SUBCLASS *ROSIDAE* - sequel

Cornaceae - The Dogwood family

•Evergreen or deciduous trees or shrubs, rarely herbaceous,

•leaves are opposite or rarely alternate, simple, entire, the stipules are lacking; inflorescences are arranged in terminal cormybose, capitate cymes or in heads subtended by herbaceous or petaloid bracts, occasionally umbellate;

•flowers are small, bisexual or rarely unisexual and dioecious (*Afrocrania*), actinomorphic, epigynous, typically with a small disk like hypanthium beyond the top of the ovary, flowers are 4(-10)-merous; the sepals are 4, free and attached at the top of the hypanthium, valvate, the petals are 4, alternating with the sepals, free, valvate; stamens are 4 and alternating with the petals, free, borne on the nectiferous disk, gynoecium inferior, the carpels are 2 and united to form a compound bilocular ovary.

•fruits are a drupe with a hard endocarp, the seeds are compressed and with a membranous testa

•there are 2 genera and about 55 species in cold and temperate regions, circumpolar in the Northern Hemisphere

Main species: Cornus mas - Cornelian cherry; Cornus sanguinea - common dogwood

BAS: secoiridoids, isoquinoline alkaloids, triterpenoid saponins, flavonols,, tannins; mucilage

Action and use: Astringent and reduce fever, anemia, diseases of the urinary tract and kidney stones, against ringworms. Toxic!!

Buxaceae - The Boxwood family

- evergreen small trees or shrubs with a height of up to 10 meters,
- leaves are simple, alternately arranged and comparatively small. They are egg-shaped, elliptical, leathery and peripherally uncut. The upper surface is dark green and glossy, while the lower one is light green or yellow-green and dull.
- Flowers are small, unisexual, and without petals, the majority of species are dioecious (bearing male and female flowers on separate plants).
- Fruits are one- or two-seeded capsules or drupes (stony-pitted fleshy fruits)
- Box-tree is one of the slowest growing deciduous species. It is long lived and reaches an age of up to 700 years.

BAS: the leaves - contain steroidal alkaloids, oils and tannins, the bark - contains wax, resin, lignin and minerals; Toxic!!

Action and use: cholinesterase inhibition, antibacterial and anti-leishmanial activities; for treatment urinary tract infections, intestinal worms, but also has the reputation of curing leprosy, fever and malaria.

Euphorbiaceae - The Spurge family

- There are 300 genera and 7,500 species.
- herbs, but sometimes especially in the tropics, are shrubs or trees with succulent and cacti appearance
- occurs mainly in the tropics, with the majority of the species in the Indo-Malayan region and tropical America; non tropical areas such as the Mediterranean Basin, the Middle East, South Africa,
- leaves are alternate, seldom opposite, with stipules. They are mainly simple, but where compound, are always palmate, never pinnate. Stipules may be reduced to hairs, glands, spines, or in succulent species are sometimes absent.
- plants can be monoecious or dioecious. The radially symmetrical flowers are unisexual, with the male and female flowers usually on the same plant. The stamens (the male organs) number from one to 10 (or even more). The female flowers are hypogynous, that is, with superior ovaries.
- Form inflorescence named cyathium - a small, cup-like involucre consisting of fused-together bracts and peripheral nectary glands, surrounding a ring of male flowers, each a single stamen. In the middle of the cyathium stands a female flower: a single pistil with branched stigmas. This whole arrangement resembles a single flower.
- fruit is usually a schizocarp, but sometimes a drupe. A typical schizocarp is the regma, a capsular fruit with three or more cells, each of which splits open at maturity into separate parts and then breaks away explosively, scattering the small seeds.

Main species: Genus *Croton* - Croton; Genus *Euphorbia* - Spurge

Ricinus communis (Castor been) - rich of unsaturated fatty acids - laxative effect; toxic substance ricin - prevents protein synthesis (Just 1 milligram of ricin is fatal if inhaled or ingested, and much less than that if injected. Eating just 5 to 10 castor seeds would be fatal)

BAS: milky latex with alkaloids, glycosides, unsaturated fatty acids

Action and use: constipation, dysentery, inflammatory bowel disease, bladder and vaginal infections

Modern Medicinal Uses for Castor Oil: Gastrointestinal remedy; Antimicrobial (antibacterial, antiviral, and antifungal); labor stimulantix; anti-inflammatory and analgesic; immune system and lymphatic stimulant

Erythroxylaceae - The Coca family

- Small trees and shrubs;
- leaves are alternate or rarely opposite (*Aneulophus*), simple, entire, the stipules are intrapetiolar, often caducous;
- inflorescences are basically arranged in axillary fascicles, sometimes reduced to a solitary axillary flower;
- flowers are small, bisexual or infrequently unisexual, actinomorphic, hypogynous, the sepals are small, 5, connate and forming a distinct tube, the lobes imbricate or valvate, the petals are 5, free, alternating with the sepals, often with a basal ligular appendage, imbricate; gynoecium is superior to inferior, the carpels are (2) 3 and united to form a compound ovary with as many locules as carpels
- fruits are 1-seeded drupe
- there are 4 genera and some 260 species, pantropical but mainly in the Andeas and the Amazon Basin of South America.

Main species: *Erythroxylum coca* - coca bush

BAS: psychoactive alkaloid - cocaine, tropacocaine, ecgonine, cuscohygrine, dihydrocuscohygrine, nicotine; essential minerals (calcium, potassium, phosphorus), vitamins (B_1, B_2, C, and E) and nutrients such as protein and fiber.

Action and use: natural - acts as a mild stimulant and suppresses hunger, thirst, pain, and fatigue; synthetic analogues - with anesthetic and analgesic properties, powerful stimulant

!!The coca leaf, when consumed in its natural form does not induce a physiological or psychological dependence, nor does abstinence after long-term use produce symptoms typical to substance addiction!!

Linaceae -The Flax family

- Herbs, subshrubs or rarely small shrubs (*Tirpitzia*);
- leaves are alternate or opposite, simple, entire, the stipules are usually small and inconspicuous, sometimes reduced to glands or even lacking;
- inflorescences are basically arranged in cymes, rarely in racemes (*Anisadenia*); flowers are small to mid- size, bisexual, actinomorphic, hypogynous, 4-merous only in Radiola, the sepals are 5, free or connate basally, imbricate, the petals are 5, alternating with the sepals, free, stamens are 5, connate basally, alternating with the petals, the carpels are (2) 3-5 and united to form a compound ovary with as many locules as carpels,
- fruits typically are a septicidal capsule (indehiscent with 2, or 1-seeded mericarps in Anisandenia),
- there are 8 genera and about 250 species in temperate and subtropical regions of the world.

Main species: *Linum hirsutum* - Anatolian flax; *Linum catharcticum* - Fairy flax; *Linum catharcticum* - Fairy flax; *Linum usitatissimum* - common flax

BAS: omega-3 fatty acids, B vitamins, glycosides, cyanogenic glycosides, cadmium

Action and use: Emollient, demulcent, pectoral, laxative

Myrtaceae - The Myrtle family

- Aromatic trees and shrubs;
- leaves are opposite or occasionally alternate, rarely verticillate, simple, entire, often coriaceous, the stipules are vestigial or lacking;
- inflorescences are arranged in racemes or cymes, rarely solitary and axillary;
- flowers are small, bisexual or rarely unisexual (*Psiloxylon)*, actinomorphic, epigynous and often with a well-developed hypanthium atop the ovary, occasionally half-epigynous to perigynous with a hypanthium free of the ovary, the sepals are (3) 4-5 (6), free and attached at the top of the hypanthium or variously connate and even forming a deciduous calyptra, the petals are (3) 4-5 (6), free or variously connate and forming a calyptra in some species of

Eucalyptus, rarely lacking; stamens are numerous and originating centripetally, free or connate basally into 4-5 fascicles opposite the petals and borne at the rim or on the upper portion of the hypanthium, gynoecium superior to half-inferior or more commonly inferior, the carpels are 2-5 (16) and united to form a compound, plurilocule ovary typically with as many locules as carpels,

- fruits are a loculicidal or rarely a circumscissle capsule, occasionally a drupe, schizocarp or a nut, sometimes a 1-few (many-) seeded berry.
- There are nearly 130 genera and more than 3900 species in tropical and subtropical regions of the world, especially in Australia, a few in warm Temperate regions.

