus* contains many useful plants that also may be poisonous. Peach pits (*Prunus persica* Batsch.) are rich in cyanide and have been responsible for animal toxicosis. Apricot kernels (*Prunus armeniaca* L.) have been fatal when consumed by children. Plum pits and bitter almond pits are also cyanogenic. It should be noted that seeds of both the common apple and crabapple (*Malus* spp ) contain HCN. The death of a man, resulting from eating a cup of apple seeds at once, has been reported.

## Order *Fabales* - The Legumes

Include three families (sometime in rank of subfamilies of *Fabaceae* Family (APG group)

### 1. *Mimosaceae* - The Mimosa Family

- Trees, shrubs, infrequently lianas or rarely herbs or aquatic (*Neptunia)*; leaves alternate, usually bipinnately compound, occasionally merely once pinnate or reduced to a narrow phyllodia as in some species of Acacia, often with a basal pulvinus, the stipules mostly present, sometimes specialized into prickles or spines;
- inflorescences arranged in showy racemes, spikes or heads;
- flowers small, bisexual or rarely unisexual, actinomorphic, hypogynous or slightly perigynous, in type 5
- fruits a legume, infrequently indehiscent and breaking into 1-seeded segments

Main species: *Mimosa pudica* - Shy mimosa;*Albizzia julibissin* - Silky acacia; Genus *Acacia* - The thorn trees (Acacias)

### 2. *Caesalpiniaceae* - The Caesalpinias Family

- Leaves usually paripinnate or binary
- Flowers slightly irregular, zygomorphic
- Ovary superior
- Fruits dehiscent or indehiscent
- Raceme inflorescence
- contains 180 genera in all over the world.

Main species: *Cercis siliquastrum* - Judas tree; *Cassia fistula* - Golden Shower; *Senna obtusifolia* - Chinese senna

**Toxity**: *Gymnocladus dioica* (L.) C. Koch - Kentucky coffee-tree - contain cytosine - a toxic quinolizidine alkaloid, has been extracted from leaves, pods, and seeds.

### 3. *Fabaceae* - The Pea Family (alternative name *Leguminosae*)

- Trees, shrubs, lianas or much more commonly herbs;
- leaves alternate, pinnately or occasionally palmately compound or

- trifoliolate, infrequently unifoliolate or simple, sometimes modified into tendrils, with or without a swollen, basal pulvinus, the stipules mostly present;
- inflorescences arranged in racemes, spikes or heads;
- flowers small or more commonly mid-size and often showy, bisexual, usually zygomorphic, perigynous, the sepals mostly 5, usually connate and forming a bilabiate calyx tube, imbricate, the petals 5, papilionacineous and composed of a free banner or standard, two lateral and free wings, and two partially fused petals that form a keel, rarely all but the banner suppressed, all wanting or all alike (*Etaballia*), imbricate; stamens mostly 10 (9 fused and 1 free),
- gynoecium superior, the carpels 1
- fruits a legume, infrequently indehiscent and breaking into 1-seeded segments, infrequently forming a follicle and rarely winged, drupaceous, nut-like or achene-like
- More than 460 genera and in excess of 12 000 species. Cosmopolitan but mainly in temperate regions.

Main species

- Forage species: *Trifolium repens* - White clover; *Trifolium pratense* - Red clover; *Medicago sativa* - Lucerne (Alfalfa) ; *Melilotus officinalis* - Yellow sweet clover; *Coronilla varia* - Crownvetch; *Trigonella foenum - graecum* - Fenugreek ; *Lotus corniculatus* - Bird's-foot Trefoil

  **BAS**: Alfalfa - source of chlorophyll and carotene; steroidal saponins (hederagenin) and fibers ; vitamin K - anticoagulant effect; deleterious effects; toxic amino acid L - canavanine, an analog of arginine – causes hemolytic anemia.

  * Alfalfa seeds and sprouts easy can be contaminated with pathogens as Salmonella enterica and Escherichia coli - causes symptoms such as diarrhea, nausea, abdominal cramping, and fever that are self-limiting.

