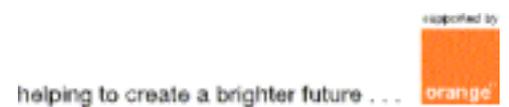


Glossary of Seed and Fruit Morphological Terms

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acampylotropy = orthocampylotropy:

▶ campylotropy

accessory fruit: ▶ anthocarp

achenarium: a ▶ fruit derived from a ▶ schizocarpous gynoecium consisting of whole-carpelled indehiscent ▶ fruitlets with a thin ▶ pericarp contiguous to the ▶ seed(s); e.g. *Galium apparine* (Rubiaceae), *Bibersteinia multifida* (Geraniaceae) etc. (Spjut 1994).

achene: an indehiscent single-seeded ▶ fruit with a dry ▶ pericarp contiguous to the seed but still distinguishable from the ▶ testa (e.g. *Helianthus annuus*).

achenetum: a ▶ multiple (= ▶ aggregate) fruit of indehiscent carpels with the pericarp of each apocarp contiguous to one or more seeds = an aggregation of ▶ achenes (Spjut 1994), e.g. *Alisma plantago-aquatica* (Alismataceae), *Clematis* (Ranunculaceae; with plumose styles), *Ranunculus* (Ranunculaceae).

achenoconum: an indehiscent ▶ compound fruit with ▶ pericarpia subtended by scales spirally or imbricately arranged into a cone (Spjut 1994); e.g. *Alnus* sp. (Betulaceae), *Humulus lupulus* (Cannabaceae), *Isopogon* spp. (Proteaceae), *Petrophile* spp. (Proteaceae).

achenosum: a ▶ compound fruit consisting of dry indehiscent ▶ fruitlets, each fruitlet with a thin ▶ pericarp that is mostly contiguous to the ▶ seed (Spjut 1994); e.g. *Platanus occidentalis* (Platanaceae).

acorn: colloquial term for the fruit of the oak (▶ glans), *Quercus* spp. and other Fagaceae.

acrosarcum: a ▶ simple ▶ indehiscent fruit characterised by an undifferentiated ▶ pericarp (lacking a stony ▶ endocarp) that is surrounded by an ▶ accrescent fleshy ▶ exocarp derived from ▶ perianth or ▶ receptacle (basically a ▶ berry derived from an ▶ inferior ovary); e.g. *Cryptocarya glaucescens* (Lauraceae), *Opuntia* sp. (Cactaceae; the fruit of *Opuntia* is regarded as an ▶ anthocarp because of the thick, often spiny, cuticle, a character associated with a fruiting ▶ hypanthium (Kiesling 1984), *Gaultheria* (Ericaceae), *Coccoloba diversifolia* (Polygonaceae) (Spjut 1994).

adventive embryo: a diploid ▶ embryo or embryo sac formed asexually by a somatic cell or by suppression or modification of the meiotic

process (▶ meiosis) to give unreduced ▶ megaspores (▶ diplospory, ▶ aneuspority). The development of a mature diploid ▶ embryo can then proceed without ▶ fertilisation (▶ parthenogenesis, ▶ pseudogamy).

agamosperry: production of ▶ seeds without prior ▶ fertilisation. See also ▶ apomixis and ▶ parthenocarp.

aggregate fruit: fruit developing from an ▶ apocarpous gynoecium, as a consequence composed of several separate ▶ fruitlets (e.g. strawberries, blackberries, magnolias). According to Spjut (1994) the term is synonymous to ▶ multiple fruit, a term which in most modern textbooks is, however, used to address a ▶ compound fruit.

alate seeds: winged seeds; see also ▶ wing.

albumen: ▶ albuminous

albuminous: seeds are called "albuminous" if they contain a storage tissue next to the ▶ embryo; this storage tissue can be either ▶ endosperm or ▶ perisperm.

aleurone grain: also called "protein body"; a characteristic form of storage protein granules in the ▶ endosperm and ▶ embryo (esp. cotyledons). Aleurone grains consist of proteins, ▶ phytin and hydrolytic enzymes.

aleurone layer: a proteinaceous layer of the ▶ endosperm, its cells containing ▶ aleurone grains ("protein bodies"); in seeds of the Poaceae and Polygonaceae, for example, the outermost layer of the endosperm.