Main species: *Myrtus communis* - Common myrtle; *Pimenta dioica* - allspice; *Eugenia caryophyllata* - Clove; *Eucalyptus globulus* - Tasmanian bluegum

BAS: essential oil, tannins; myricetin - glycoside

Action and use: for treatment to unrinary and bladder infections; anti-inflammatory and antioxidant properties

Rhamnaceae - The Buckthorn family

- Trees and shrubs or occasional lianas or even subshrubs or rarely herbs, the shrubs are often thorny; named also “much-branched” shrubs from the name of genus *Rhamnus* (the name derived from the Greek rhamnos - a branch)
- leaves are alternate or less often opposite, simple, entire, sometimes reduced and the stems are photosynthetic, the stipules are usually present and small or reduced to spines, sometimes lacking;
- inflorescences are basically arranged in terminal and axillary cymes or panicles, sometimes umbels or racemes, occasionally reduced (or seemingly so) to a solitary flower;
- flowers are small and often greenish, bisexual or rarely unisexual, actinomorphic, perigynous to epigynous, the sepals are small, 4-5, free, valvate, soon deciduous atop the hypanthium tube ("calyx tube") or the ovary, the petals are the same number as and alternating with the sepals, each often hooded or concave and somewhat enclosing an anther, valvate, rarely lacking; stamens are 4-5, free, alternating with the sepals and opposite the petals atop the hypanthium with the well-developed

nectiferous disk intrastaminal, gynoecium is superior to inferior, the carpels are 2-3 (5) and united to form a compound ovary commonly with as many locules as carpels,

- fruits are drupaceous, variously dehiscent or indehiscent, sometimes separating into mericarps,
- there are about 50 genera and some 875 species, nearly cosmopolitan but mainly in subtropical and tropical regions of the world.

Main species: *Frangula alnus* - Alder buckthorn; *Rhamnus catharaticus* - Common buckthorn; *Paliurus spina - christi* - Jerusalem thorn

BAS: The ripe berries have acrid, nauseous, bitter juicep due to tannic acid, sugar and gums, antraquinone glycosides - rhamnaglycosides

Action and use: purgative

!! Large doses of the herb highly irritating the gastrointestinal tract and kidneys!!

SUBCLASS ASTERIDAE

- there are 11 orders, 49 families, 60 000 species
- the most advanced subclass of dicotyledons
- exploit specialized pollinators and specialized means of presenting the pollen
- leaves - without stipules, often simple
- flowers - hermaphrodite, regular or irregular, with often fussed in tube sepals and petals or with reduced perianth, collected in dense clusters - paniculate flower heads (capitula)
- flowers - adapted to entomophilic pollination
- frequent occurrence of iridoid compounds

Asteraceae - The Sunflower Family

*The word aster means "star" in Greek, referring to the appearance of some family members, as a "star" surrounded by "rays"

- Herbs, subshrubs or subshrubs, occasionally lianas or small to medium-size trees, rarely epiphytes or tall trees; especially common in open and dry environments

- leaves are alternate, occasionally opposite, infrequently verticillate, simple and entire to toothed or lobed, infrequently divided or compound, the stipules are lacking;
- inflorescences are arranged in dense, racemose heads (capitula) of 1-many or numerous, sessile flowers on a single receptacle nearly always subtended by 1-several series of bracts, the capitula sometimes secondarily arranged in cymose heads with a series of additional subtending bracts;
- flowers are mostly small, epigynous, either all alike (homogamous) or of two or more kinds (heterogamous) in a head, the homogamous ones usually bisexual, the heterogamous ones typically with an outer array of radiate female or neutral flowers and an inner group of bisexual or functionally male flowers, the sepals connate into a tube fused with the ovary with the free lobes modified into a pappus, this occasionally reduced or even obsolete, the petals are 5, tubular or discoid and completely sympetalous, ligulate (or rayed) and zygomorphic with the ligule 3-5-toothed apically, or bilabiate, the petals are rarely lacking entirely and then only in the outer female heterogramous flowers;
- gynoecium is inferior, the carpels are 2 and united to form a compound, unilocular ovary as a result of aborption,
- fruits are an achene typically crowned with the persistent pappus of scales or bristles, rarely drupaceous with a fleshy pericarp, the pappus is sometimes deciduous or rarely wanting,
- there are nearly 1550 genera and some 24,000 species, cosmopolitan but mainly in temperate and subtropical regions.

Main species: *Matricaria chamomilla* - Chamomile; *Artemisia vulgaris* - Common wormwood*; Achillea millefolium* - Common yarrow; *Arctium lappa* - Greater burdock; *Centaurea cyanus* - cornflower; *Cirsium arvense* - creeping thistle; *Leontopodium alpinum* - Edelweiss; *Tussilago farfara* - Coltsfoot; *Helianthus annuus* - Sunflower; *Helianthus tuberosus* - The Jerusalem artichoke; *Echinops sphaerocephalus* - Glandular globe-thistle; Echinacea purpurea - Eastern purple coneflower; *Taraxacum officinale* - Common dandelion; *Cychorium inthybus* - Chicory; *Senecio vernalis* - Eastern groundsel; *Cinara cardunculus* - Cardoon

**Matricaria recutita* - Chamomille

BAS: Volatile oils (alpha bisabolol, azulene, chamazulene & matricin), sesquiterpenes lactones, coumarins (umbelliferone), salicylic acid, choline, fatty acids, mucopolysaccharides, flavonoids (apigenin, luteolin, quercetin)

Action and use: Mild nervous system sedative, anti-spasmodic, analgesic, anti-inflammatory, antiseptic, anti-emetic, carminative, anti-microbial, vulnerary, anti-ulcer, anti-allergic

**Artemisia absinthium* - Wormwood

BAS: Volatile oils (thujone, absitol, azulenes, etc), terpenoids, bitter sesquiterpenes & bitter sesquiterpene lactones (artemisinin), triterpenoid, flavone glycoside, hydroxycoumarins

Action and use: Anti-parasitic, anthelmintic, anti-neoplastic, bitter tonic & digestive stimulant, carminative, anti-microbial, choleretic, emmenagogue, aromatic, mental stimulant, narcotic, immuno-stimulant, anti-inflammatory, emmenagogue, diuretic.

Medicinal use: CNS depressant and uterine stimulant. Antimalarial and anti-cancer. Wormwood, signifies its use as an anthelmintic (especially against roundworm and pinworm). Will promote appetite and bile secretions as wells as absorption of nutrients. It cn be applied topically for rheumatic pains.

Toxicity: *Artemisia* (primarily thujone isolated and in high doses) is very toxic to the CNS, causing paralysis, decreased coordination, and (euphoric) hallucinations. These effects are said to be reversible. Thujone is not well preserved in water, thus water extractions are safer than alcohol extractions. Long-term or high dosing may irritate stomach and dangerously affect the heart and arteries.