  *The Arabs fed alfalfa to their horses, claiming it made the animals swift and strong, and named the legume “Al-fal-fa” meaning “father of all foods.”

  **Action and use**: diuretic, anti-inflammatory, antidiabetic, or anti-ulcer purposes

- Legume food*: Phaseolus vulgaris* -Common bean; *Pisum sativum* - Pea; Lens esculenta - Lentil; *Arachis hypogaea* - Peanut; *Cicer arietinum* - Bengal gram; *Vicia sativa* - Common vetch; *Vicia faba* - Broad bean

  * Excess consumption of legume seeds - can lead to depression and nervous disorders. The iron in legumes isn't absorbed well by the human body. Consuming legumes (the pea family) along with Vitamin C gives you a better chance of absorbing the iron.

  *Toxity: *Astragulus* (Locoweed) accumulate selenium in toxic levels; *Cassia* and *Senna* - contain alkaloids.

  Trees & shrubs: *Glycirrhiza glabra* - Liquorice; *Sophora japonica* - Japanese pagoda tree; *Robinia pseudoacacia* - Black locust; *Gleditschia triacanthos* - Thorny locust; *Laburnum anagyroides* - Common laburnum; *Wisteria sinensis* - Chinese wisteria; *Ceratonia siliqua* - Carob tree; *Indigofera tinctoria* - True Indigo

  **BAS**: triterpene and steroidal saponins , pyrrolizidine alkaloids , toxic nitrogen compounds , cyanogenic glycosides, saponins, tannins, mucilage, anthocyanins

  **Toxity:** A large amount of plants in this family are toxic. Members should never be sampled without positive identification and reliable information as to use and preparation. Alkaloidal convulsant posion containing genera include Kentucky coffee tree (*Gymnocladus*), Scholar Tree (*Sophor*a), Golden Chain tree (*Laburnum*) and Indigo (*Baptisia*) (Nelson, Shih, & Balick, 2007). Alfalfa *(Medicago sativa*) and Rattlebox (*Sesbania spp*.) contain saponins (Kingsbury, 1964). Triterpine and steroidal saponins may occur in the *Fabaceae* in general (Wink & Van Wyk, 2008). *Sesbania* and *Crotalaria* contain pyrrolizidine alkaloids (Nelson et al., 2007). Vetch (*Vicia spp.)* and Clover (*Trifolium spp*.) can cause photosensitivity through their effect on the liver (Kingsbury, 1964). Some people are allergic to members of the *Fabaceae* including soybeans *(Glycine max*). Aflotoxin is a toxic fungus that can occur on Peanuts (*Arachis hypogaea*) and other nuts. Black Locust (*Robinia psuedoacacia*) contains a toxalbumin (Nelson et al., 2007). *Wisteria spp*. contains wistarine a gylcocide (Nelson et al., 2007). Other potentially toxic members include Locoweeds (*Astragalus spp*.), Senna (*Cassia)*, Sweet peas (*Lathyrus spp*.) and Lupines (*Lupinus spp*.). Cytisine, also known as baptitoxine and sophorine, is an alkaloid that occurs naturally in several plant genera, such as Laburnum and *Cytisus* of

the family *Fabaceae*. It has been used medically to help with smoking cessation. Cytisine is are lethal to most animals.

**Lupinus* ssp. (Lupine) - contain a quinolizidine alkaloid, induces nicotinic effects in animals. Leaves, seeds and fruits all contain lupinine, which is retained in dried plants. Pods may concentrate the toxin, becoming a source of poisoning during the winter season when livestock are moved through infested areas or contaminated hay is fed. Lupines are a major toxic problem in range sheep. Lupines are toxic when ingested at 1% or less of body weight.

***Clinical signs***: Salivation, ataxia, seizures and dyspnea are major acute clinical signs and are more common in sheep that in cattle; Head-pressing and excitement may also be seen; Effects not related to the nervous system include the "crooked calf syndrome" (i.e., carpal flexure, torticollis and scoliosis in calves exposed in utero during days 40-70 of gestation). The toxic principle for this effect is the alkaloid anagyrine. Interestingly, anagyrine is not teratogenic to sheep fetuses.

***Treatment:*** Oral detoxification and control of seizures in severely affected animals is the only recourse.

***Prevention:*** through correct range management is preferred. Alter grazing rotations so that cows are not exposed to lupines between days 40 to 70 of gestation. It has been proposed that cattle are affected by anagyrine due to ruminal metabolism of the alkaloid to a teratogenic metabolite. The mode of teratogenic action may involve an immobilizing effect on the fetus; skeletal malformations occur because the fetus remains in one position for extended periods of time.

*Lathyrus spp*. (Vetchling) - contian butyric acid, which cause - lathyrism, which manifests after consumption of large quantities or an exclusive diet of seeds. Lathyrism is well documented in human history when war, poverty, or drought have altered the diet of the people in a region. Human symptoms include paralysis (with loss of bladder or bowel control); slow, weak pulse; muscle tremors; a posture of feet turned-in, toes down; sensory disturbances; convulsions; and death. Horses probably are the animals most sensitive to the toxic principles. They display symptoms similar to those cited above and also hind leg paralysis, dyspnea, and roaring. In toxicity experiments in rats, L. Iatifolius produced nervous symptoms of hyperexcitability, convulsions, and death.

## *Brassicaceae* - The Mustard Family (alternative name *Cruciferae*)

- Annual, biennial or perennial herbs, occasionally shrubs;
- leaves alternate or rarely opposite, simple, entire to pinnately lobed or even dissected, without stipules;
- inflorescences mostly racemose, rarely solitary;
- flowers small, bisexual, actinomorphic to slightly zygomorphic, the !!! sepals 4 **in two opposite pairs** rarely 5, free, the petals 4, sometimes lacking or rarely 5, free and diagonal to the sepals, typically clawed with the broad blade abruptly spreading; stamens typically 6 (4+2) free, developing centrifugally
- gynoecium superior, the carpels 2, united to form a compound but unilocular ovary fully divided by a replum with parietal placentation,
- fruits an elongated silique or a short silicle with the valves falling away leaving the replum,
- 350-370 genera and more than 3000 species. Cosmopolitan and often weedy mainly in temperate regions but only sparsely represented in the Southern Hemisphere.

Main species: *Brassica oleraceae* - Cabbage; *Brassica napus* - Oilseed rape; *Brassica rapa* - Wild Turnip; *Sinapis alba* - White mustard; *Brassica nigra* - Black mustard; *Brassica juncea* - Mustard greens; *Raphanus raphanistrum* - Wild radish; *Raphanus sativus* - Radish; *Capsella bursa - pastoris* - Shepherd's - purse; *Nasturtium officinale* - Watercress; *Armoracia rusticana* - Horse-radish; *Alliaria petiolata* - Garlic mustard

**BAS**: The main brassica oil glycosides - sinigrine - which in the presence of the enzyme myrosinase, is converted to glucose, allyl isothiocyanate (mustard oil), and potassium hydrogen sulfate. Mustard oils are poisonous. The toxicity, by ingestion, of allyl isothiocyanate has been determined (in cattle) to be 0.001% of the body weight. Also, mustards occasionally contain toxic concentrations of nitrate that may complicate toxicosis.

**Action and use**:digestive stimulants and respiratory decongestants with antibacterial and antifungal action, rubefacient effect (help to bring the circulation to the surface of the skin) exploited in the use of the mustards and cabbage in poultices for anti-inflammatory effects; for scurvy and as purifying tonics (*Nasturtium officinale*, Scurvy-grass and Charlock); and for stopping bleeding (*Capsella bursa-pastoris* only).

*CONFUSED TAXA: There are 40 genera of mustards; many are yellow flowered. Botanical keys for the identification of mustards are complex and require mature fruits. One species frequently mistaken for a *Brassica* is *Barbarea vulgaris* R. Br (Yellow rocket, winter cress), which also has been reported to produce mustard-oil type poisoning. One feature used to separate *Brassica* from *Barbarea* is the beak of the fruit: 8- 15 mm long in *Brassic*a, 1-3 mm long in *Barbarea.*

*SPECIES OF ANIMALS AFFECTED: Reported poisonings include, cattle and sheep, *Brassica hirta* (white mustard); cattle and swine, B Kaber (charlock); and ruminants, large quantities of *Brassica oleracea var. botrytis* (broccoli). Goiter formation is known for lambs (ewes) fed on *Brassica oleracea var. acephala* (kale) and rabbits fed *Brassica oleracea var, capitata* (cabbage).