**Arctium lappa* (Burdock) - parts used: Root, seeds & leaves

BAS: Root: up to 50% inulin (polysaccharides), tannin (phlobaphone), polyacetylenes (sulphur containing), volatile acids (acetic, proprionic, butyric, isovaleric), non-hydroxyl acids (lauric, myristic, stearic, palmitic), polyphenolic acids, and sesquiterpene lactones (arctiopicrin). Seed: 15-30% fixed oils, a bitter glycoside (arctiin) and chlorogenic acid. Leaf: arctiol, fukinone, and taraxasterol.

Medicinal actions: Alterative, anti-mutagenic, diuretic, diaphoretic, mild laxative, immunostimulatory, anti-inflammatory, bitter digestive stimulant & hepatoprotective, antimicrobial.

Medicinal use: Alteratives may act through a combination of effects including: choleretic, cholagogue, enhancing detoxification pathways in the liver,

increasing cellular metabolism, laxative, nerve tonic, and stimulation of glandular functioning. Arctium is useful in conditions such as eczema, acne, psoriasis, and possibly in the treatment of cancer. It is a useful adjunct in the treatment of rhuematoid arthritis and tonic to the digestive system.

**Calendula officinalis* - Marigold, Calendula

BAS: flavonoids, triterpenoid & steroidal saponins, carotenoids, bitter resin (calendulin), mucilage & polysaccharides, volatile oils

Actions and use: anti-inflammatory; antimicrobial; anti-spasmodic; demulcent; lymphatic; phytoestrogenic

**Echinacea spp.* - Echinacea, Coneflower - Part used: Root (dried), aerial parts

BAS: Glycosides - natural antibiotics (caffeic acid derivatives: echinacoside, isochlorogenic acid, chlorogenic acid, cichoric acid), polysaccharides (inulin), glycoproteins, aminds (alkamides), volatile oils, polyacetylenes, flavonoids, alkaloids (pyrrolizidine saturated type)

Actions: General tonic, immuno-modulator & immuno-stimulator, lymphatic, antimicobial (antibacterial & antiviral), anti-inflammatory, anti-allergic, diaphoretic, anti-catarrhal, detoxifer, alterative, peripheral vasodilator, bitter, vulnerary

Apocynaceae - The Dogbane family

- Trees, shrubs, subshrubs, lianas or herbs, with a well- developed laticifer system;
- Leaves are opposite or infrequently verticillate, rarely alternate, simple and entire, rarely lobed or dentate, the stipules are typically wanting or if present then small and interpetiolar; inflorescences are arranged in cymes, racemes or as solitary flowers;
- flowers are mid - size to large, occasionally exceedingly so, often showy, bisexual, actinomorphic or rarely slightly zygomorphic, hypogynous, the sepals are (4) 5, connate into a tube, the lobes imbricate, the petals are (4) 5, sympetalous with a short to long tube, mostly funnelform to salverform, the lobes are contorted, rarely imbricate or valvate; gynoecium is superior or rarely half-inferior, the carpels are 2 (8) and united to form a bilocular, sometimes deeply divided ovary

- fruits are variable, the seeds are occasionally with a terminal coma of hairs, the embryo is large, straight in abundant to scanty, oily endosperm
- there are approximately 230 genera and 2000 species (some accept only about 170 genera), widespread and common in tropical and subtropical regions, less common in warm temperate and temperate environs.

Main species: *Vinca major* - Bigleaf periwinkle; *Vinca minor* - Lesser periwinkle; *Nerium oleander* - Oleander; *Rauwolfia serpentina* - Indian snakeroot; *Strofanthus kombe* - Strofanthus;

**Rauwolfia serpentina* (Indian snakeroot) - contain indole alkaloids (mainly reserpine) - deplete catecholamine and serotonin stores in many organs;

Action: hypotensive, for treatment schizophrenic disorders.

Toxicity: Signs of toxicity include: sedation, depression, nightmares, abdominal cramps, diarrhea, gastrointestinal ulceration and hemorrhage, water retention, nasal congestion, flushing of the skin, pinpoint pupils, hypotension, bradycardia, vertigo, stupor, tremors, coma. Convulsions and extrapyramidal reactions have occurred following large doses. Small doses may stimulate respiration, large doses produce respiratory depression.

**Vinca minor* (Periwinkle) - contain indole alkaloids (vincristine & vinblastine), tannins, volatile oils (terpenoids), flavonoids, saponins, phytosterols ;

Action: adstringent, cerebral circulatory stimulant, cytotoxic (anti-cancer)

Loganiaceae - The Loganian family

- Trees and shrubs or lianas, or herbs;
- leaves are opposite, simple and entire, the stipules are interpetiolar and often with colleters, sometimes reduced to interpetiolar lines, persistent or caducous;
- inflorescences are mostly arranged in terminal or axillary cymes or reduced to solitary flowers, infrequently in spikes;
- flowers are mid- sized to large, bisexual, actinomorphic, rarely with one of the calyx-lobed enlarged and petaloid (*Usteria*), hypogynous, the sepals are (2) 4-5, connate into a toothed or deeply cleft tube, imbricate, occasionally with colleters, the petals are 4-5 (15), sympetalous with a short to long tube, valvate or imbricate; gynoecium is superior or rarely half-inferior, the

carpels are 2-3 and united to form a compound ovary with as many locules as carpels, rarely reduced to a single locule

- fruits are a septicidial or occasionally a loculicidal or rarely a circumscissile capsule or a berry, the seeds are sometimes wholly or partially winged, the embryo is small, straight or nearly so, axially embedded in the endosperm
- there are 20 genera and approximately 430 species, pantropical with a few representatives in warm temperate regions, rarely in temperate environs.

Main species: *Strychnos nux-vomica* - Strychnine tree

BAS: indole alkaloid strychnine

Action and use: a powerful central nervous system stimulant that competes with the inhibitory neurotransmitter amino acid glycine, producing an excitatory state with hyperreflexia, severe muscle spasm, and tetanic convulsions.

Its principal action is to cause uncontrolled muscle contractions. In overdose, these lead to death from exhaustion or cardiac arrest. The muscle contractions can result in muscle tearing itself away from bone allowing the body to be twisted into normally impossible positions.

Gentianaceae - The Gentian family

- Herbs or infrequently subshrubs, shrubs, lianas or small trees, the herbs sometimes are mycotrophic and achlorophyllous;
- leaves are opposite or infrequently verticillate, rarely alternate, simple and entire, greatly reduced and scale like in mycotrophic species, the stipules are wanting;
- inflorescences are mostly arranged in terminal or axillary cymes, infrequently racemose or reduced to solitary flowers;
- flowers are small to large, bisexual or rarely unisexual, actinomorphic to slightly zygomorphic, hypogynous, the sepals are 4-5 (12), connate into a tube, rarely free or nearly so, the lobes imbricate or occasionally valvate, the petals are 4-5 (12), sympetalous with a short to long tube, contorted; gynoecium is superior or rarely half-inferior, the carpels are 2 and united to form a unilocular ovary,
- fruits are a septicidial capsule or occasionally a berry, the embryo is small and sometimes poorly differentiated in mycotropic genera, straight in abundant endosperm;

- there are approximately 80 genera and perhaps 1265 species, cosmopolitan, mainly of temperate and subtropical regions.

Main species: *Gentiana lutea* - Great yellow gentian; *Gentiana punctata* - Spotted Gentian; *Gentiana verna* - Spring gentian; *Centaurium erythraea* - Common centaury;

**Gentiana lutea* - Great yellow gentian

BAS: glycosides, flavonoids, alkaloids, iridoids, xanthones, phenolic acids

Action and use: bitter, gastric stimulant, cholagogue, sialagogue (promotes the secretion of saliva glands), anti-microbial, antihelmintic

Toxicity: If given in large amounts, Gentian will suppress the stomach, irritate the bowels, causes N/V.