*OF INTEREST: Numerous members of the mustard family have been reported to cause poisoning Winter cress (*Barbarea vulgaris*) flowers April through June and is an abundant weed in Pennsylvania. One case was reported of a horse ingesting a relatively large amount of *Brassica vulgaris* and developing gastroenteritis. Rape (*Brassica campestris* L), although a late fall pasturage crop, has been suspected of causing toxicosis. Horseradish (*Armoracia rusticana* P. Goertn.) has caused bloody vomiting and diarrhea in humans when consumed in large quantities. Loss of cattle, horses, and swine are known from the ingestion of vegetation and roots. Small children, who eat large quantities of raw mustard vegetables (cabbage, mustard, kale, Brussel sprouts, cauliflower, broccoli, rutabaga, turnip, radish, cress, horseradish and stock) can develop diarrhea and vomiting. Field penny-cress (*Thlaspi arvense* L.), a common weed of fields, roadsides, and waste places, is responsible for gastric distress in livestock. It has been suggested that toxicity in members of the mustard family increases after flowering. Additional plants suspected of being poisonous are *Erysimum* (wallflower), *Sisymbrium* (Tumbling mustard), *Descurainia* (Herb-Sophia), *Camelina* (False flax) and *Bepidium* (Peppergrass).

## ***Apiaceae* - The Carrot family (or *Umbelliferae)***

- Herbs or infrequently subshrubs, rarely shrubs or small, soft-wooded trees;
- leaves alternate, simple to dissected or pinnately compound, rarely entire, the stipules lacking;
- inflorescences mostly arranged in terminal or axillary compound umbels, the umbels subtended by bracts, these sometime somewhat involucrate;

- flowers small, bisexual or rarely monoecious, actinomorphic, occasionally the peripheral flowers somewhat zygomorphic, epigynous, the sepals 5, mostly reduced to small or obsolete teeth, free, valvate, the petals 5, rarely wanting, free, alternating with the sepals, valvate; stamens 5, alternating with the petals, free,
- fruits a schizocarp, the embryo straight in copious, oily endosperm
- Around 415 genera and some 3100 species. Cosmopolitan but mainly in the temperate regions of the Northern Hemisphere.

Main species: *Daucus carota* - Wild carrot; *Anethum graveolens* - Dill; *Apium graveolens* - Celery; *Petroselinum crispum* - Parsley; *Pastinaca sativa* - Parsnip; *Pimpinella anisum* - Anise; *Coriandrum sativum* - Coriander; *Heracleum ternatum* - Hogweed; *Conium maculatum* - Poison hemlock; *Seseli annuum* - Steppes seseli; *Chaerophyllum temulentum* - Rough chervil; *Cicuta virosa* - Cowbane

**Toxity**: *Conium maculatum* (Poison hemlock) - contain alkaloids of the group of pyridines - coniine, in the root, young plants and seeds. As plants mature, the foliage loses alkaloid content, but the seeds accumulate the alkaloid. The whole green plant is toxic at dosages of approximately 1% of body weight.

***Clinical signs***: The clinical course is rapid, and animals may be found dead or die within a few hours. Initial consumption may cause a burning sensation in the mouth, salivation, emesis and diarrhea. Rapidly developing neurologic signs include muscle tremors, muscular weakness, dim vision, convulsions and coma. Death results from respiratory failure. Frequent urination and defecation may also occur.

***Treatment:*** The stomach should be evacuated, and activated charcoal administered. Respiratory support by mechanical ventilation may be lifesaving in small animals. Poison hemlock can also cause birth defects in ruminants and swine, with cattle and swine more susceptible than sheep and goats. The most often reported birth defects are cleft palate and spinal abnormalities. The gestational ages that have been associated with birth defects are: for goats, days 30 through 60; for cattle, days 40 through 70; for pigs, days 30 through 60. The birth defects resemble those seen with lupine, with lupine being the more dangerous plant.