Valerianaceae - The Valerian family

- Annual or perennial herbs, typically with a rank odor;
- leaves are opposite, often in basal rosettes, simple and entire to pinnatifid or pinnately compound, the stipules are lacking;
- inflorescences are arranged into variably divided cymes, occasionally in heads;
- flowers are small, bisexual or sometime polygamous or unisexual and often dioecious, nearly actinomorphic to more commonly zygomorphic, epigynous, the sepals are 5, connate, mostly small or even reduced to a mere rim, occasionally of numerous segments that become pappus-like or even plumose in fruit (*Valeriana)*, rarely well developed (*Nardostachys*), the lobes imbricate, the petals are (3) 5, sympetalous, mostly tubular, occasionally funnelform (*Triplostegia*), gynoecium is inferior, the carpels are 3 and united to form a compound ovary with as many locules as carpels,
- fruits are dry and achene-like, often with accrescent wings, awns or plumose hairs derived from the persistent calyx, occasionally surrounded by a persistent epicalyx (*Triplostegia)*, the embryo is large, straight in oily endosperm;
- there are 10 genera and around 400 species, nearly cosmopolitan but mainly in temperate regions.

Main species: *Valeriana officinalis* - Valerian

BAS: volatile oil (camp hene, borneol), sesquiterpene alkaloids (valerenic acid), Iridoid esters (valepotriates), alkaloids (actinidine, valerine, valerianine, chatinine)

Action: Nervous system relaxant, hypnotic, hypotensive, anxiolytic, analgesic, antibiotic, expectorant, bitter, carminative, sedative (paradoxical stimulant), antispasmodic

Medicinal use: One of the most relaxing nervines available to herbal medicine. It can be used safely to reduce tension, anxiety, and overexcitable states. It is an effective aid in insomnia, producing a natural healing sleep. As an antispasmodic it has a muscle relaxing effect on smooth and skeletal muscles, and will aid in the relief of cramping, neuralgias and intestinal colic.

*Volatile oil (camphene, borneol) are CNS depressants and therefore responsible for sedative, hypnotic and antispasmodic actions.

Valerenic acid and its derivatives are sedative and antispasmodic. Bind GABA receptors, release GABA and inhibit GABA degradation causing CNS sedation and smooth & skeletal muscle relaxation. Iridoid valepotriates are sedative and antispasmodic. Paradoxical stimulant effects may be due to a high sensitivity to valepotriates. Alkaloids are hypotensive.

Caprifoliaceae - The Honeysuckle family

- Trees, shrubs, lianas, subshrubs and herbs;
- leaves are opposite, simple and entire or variously toothed, the stipules lacking;
- inflorescences are arranged variously into axillary or terminal cymes, occasionally otherwise;
- flowers are mostly mid-size to large, bisexual, actinomorphic to zygomorphic, epigynous, the sepals are 4-5, connate, the lobes imbricate, the petals are 4-5, sympetalous, mostly funnel form to tubular, occasionally gibbous basally, the lobes imbricate; stamens are epipetalous, as many as and alternating with the corolla lobes, the anthers are tetrasporangiate and 2-locular, dehiscing by longitudinal slits; gynoecium is inferior, the carpels are 2-5 (8) and united to form a compound ovary with as many locules as carpels,
- fruits are capsules, berries or drupes, the embryo is straight in fleshy, oily endosperm;
- there are 12 genera and 260 species, mostly in northern temperate regions with some expending into subtropical or tropical mountains.

Main species: *Viburnum opulus* - Crampbark; *Viburnum prunifolium* - Black Haw

BAS: Viburnin (glycoside), valerianic acid, coumarins (scopoletin, scopaline) - (uterine relaxant), salicosides, resin and 3% tannin, hydroquinone glycosides (arbutin), bitter (viburnin)

Action: Antispamodic, sedative, nervous system relaxant, astringent, anti-asthmatic, hypotensive, peripheral vasodilator, muscle relaxant, bitter, uterine tonic, diuretic

Medicinal use:Viburnum is a skeletal and smooth muscle relaxant (uterus, bronchial mucous membrane and blood vessels). It can be used both internally topically to relieve cramps (especially menstrual and in uterine & ovarian pain), asthma, and hypertension. Muscle spasms, pain and cramping in any area can benefit from its use including back & leg pain, arthritis and polymyalgia.

**Viburnum prunifolium* - Black Haw

BAS: Flavonoids, coumarins (scopoletin), iridoid glycosides, triterpenes, phenolic acid (salicin, chlorogenic acid), tannins, oleanolic & ursolic acid

Actions: Antispasmodic (especially uterine & bronchial), sedative, astringent, anti-asthmatic, hypotensive, bitter, uterine tonic, diuretic

Boraginaceae - The Forget-me-not family

- Herbs, occasional shrubs or trees, or infrequent lianas;
- leaves are alternate or rarely opposite (at least below), simple and mostly entire, the stipules are lacking;
- inflorescences are arranged in compact to open, typically helicoid cymes, infrequently axillary and solitary;
- flowers are small to mid-sized, bisexual, actinomorphic or slightly zygomorphic, hypogynous, the sepals are (4) 5 (6), free or more often connate to nearly throughout and tubular, imbricate or infrequently valvate, the petals are (4) 5 (6), sympetalous, mostly salver form, sometimes funnel form to tubular, stamens are epipetalous, as many as and alternating with the corolla lobes, variously attached in the floral tube, with (or rarely without) an annular nectary disk at the base of the ovary, gynoecium is superior, the carpels are 2 and united in varying degrees to form a compound ovary with seemingly twice as many locules as carpels, the ovary is deeply divided

- fruits are mostly of 2 or 4 nutlets, occasionally forming dry to fleshy drupes or rarely a loculicidal capsule, the embryo is straight in copious, scanty or no oily endosperm
- there are approximately 130 genera and some 2300 species, nearly cosmopolitan in temperate, subtropical and tropical regions of the world, especially in western North America, the Mediterranean Region, and the Middle East.

Main species: *Anchusa officinalis* - Common bugloss; *Symphytum officinale* - Comfrey; *Pulmonaria officinalis* - Lungwort; *Cynoglossum officinalis* - Houndstongue; *Lithospermum officinale* - Common Gromwell; *Alkanna tinctoria* - Dyer's alkanet; *Heliotropium europaeum* - European heliotrope; *Lycopsis orientalis* - Oriental Bugloss;

**Lithospermum spp* - Common gromwell, Stoneseed - contain lithospermum acid (phenolcarboxylic acid); naphthoquinone derivative (shikonin); cyclitol (scyllitol); cyanoglucoside-lithospermocide; caffeic, chlorogenic and ellagic acids; catechin-type tannins; mucilage;

Action and use: expectorant, astringent

**Pulmonaria officinalis* (Lungwort) - contain allantoin, flavonoids (quercetin, kaempferol), tannins, mucilage, saponins

Action and use: Emollient, expectorant, anti-hemorrhagic, astringent.

Lamiaceae - The Mint family

- Herbs, subshrubs, shrubs, or trees;
- leaves are opposite or sometimes verticillate or rarely alternate, simple and mostly entire, infrequently 3-7-foliolate or pinnalely compound, the stipules are lacking;
- inflorescences are arranged mainly in small, compact, axillary cymes congested into verticillasters, occasionally reduced to a solitary flower;
- flowers are small to mid- sized, bisexual or infrequently unisexual, actinomorphic to strongly zygomorphic, hypogynous, the sepals are 5 connate and tubular, often bilabiate, imbricate, the petals are 5, sympetalous, bilabiate, the lobes imbricate; stamens are epipetalous, typically 4; gynoecium is superior, the carpels are 2 and united to form a compound ovary with as many locules as carpels,

- fruits are a 4-seeded mesocarp, rarely fleshy, the embryo is straight or infrequently slightly bent in scanty or no oily endosperm;
- there are approximately 290 genera and some 7750 species, cosmopolitan.