**Cicuta maculata* (Cowbane) - all parts are extremely poisonous. A piece of root the size of a pea is sufficient to kill a human. A piece of root the size of a

walnut will kill a cow in fifteen minutes, and about 1 lb of dried plant may kill a horse. SYMPTOMS: Usually within 1/2 hour after ingesting a lethal dose the following symptoms occur: excessive salivation, then tremors and spasmodic convulsions with intermittent relaxation (the convulsions are extremely violent). Abdominal pain is evident, pupils are dilated, and temperature may be several degrees higher than normal. Humans may become delirious. Nausea and vomiting occur if the animal can vomit. Bloating is common. Additional symptoms include diarrhea, irregular pulse and heart rate, and behavioral abnormalities such as rolling of the eyes, turning in circles, twisting of the neck, falling down, and opening and shutting of the mouth. Death is due to respiratory failure after complete paralysis. Postmortem: gross and histological lesions: no obvious changes.

POISONOUS PRINCIPLE: Cicutoxin, a highly unsaturated alcohol, is responsible for poisoning. It is usually associated with the yellowish, oily liquid located in the lower stem and roots.

CONFUSED TAXA: Young plants of elderberry, *Sambucus spp.* (*Caprifoliaceae),* resemble to Cowbane. The leaves are opposite in elderberry and alternate in water hemlock. Elderberry may be mildly toxic. A cyanogenic glycoside, as well as an alkaloid, are present in elderberry leaves, flowers, berries, and particularly the roots. In moderate amounts these substances are purgative. Fresh berries are paradoxical - harmless when cooked but sometimes producing nausea when uncooked. Postmortem evaluation of elderberry toxicosis reveals bright red blood characteristic of cyanide poisoning.

* *Heracleum lanatum*.(Cow parsnip) - contain glycoside furanocoumarin. SYMPTOMS: Cow parsnip produces severe, painful, burning blisters in susceptible people, the symptoms appearing within 24 to 48 hours after contact. The sap can produce painless red blotches that later blacken and scar the skin for several years. For an adverse reaction to occur the skin, contaminated with plant juices, must be moist and subsequently exposed to sunlight (see also *Lantana* and *Hypericum*). This phenomenon, known as phytophotosensitization, occurs in animals when chemical compounds, either derived directly from plants or produced by the animal in response to plant substances, are present in peripheral circulation. *Heracleum lanatum* has also been implicated in less severe photosensitization reactions in some people.

## *Araliaceae* - The Ivy Family

- Trees, shrubs, lianas, woody epiphytes or rarely perennial herbs;
- leaves alternate or rarely opposite or verticillate, simple to dissected or pinnately or palmately compound, sometime 2 or 3 times compound, the stipules occasionally present;
- inflorescences mostly arranged in terminal or axillary simple umbels;
- flowers small, bisexual or rarely polygamous or dioecious, actinomorphic, epigynous, the sepals 5, mostly reduced to small or obsolete teeth, occasionally lacking, free, valvate, the petals 5-10 (12), rarely 3, free or rarely connate basally, even more rarely forming a calyptra or a tube, mostly deciduous, alternating with the sepals, valvate or infrequently slightly imbricate; stamens usually as many as and alternating with the petals, free; gynoecium inferior, rarely half-inferior or superior, the carpels mostly (2-) 5, connate and united to form a compound ovary with as many locules or carpels,
- fruits are drupes, berries or rarely a drupelike schizocarp (and then with a carpophore), the endocarp never woody. the embryo straight in copious endosperm;
- Around 50 genera and perhaps 1200 species. Tropical and subtropical regions of the world (especially southern Asia and the islands of the western Pacific) with a few extending into temperate regions.

Main species: *Hedera helix* - Common ivy; *Panax ginseng* - True ginseng; *Eleutherococcus senticosus* - Siberian ginseng

**Toxity**: The black berries and leaves of English ivy are poisonous if consumed in quantity. *Hedera helix* is a purgative that produces local irritation, excessive salivation, nausea, excitement, difficulty in breathing, severe diarrhea, thirst, and coma.