Main species: *Galeopsis tetrachit* - Common hemp-nettle; *Lamium purpureum* - Red dead-nettle; *Leonurus cardiaca* - Motherwort; *Lavandula angustifolia* - Lavender; *Mentha piperita* - Peppermint; *Origanum vulgare* - Oregano; *Origanum majorana* - Sweet marjoram; *Salvia sclarea* - Clary; Genus *Thymus* - common thyme; *Teucrium chamaedrys* - wall germander; *Clinopodium vulgare* - Wild Basil

**Lavandula angustifolia* - Lavender

BAS: volatile oil (linalyl acetate, linalol, geraniol, cineole, limonene), tannins, flavonoids (luteolin), coumarins, phytosterols, triterpenes (ursolic acid)

Action and use: carminative, nervous system relaxant, sedative, antispasmodic, anti-depressant, rubefacient, anti-septic (essential oil), aromatic, uterine stimulant, diuretic, hypotensive, anti-rheumatic

**Melissa officinalis* - Lemon balm

BAS:Volatile oil (citral, citronellal, citronellol, geraniol), polyphenols (chlorogenic, rosmarinic and caffeic acids), tannins, bitter principle, flavonoids (luteolin, quercitin, apigenin, kaempferol)

Action and use: Nervous system tonic & relaxant, carminative, sedative, diaphoretic, frebrifuge, antidepressant, anti-viral, anti-microbial, anti-thyroid, choleretic, mild analgesic, antispasmodic, anti-histamine, hepatic, cardiotonic

**Mentha piperita* - Peppermint

BAS: Volatile oil (2%) containing methol, menthone and jasmone, tannins, bitter principle, Phenolic acids (rosmarinic, chlorogenic, caffeic), flavonoids (luteolin, rutin, hesperidin), gum, resins, nutrients (carotenes, choline, vitamin E, minerals)

Action and use: Carminative, antispasmodic, aromatic, diaphoretic, anti-emetic, nervine, anti-septic, analgesic, anti-microbial, anti-inflammatory, decongestant, anti-tussive, peripheral vasodilator, choleretic, cholagogue, anti-pruritic

**Origanum vulgare* - Oregano

BAS: Volatile oil (carvacrol, thymol, bisabolene, caryophyllene, borneol, linalool), flavonoids, tannins, resin, sterols

Action and use: Antiseptic, mild anti-viral, diaphoretic, expectorant, rubefacient, bitter, carminative, diuretic, antispasmodic

Rubiaceae - The Madder family

- Trees, shrubs, subshrubs and herbs, often lianas or epiphytic;
- Leaves are opposite or rarely verticillate (Henriquezia), occasionally seemingly alternate as a result of the supression of one of the opposite leaves in a pair, simple and entire or variously dentate, rarely lobed or pinnately divided, the stipules are inter- or intrapetiolar, often with colleters;
- inflorescences are arranged variously into axillary or terminal cymes, rarely reduced to a solitary flower;
- flowers are small to large, bisexual or rarely unisexual, mostly actinomorphic, mainly epigynous, often heterostylic, the sepals are 4-5, connate, sometimes small or nearly obsolete or large and then often brightly colored, the lobes imbricate or valvate, the petals are (3) 4-5 (8-10), sympetalous, campanulate or funnel form to tubular, occasionally bilabiate, stamens are epipetalous and variously placed at the base, 7-12 and free of the corolla in the staminate flowers of the Theligonoideae, gynoecium is inferior, or superior the carpels are 2 (3-5 or more) and united to form a compound ovary with as many locules as carpels,
- fruits are mostly capsules, berries or drupes, the embryo is straight or curved in copious, oily endosperm;
- there are approximately 630 genera and some 11,000 species, cosmopolitan.

Main species: *Galium verum* - lady's bedstraw; *Asperula odorata* - Sweet Woodruff; *Rubia tinctorum* - Common madder; *Cinchona succirubra* - Cinchona; Genus *Coffea* - coffee tree

**Galium aparine* - Cleavers

BAS: Acids (caffeic, gallic, salicylic, citric), iridoid glycosides (asperuloside), tannins (gallotannic acid), coumarins, flavonoids, polyphenolic acid, alkanes, anthraquinones (root only

Action and use: adaptogen, lymphatic tonic & cleanser, anti-tumor, anti-inflammatory, astringent, detoxifier, alterative, hypotensive, mild laxative, diuretic,vulnerary

**Cinchona succirubra* - Cinchona

BAS: alkaloids - antimalarial (quinine) and the antiarrhythmic (quinidine)

Action and use: muscle relaxant, against malaria and babesiosis (Texas cattle fever, redwater, or piroplasmosis) (Babesia is thought to be the second-most common blood parasite of mammals)

**Coffea arabica* - Coffee

BAS: caffeine 1%-2% (less when roasted), alkaloids (theobromine), trigonelline, chlorogenic acid, polyamines, tannins, b vitamins, carbohydrates, oil, tannin, sugars, pentosans

Action and use: stimulant, diuretic, antinarcotic, antiemetic

Scrophullariaceae - The Figwort family

- Herbs, subshrubs, shrubs or trees, autotrophic or occasionally hemiparasitic;
- leaves are alternate or opposite, rarely verticillate, simple and entire or lobed to pinnately dissected, the stipules are lacking;
- inflorescences are arranged variously in cymes, racemes, spike or reduced to a solitary flower;
- flowers are small to large, bisexual, zygomorphic to nearly actinomorphic, hypogynous, the sepals are 4-5, connate, the lobes imbricate or valvate, the petals are 4-5, sympetalous, variably shaped, typically labiate, occasionally saccate or spurred at the base, the lobes imbricate or valvate, rarely wanting (Besseya); stamens are epipetalous, 4-5, often with one obsolete or reduced to a staminoid, with an annular nectary disk at the base of the ovary; gynoecium is superior, the carpels are 2 and united to form a compound, bilocular ovary,
- fruits are mostly a septicidal capsule, occasionally loculicidal or poricidal, rarely a berry or schizocarp, the embryo is straight or slightly curved in copious to scanty, oily endosperm;
- there are 190 genera and some 4000 species, cosmopolitan but especially common in temperate regions and tropical mountains.

Main species: *Paulownia tomentosa* - Princes tree; *Verbascum thapsiforme* - Great mullein: *Verbascum phlomoides* - Wooly Mullein; *Veronica officinalis* - heath speedwell; *Digitalis lanata* - Woolly Foxglove; *Linaria vulgaris* - Common toafldax; *Antirrhinum orontium* - Lesser snapdragon;

**Digitalis purpurea* - Foxglove

BAS: cardioglycosides - digitoxin, digoxin, and gitoxin

Action and use: cardio-stimulant

**Verbascum thapsus* - Mullein

BAS: mucilage (leaves), flavonoids [acubin], saponins (leaves), volatile oil (flowers), tannins, resins (flowers), bitters.