POISONOUS PRINCIPLES: The toxic substance is hederin, a glycoside of the steroidal saponin hederagenin.

*Other species of *Hedera*, especially the popular Algerian ivy, *H. canariensis* Willd., as well as members of the genus *Aralia* (sarsaparilla) should be viewed with suspicion. The fruits of all species of *Aralia* are poisonous when eaten raw but are infrequently cooked as jelly, which is reported edible.

## *Anacardiaceae* - The Sumac Family

- Trees, shrubs or lianas, rarely subshrubs;
- leaves alternate or rarely opposite, pinnately compound or trifoliolate, infrequently simple, the stipules mostly lacking, infrequently inconspicuous or vestigual;
- inflorescences arranged in complex axillary or terminal panicles;
- flowers small, bisexual or more commonly functionally unisexual with the androecium or gynoecium reduced, actinomorphic, hypogynous or infrequently perigynous or epigynous, the sepals small, (3) 5 (7), connate basally, imbricate or valvate, the petals (3) 5 (7) or rarely lacking, free or infrequently connate basally, alternating with the sepals, imbricate or valvate; stamens (1) 5-10 (many), typically in a single whorl, free or basally connate; gynoecium superior or inferior, the carpels (2) 3 (5-12) and united to form a compound ovary with as many locules as carpels but often only a single locule fully developed and fertile, infrequently apocarpous and still only one fertile, the styles free or connate, the stigma mostly capitate, the ovule 1;
- fruits variable - drooping panicles of berries, the embryo curved or occasionally straight, with scanty or no endosperm;
- Approximately 75 genera and perhaps 600 species. Pantropical or occasionally in temperate environs.

Main species: *Pistacia terebinthus* - turpentine tree; *Pistacia vera* - pistachio; *Rhus coriaria* - Elm-leaved sumach; *Rhus toxicodendron* - Poisonous sumach; *Cotinus coggigria* - European smoketree

**BAS**: tannins, essential oils, flavonoid glycosides - mirythricine, saponins, alkaloids - dictamine

**Ation and use**: astringent, antiseptic, uterotonic, diuretic action , against worms; cause dermatitis

## *Rutaceae* - The Citrus Family (Rue Family)

- Trees, shrubs, subshrubs, lianas or infrequently herbs, often aromatic - with oil glands
- leaves alternate or occasionally opposite, rarely verticillate, pinnately compound or trifoliolate, rarely simple, often pellucid-punctate, the stipules lacking;

- inflorescences arranged in cymes or less often in racemes, occasionally solitary or even epiphyllous, rarely in dense, bracteated heads (Diplolaena);
- flowers small, bisexual or infrequently unisexual, actinomorphic to slightly zygomorphic, on type 5; stamens mostly 3-4 times the number of petals, infrequently numerous (up to 60), rarely 2-3 fertile, free or connate basally, occasionally adnate to the petals or inserted above the disk ; gynoecium superior, the carpels (2) 4-5 (many), more or less united to form a compound ovary with as many locules as carpels
- fruits variable - hesperidium
- About 160 genera and some 1650 species.
- Widespread in tropical, subtropical and (warm) temperate regions of the world, especially in Australia and South Africa.

Main species: *Ruta graveolens* - Common rue; *Dictamnus albus* - Gas plant; Genus *Citrus:Citrus limon* - Lemon; *Citrus x sinensis* - Sweet orange; *Citrus aurantium* - Bitter orange; *Citrus paradisii* - Grapefruit; *Mandarina reticulata* - Mandarine; *Citrus bergamia* - Bergamot; *Citrus latifolia* - Tahiti lime; *Citrus maxima* - Pomelo

**BAS**: essential oils, quinoline alkaloids, flavonoids and steroids, sapon nins,

**Ation and use**: diuretic, against sweating and worms

**Toxity**: *Dictamnus albus* (Gas plant) - about 170 chemical compounds, which include quinoline alkaloids, limonoids, sesquiterpenes, coumarins, flavonoids and steroids, have been isolated from the genus *Dictamnus.* The characteristic and active constituents of *Dictamnus* species are considered to be quinoline alkaloids and limonoids, which exhibited a broad spectrum of biological activities such as anti-cancer, anti-inflammation, anti-microbe, anti-platelet-aggregation, vascular-relaxation, anti-insect, anti-HIV, anti-allergy and neuroprotection. Moreover, quinoline alkaloids and limonoids could be used as quality control markers to distinguish different species from the genus *Dictamnus.* However, there were also some reports on the toxic hepatitis and phototoxic effect of *Dictamnus* species.