Action and use: demulcent, emollient, expectorant, vulnerary, mildly antispasmodic and relaxing

Oleaceae - The Olive family

- Trees or shrubs, occasionally climbers or scramblers;
- leaves are opposite or rarely alternate in some species of *Jasminum*, simple and entire or lobed to pinnately compound or trifoliolate or unifoliate, the stipules are lacking;
- inflorescences are arranged mainly in cymes, these open or congested and often racemiform or paniculiform, infrequently reduced to a solitary flower;
- flowers are mostly small, bisexual or sometimes unisexual and the plants are then often dioecious, actinomorphic, hypogynous, the sepals are 4, connate, the lobes valvate, rarely wanting, the petals are 4, sympetalous but occasionally connate only at the base, broadly funnelform, the lobes imbricate or induplicate-valvate or convolute, rarely obsolete in some species of Fraxinus and Forestiera; stamens are epipetalous or essentially so, 2 (3-5), with or more often without an annular nectary disk at the base of the ovary, the anthers tetrasporangiate and are 2-locular, dehiscing by longitudinal slits; gynoecium is superior, the carpels are 2 and united to form a compound, bilocular ovary;
- fruits are mostly a loculicidal or circumscissile capsule, samara, berry or drupe, the embryo is straight in copious to scanty or no, oily endosperm;
- there are 24 genera and some 900 species, nearly cosmopolitan but best developed in southeastern Asia, Australia, and scattered locations throughout the Old World tropics**.**

Main species: *Fraxinus excelsior* - Ash; *Olea europaea* - Olive; *Ligustrum vulgare* - Wild priy; *Phyllirea latifolia* - Green Olive Treeet; *Syringa vulgaris* - Common lilac; *Jasminum fruticans* - Wild jasmine

**Fraxinus excelsior* - Ash

BAS: tannins, flavonoids - fraxin, quercetin, oleuropein – with anti-inflammatory, cardio-protective, antimicrobial, antiviral properties

Action and use: leaves have diuretic, diaphoretic and purgative properties, and are employed in modern herbal medicine for their laxative action

!! Ash trees seem prone to lightning strikes, so trees can be found struck in two. They kill most vegetation growing under them.

Solanaceae - The Potato family

- Herbs, shrubs, lianas or small trees, often with stellate or at least branched hairs;
- leaves are alternate, simple to pinnately compound or 3-foliolate, the stipules are lacking;
- inflorescences are mostly arranged in cymes or reduced and solitary, occasionally axillary;
- flowers are mid - sized to large, bisexual, actinomorphic or infrequently distinctly zygomorphic, hypogynous, the sepals are (4) 5 (6), connate into a toothed tube, imbricate, the petals are (4) 5 (6), sympetalous, mostly rotate to tubular, the lobes plicate and are occasionally contorted, valvate or imbricate; stamens are epipetalous, as many as and alternating with the corolla lobes, occasionally with 1 or 3 reduced and staminoid is typically with a well - developed intrastaminal nectary disk, gynoecium is superior, the carpels are typically 2, and united to form a compound ovary with as many locules as carpels,
- fruits are a berry or septicidal capsule, rarely separating into mericarps (Nolina), the embryo is small, straight or more commonly curved, typically subperipherally embedded in the oily or occasionally starchy endosperm, the endosperm is rarely lacking;
- there are about 96 genera and approximately 2300 species, nearly cosmopositan and most abundant in South America.

Main species: *Solanum nigrum* - European black nightshade; *Solanum dulcamara* - bittersweet; *Solanum tuberosum* - potato; *Solanum melongena* -

Eggplant; *Solanum lycopersicum* - Tomato; *Capsicum annuum* - Chili Pepper; *Nicotiana tabacum* - Tobacco; *Nicotiana rustica* - Aztec tobacco; *Atropa bella* - - *dona* - Deadly nightshade; *Hyosciamus niger* - henbane; *Datura stramonium* - Jimson weed

**Atropa belladonna* - Deadly nightshade

BAS: Tropane alkaloids (up to 0.5% in leaves and roots): hyoscyamine, atropine, scopolamine, hyoscine, belladonnine; Volatile pyridine and pyrrolidine bases; Flavonoids: scopoletin, scopolin, kaempferol and quercetin derivatives

Action and use: Narcotic, spasmolytic, anodyne, secretolytic

**Capsicum annuum* - chilli pepper

BAS: Capsaicinoids (mainly capsaicin), carotenoids (capsanthin, capsorubin, carotene, lutein; ascorbic acid (0.1-0.5%), tocopherols, steroidal saponins (capsicidins) in seeds and root, vitamin A

Medicinal actions: Antioxidant, circulatory stimulant, general tonic, analgesic, carminative, antispasmodic, diaphoretic, antiseptic, rubefacient, hemostatic, gastric stimulant, carminative, counter-irritant.

Medicinal use: It is one of the purest of all known stimulants and the most useful of the stimulating diaphoretics. Its potent diaphoretic qualities make it widely applicable in most fevers, infections and general body cleansing. It regulates blood flow, equalizes and strengthens the heart, arteries, capillaries and nerves. It is a general tonic and is specific for the circulatory and digestive system. It acts with force and has a long-lasting, spreading effect, acting mainly on the circulation and nerves to give increased tone to circulation manifested as increased force of the pulse. It may be used in flatulent dyspepsia and colic, and if there is insufficient peripheral circulation causing cold hands and feet. It is used for treating debility and warding off colds. Externally it is used a rubefacient in problems such as rheumatic pains. It stimulates excessive production of substance P (a neurotransmitter involved in pain, inflammation and pruritis) by peripheral neurons to the point of depletion.

**Hyoscyamus niger*- Henbane

BAS: Tropane alkaloids: hyoscyamine, hyoscine [scopolamine]

Medicinal actions: Antispasmodic, anodyne, sedative

Medicinal use: *Hyoscyamus* is often compared to *Belladonna* as both plants exert anticholinergics effects. *Hyoscyamus* is most often used for its antispasmodic effects on the digestive and urinary tracts, (eg. kidney stones) with large doses affecting the central nervous system.

**Datura stramonium* - Jimson weed, Devil's apple

Parts used: Leaves, flowering tops, seeds

BAS: Tropane alkaloids (0.2%-0.45%): scopolamine (hyoscine), atropine, hyoscyamine, mandragorine, and others.

Medicinal actions: Spasmolytic, hallucinogenic

Medicinal use: *Datura* is a highly toxic and is rarely used internally. *Datura* is has historical use as a hallucinogenic herb.

Toxicity: Anticholinergic. Acute: nausea, thirst, dilated pupils, vomiting, impaired vision, dry skin and mucous membranes, staggering, dizziness, incoherence, hallucinations, loss of conciousness, weak rapid pulse, inability to urinate, convulsions, delirium with laughter, loquacity and violence, circulatory collapse prior to death.

Cuscutaceae - The Doder Family

- Annual, essentially achlorophyllus, twining, parasitic herbs attached to a host by intrusive haustoria;
- leaves are reduced to minute scales, the stipules are lacking;
- inflorescences are arranged in small, dense, head-like clusters or in short cymose spikes;
- flowers are small, bisexual, actinomorphic, hypogynous, (3-4) 5-merous, the sepals are free or more often connate basally to nearly throughout and tubular, imbricate, the petals are sympetalous, mostly campanulate to globose, the lobes limbricate, the corolla tube is typically fringed with a whorl of variously fringed or cleft scales at the base of the stamens; stamens are epipetalous, as many as and alternating with the corolla lobes, the stamens are attached at the upper portion of the floral tube and the filaments of equal lengths, occasionally with an intrastaminal nectary disk at the base of the ovary, gynoecium is superior, the carpels are 2 (3) and united to form a compound ovary with as many locules as carpels,

- fruits are a capsule, sometimes circumscissile or irregularly dehiscent or even indehiscent, often somewhat fleshy, the embryo is small, straight and essentially acotyledonous or strongly curved or even spiral and peripheral to the starchy endosperm;
- there are 1 genus and approximately 150 species, nearly cosmopolitan and most abundant in the warmer regions of the New World.