## ***Hippocastanaceae*** **- The Horse-chestnuts family**

- Trees or shrubs;
- leaves opposite, palmately compound and 3-11-foliolate, the stipules lacking;

- inflorescences arranged in terminal panicles or racemes;
- flowers rather large, bisexual or often with the uppermost functionally staminate, zygomorphic, hypogynous, the sepals 5, free (*Billia*) or connate and forming a tube (*Aesculus)*, imbricate, the petals 4-5, free, alternating with the sepals, unequal, clawed, imbricate; stamens (5) 6-8 with an inner whorl of 5, free, gynoecium superior, the carpels (2) 3 (4) and united to form a compound ovary with as many locules as carpels, the styles connate
- fruits a loculicidal capsule, the seeds large, the embryo curved, without endosperm;
- 2 genera and some 15 species. Temperate and subtropical regions of southern and eastern Asia and of North America southward to northern South America.

Main species**:** *Aesculus hippocastanum* - Horse-chestnuts

**BAS**: purine alkaloids , coumarine glycosides - esculine; saponins - escine; flavonoids - quercetine; tannins, phytosterols, fat oils, vitamins - C,B complex, K.

**Action and use**: increases the resistance of the capillary walls - vasoconstrictor and analgesic action

## *Aceraceae* - The Maple Family

- Trees or infrequently shrubs;
- leaves opposite, simple and typically palmately lobed or at least veined, or pinnately or palmately 3-5-foliolate, the stipules lacking;
- inflorescences arranged in small umbels or corymbs, or sometimes large panicles or racemes;
- flowers small, unisexual or at least functionally so, actinomorphic, hypogynous or the staminate ones sometimes perigynous, the sepals (4) 5 (6), rarely lacking, free or rarely basally connate, imbricate, the petals (4) 5 (6), rarely lacking, often sepaloid, free, alternating with the sepals, imbricate; stamens (4-5) 8 (10-12), free; gynoecium superior, the carpels mostly 2 and united to form a compound ovary with as many locules as carpels,
- fruits a winged shizocarp commonly in the form of a double samara, the embryo curved, without endosperm;

- 2 genera and some 110 to 120 species. Temperate regions of Eurasia and North America.

Main species**:** *Acer rubrum* - Red maple; *Acer negundo* - Box Elder; *Acer circinatum* - Vine Maple; *Acer palmatum* - Japanese Maple; *Acer platanoides* - Norway Maple

*The leaves of the Maples commonly exhibit varnish-like smears, of sticky consistence, known as honey-dew. This is the excretion of the aphides which live on the leaves; the insect bores holes into the tissues, sucks their juices and ejects a drop of honeydew, on an average once in half an hour. In passing under a tree infested with aphides the drops can be felt like a fine rain. The fluid is rich in sugar. When the dew falls, the honey-dew takes it up and spreads over the leaf; later in the day evaporation reduces it to the state of a varnish on the leaf surface, which aids in checking transpiration. Many other trees exhibit this phenomenon, e.g. lime, beech, oak, etc.

**BAS**: sugars, vitamins

**Action and use**: blood tonic, diuretic and expectorant, for treating blindness.

**Toxity**: *Acer rubrum* - symptoms of poisoning : Within 18 to 24 hours after consumption of red maple leaves horses begin to show yellow or brown discoloration of the mucous membranes, especially gums and eyelids, urine becomes dark red to brown, and animals become febrile (102.0-103.5°). About 50% of the horses that consume red maple leaves are affected. As many as 64% of those affected die, usually from methemoglobinemia, a destruction of hemoglobin in the blood.