*The doders are among some of the most destructive of the parasitic angiosperms, causing millions of dollars of crop losses annually throughout much of the world. Some species are restricted to just a few hosts, but several are found on many. Control is often inexpensive, but the dispersal of dodder seeds with those of certain economically important crops remains a problem.

Main species: *Cuscuta epithymum* - clover dodder; *Cuscuta europaea* - greater dodder

BAS: glycosides, tannins, flavonoids, anthcyanins

Action and use: The seeds - with alterative, anthelmintic and carminative action and purgative effect

CLASS LILIOPSIDA - MONOCOTS

Distinctive features:

- Monocots have only one seed leaf inside the seed coat. It is often only a thin leaf, because the endosperm to feed the new plant is not inside the seed leaf.
- When a monocot seed germinates, it produces a single leaf. It is usually long and narrow, like the adult leaf. Even when it is quite a round shape, there is only one seed leaf in a monocot.
- The leaves of monocots are often long and narrow, with their veins in straight lines up and down the leaf. Sometimes, the veins run from the centre of the leaf to the edge, parallel to one another – parallel venation.
- The stems of monocots are usually unbranched and fleshy. They do not grow thicker from year to year - secondary growth absent. Stem vascular bundles are scattered. New leaves often grow wrapped in a protective sheath formed by the older leaf. The roots of dicots are usually short and stringy. Roots often are adventitious and transform in bulbs.

- The parts of the flower of monocots are in threes. The sepals are often the same colour as the petals, making it look as if the flower has six petals. There is usually the same number of stamens as petals.
- The seed pods or fruits of monocots usually have three parts. The seeds are often large and fleshy. The largest seed in the world, the Coco-de-Mer, and the smallest seeds in the world, Orchid seeds, are both monocot seeds.

SUBCLASS LILIDAE

Liliaceae - The Lily Family

- Perennial herbs from tunicated or nontunicated bulbs with 1-numerous fleshy scales;
- Leaves are basal or cauline, alternate or rarely verticillate, typically graminoid, often differentiated into a blade, petiole and closed sheath, the blades are linear to ovate, parallel-veined;
- inflorescences are arranged in axillary or terminal cymose or rarely racemes, rarely reduced and solitary (*Tulipa*);
- flowers are typically large, actinomorphic or infrequently slightly zygomorphic, hypogynous, bisexual, trimerous with the tepals all petaloid and arranged in two whorls of 3, typically free, the tepals are mostly all alike (except *Nomocharis*), erect to variously spreading or recurved; stamens are 6 in two whorls, gynoecium is superior, the carpels are 3 and united to form a compound, trilocular ovary.
- fruits are a loculicidal capsule, the embryo is straight in fatty endosperm
- a taxon of 10 genera and about 450 species of temperate and subtropical regions of the Northern Hemisphere is defined.

Main species: *Allium cepa* - common onion, *A. sativum* - garlic, *A. porum* - leeks, *A. ascalonicum* - shallots, *Colchicum autumnale* - autumn crocus; *Lilium martagon* - Martagon lily; *Lilium candidum* - Madonna lily; *Convallaria majalis* - Lily of the valley; *Asparagus officinalis* - Garden asparagus; *Ruscus aculeatus* - Butcher's-broom; *Scilla bifolia* - Alpine Squill; *Hyacinthus orientalis* - Garden hyacinth

**Allium sativum* - Garlic

BAS: Enzymes (allinase), volatile oils (sulfur containing compounds: sulfoxides (alliin, allicin), thiocyanates, nutrients, fiber, carbohydrates, proteins, amino

acids (arginine, glutamic, asparagic, methionine, threonine), lipids, prostaglandins

Medical actions: Anti-microbial (antibacterial, anthelmintic, antimycotic), antispasmodic, antiseptic, counter-irritant, diaphoretic, expectorant, carminative, expectorant, detoxifier, hypotensive, aphrodisiac

**Colchicum autumnale* - autumn crocus

BAS: alkaloids colchicine and colchamine, tannins,

Action and use: anti-rheumatic, cathartic, and emetic, diuretic

Amaryllidaceae - The Amaryllis family

- Perennial plants that resprout each year from underground bulbs.
- leaves are usually juicy and tender
- flowers are often grouped in an umbel (like an umbrella), or sometimes solitary, and typially emerge from a spathe-like bract (a modified leaf wrapped around the flower head). Otherwise, individual flowers are typical lily-like blossoms with 3 sepals and 3 petals that are identical in size and color. The daffodil (*Narcissus)* has an extra inner whorl called the corona. Most species have 6 stamens. The ovary is positioned either inferior or superior
- fruit is a capsule with numerous seeds per chamber. The dried petals are often found clinging to the tip of the fruit.
- there are 60 genera and 850 species

Main species: *Galanthus nivalis* - Common snowdrop; *Leucojum aestivum* - Summer snowflake; *Narcissus pseudonarcissus* - Wild daffodil; *Narcissus poeticus* - Poet's daffodil

BAS:

Action and use:

Iridaceae - The Iris Family

- Perennial herbs from rhizomes, corms or bulbs, infrequently evergreen herbs or subshrubs, rarely annual herbs;

- leaves are basal or cauline, mostly distichous, typically graminoid, typically not differentiated into a blade and petiole, the blades are linear to lanceolate, parallel-veined, the sheath is open;
- inflorescences are arranged in terminal cymes, racemes, spikes or panicles, occasionally reduced to a single flower, often subtended by 1-few bracts;
- flowers are small to large, actinomorphic or zygomorphic, epigynous, bisexual, trimerous with the tepals all alike and petaloid, arranged in two whorls of 3, ofttten basally connate into a short to occasionally long perianth tube; stamens are 3, rarely 2 (*Diplarrhena*), opposite the outer tepals: gynoecium is inferior, the carpels are 3 and united to form a compound, trilocular ovary.
- fruits are a loculicidal capsule, the embryo is straight to slightly curved in fleshy endosperm;
- there are some 77 genera and about 1655 species of nearly a cosmopolitan distribution with concentrations in Africa, portions of Asia, and Central and South America.

Main species: *Crocus flavus* - Yellow crocus; *Crocus biflorus* - Silvery crocus; *Crocus sativus* - Saffron crocus; *Iris germanica* - Blue Flag Iris; *Iris pseudacorus* - Yellow flag iris

BAS: carotenoid crocin - which gives pistils their natural golden-yellow color; essential volatile oils: safranal, which gives saffron its pleasant flavor, cineole, phenethenol, pinene, borneol, geraniol, limonene, etc.; source of minerals like copper, potassium, calcium, manganese, iron, selenium, zinc and magnesium, rich in vitamins, including vitamin A, folic acid, riboflavin, niacin, and vit. C.

Action and use: antiseptic, antidepressant, antioxidant, digestive, anti-convulsant, uterine stimulant

Medicinal uses: anti-spasmodic, carminative, diaphoretic

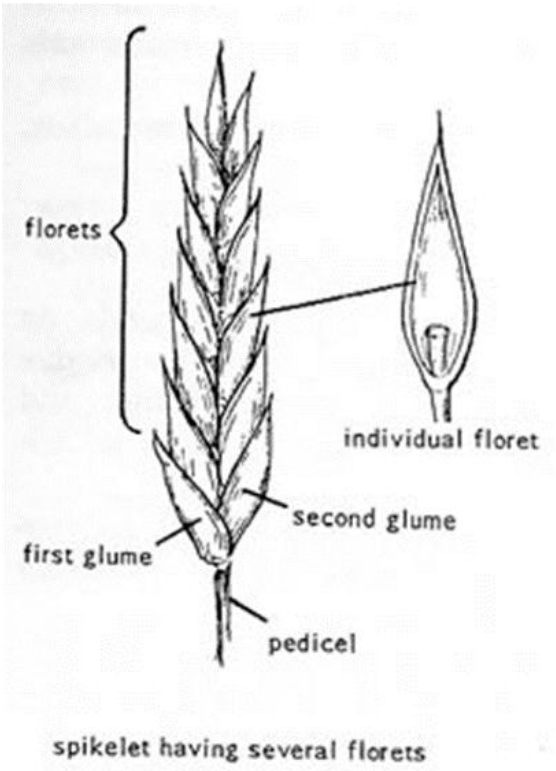
SUBCLASS COMMELINIDAE

Poaceae - The Grass Family

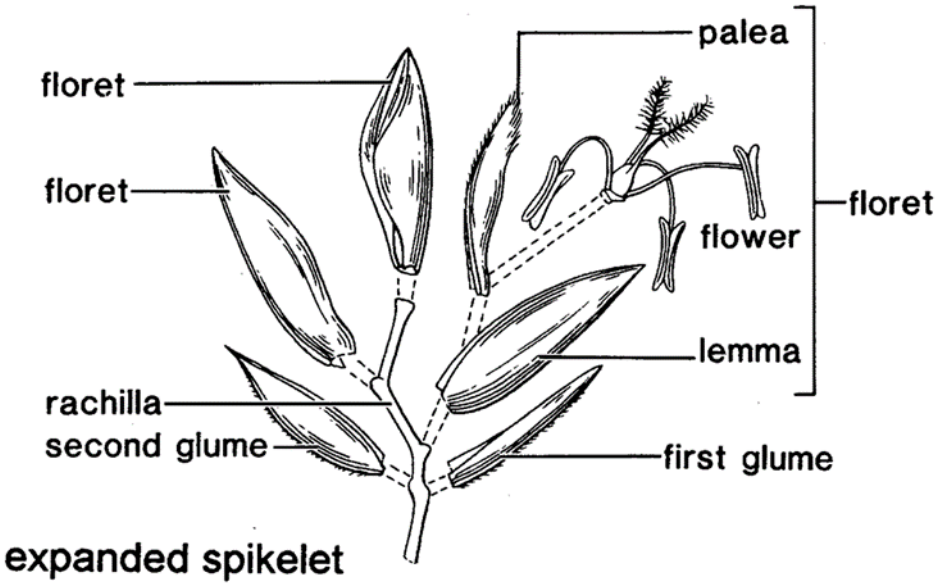
- Graminoid annual or more commonly perennial herbs and shrubs, occasionally woody and even arborescent (bamboos), with hollow internodes, mainly of dry habitats;
- leaves are distichous, rarely spirally arranged, graminoid, the blades are typically only slightly differentiated into a blade and a petiole with an

open or rarely closed sheath, the lamina is flat, parallel-veined, an adaxial ligule is commonly present, occasionally well developed or reduced to a row of hairs, rarely suppressed or lacking;

- inflorescences are distichously arranged on the axis of the spikelet or only one per spikelet with each flower subtended by a pair of scales (lemma and palea) with the inner one (palea) inserted between the often zig-zag axis (rachilla) and the flower with an additional two or three much smaller scales (lodicules) above the palea, the whole forming a floret, the spikes and spikelets themselves are commonly arranged in various sorts of secondary (often paniculate, racemose or spikelike) inflorescences;
- flowers are small and inconspicuous, sessile, actinomorphic, hypogynous, bisexual or unisexual and the plants are monoecious or dioecious, the perianth is of 2 connate outer segments (the palea) with the third one lacking and the inner segments of (1) 2-3 (6) minute scales (the lodicules); stamens are typically 3, occasionally 2 or 4, infrequently 1 or 6 (and then in two cycles of 3), gynoecium is superior, the carpels are 2-3 and united to form a compound, 1-locular ovary,
- fruits are indehiscent, dry (seldom fleshy) caryopsis with the seed adnate to the pericarp, rarely utriclelike with a free pericarp or nutlike or baccate, the embryo is small, straight, peripheral in abundant, starchy or rarely oily endosperm;
- There are about 12,000 grass species in about 771 genera, classified into 12 subfamilies; Cosmopolitan.



spikelet having several florets



expanded spikelet

Main species: *Triticum aestivum* - common wheat, *Hordeum vulgare* - Barley, *Avena sativa* - oat, genus *Bromus* - brome-gras , genus *Calamagrostis* - reed-grass, genus *Bambusa* - bamboo, *Oryza sativa* - Asian rice, genus Zizania - Wild rice, *Arundo donax* - Giant cane, genus *Phragmites* - common reed, genus *Eragrostis* - lovegrasses, *Panicum miliaceum* - proso millet, genus *Setaria* - foxtail millet, *Zea mays* - Maize, genus Saccharum - Sugar cane, genus *Dichanthium* - bluestem, *Cortaderia selloana* - pampas grass, *Cymbopogon* - lemongrass, *Cynodon dactyl*on - Conch or green grass

**Zea mays* (Corn silk) - Part used: Stigmas & styles (fresh or dried; harvested from the unripe corn), kernels

BAS: Amines, fixed oils (glycerides of linolenic, oleic, palmitic, stearic acids), tannins, allantoin, nutrients (vitamin C, K), Mg, saponins, bitter glycosides, phytosterols, flavones, gums, resins, cyanogenetic compounds, alkaloids, anthocyanins, volatile oils, mucilage

Actions: Demulcent, vulnerary, diuretic, anti-inflammatory, alterative, hypotensive, tonic

Medical uses: A soothing diuretic helpful in any irritation or inflammation of the urinary system. It is used for renal problems (eg. enuresis, infection) and as a urinary demulcent combined with other herbs in the treatment of cystitis, urethritis, prostatitis, urinary retention and kidney or urinary stones/gravel.

**Agropyron (Elymus) repens* (Couch Gras) - Part Used: Rhizome, seeds & root.

BAS: Triticin, mucilage, silicic acid, potassium, inositol, mannitol, glycosides

Actions: Diuretic, demulcent, anti-microbial

Medical uses: May be used in urinary infections such as cystitis, urethritis and prostatitis. As a broadly applicable and safe diuretic it can be used in most conditions where this action is needed. Its demulcent properties soothe irritation and inflammation.

**Avena sativa* (Oat) - Parts used: Aerial parts of the plant harvested just before it is in full flower (Milky oat seed).

BAS: starch (60%), triterpenoid saponins (avenocosides), protein (avenins, gluten) silicic acid esters, polyphenols, mono & oligosaccharides, nutrients (vitamin e & b, iron, manganese, zinc, calcium), glycosyl flavones

Medicinal actions: Antidepressant, anxiolytic, nervine, nervous system tonic & trophorestorative, nutritional, hypolipidemic (as food), cardiotonic, demulcent, emollient, vulnerary, antispasmodic

Medicinal use: One of the loveliest nervous system trophorestoratives. It is nutritive in cases of debility from anxiety & fatigue. Avena "feeds" the nervous system especially when under stress. It is specific in cases of nervous debility and exhaustion, especially when associated with depression. It may be used with most of the other nervines, both relaxant and stimulatory, to strengthen the whole of the nervous system.

Oat straw is high in silica & minerals & has connective tissue restorative qualities for bones, muscles, tendons & nerves. Oat Tops (aka. milky green oats or seed of unripe plants) has saponins & alkaloids and is neurotonic & an adaptogenic nervine useful in anxiety & lassitude.