amphisarcum: (Greek: amphi-, double + sarx, fleshy) a simple, indehiscent fruit characterised by a pericarp differentiated externally into a dry crust and internally into one or more fleshy layers, e.g. *Adansonia digitata* (baobab; Bombacaceae = Malvaceae); fruits filled with a mealy pulp), *Lagenaria* (Cucurbitaceae; fruit hard-shelled, fleshy, indehiscent), *Couroupita guianensis* (Lecythidaceae; seeds embedded in white, oxidizing bluish-green gelatinous pulp) (Spjut 1994).

amphitropy: sometimes, amphitropy is distinguished as a separate condition from ▶ campylotropy when the longitudinal axis of an ▶ ovule/seed is bent towards two sides rather than just one (Goebel 1923). Other authors (Bocquet & Bersier 1960) distinguished amphitropy from campylotropy on the basis of the formation of a mass of cells

(called "central body"), which extends, like a finger, into the arch of the ►nucellus. However, for practical reasons, recent authors (Bouman & Boesewinkel 1991) suggest to use the term campylotropy in its original, broad sense including amphitropy.

anacampylotropy: ►campylotropy

ana-campylotropy: ►campylotropy

anatropy: an ovule or seed is called anatropous when ►chalaza and ►micropyle lie in a straight line and the hilum lies close to the micropyle. The anatropous ovule is the most common type of ovule in the angiosperms and more than 200 families are exclusively anatropous.

anemochory: dispersal of the ►diaspores of a plant by wind.

aneuspority: The production, through a modification of the meiotic process (►meiosis), of an unusual number of ►spores (usually two) instead of the four normally formed from each spore mother cell. It is seen in the formation of ►megaspores in dandelions (*Taraxacum*) where, after the first meiotic division the chromosomes stay in one cell forming a *restitution nucleus*. The second meiotic division gives rise to two cells each with an unreduced number of chromosomes. One of these develops ►parthenogenetically into an embryo. Crossing-over and hence reassortment of the genes can occur during the first meiotic division. This accounts for some of the variation found in apomictic complexes that have arisen by aneuspority (definition taken from Bailey 1999). See also ►apomixis and ►parthenogenesis.

angiosperms: (Greek: angeion = vessel, container; sperma = seed) division of the ►spermatophyta producing their ►ovules and ►seeds within in closed ►megasporophylls (carpels) in contrast to ►gymnosperms where the ovules and seeds on the megasporophylls lie "naked" and are openly exposed to the environment. Angiosperms are also unique in displaying a process called "double fertilisation" (►embryo sac) which gives rise to a triploid storage tissue (►endosperm). In English, the angiosperms are often also called "flowering plants", which is, however, not entirely correct since the reproductive organs of gymnosperms are also borne in structures that fulfill the criteria of the definition of a ►flower.

anisogamy: (Greek: an = not; isos = equal; gamos = marriage) the male and female ►gametes are morphologically different whereby the first ones are usually smaller than the latter.

anthecharium: a ►fruit derived from a matured ►spikelet of the Poaceae that disarticulates above the ►glumes and between two or more ►florets; e.g. *Bromus tectorum*, *Eragrostis spectabilis*. Note: Primary and secondary points of disarticulation of the anthecharium can sometimes be distinguished, and the point of disarticulation, relative to the apex or base of a ►rachilla, can vary. The ►disseminule (►fruitlet) may or may not include part of the ►rachilla (Spjut 1994).

anthechetum: an ►anthechium with ►glumes and/or additional ►florets that disarticulates below or above the glumes but not between the ►florets; e.g. *Sphenopholis obtusata* (Poaceae).

anthechium: a ►fruit of the Poaceae derived from a one-floreted (►floret) ►spikelet consisting of the ►pericarpium, subtending ►bracts and part of the ►rachilla, but disarticulating above the ►glumes; eg. *Agrostis scabra*, *Calamagrostis*, *Phleum* etc.

anthechosum: a ►compound fruit of the Poaceae consisting of fused parts of branches, leaves, or ►glumes that form a burr or ►involucre around the ►florets; e.g. *Cenchrus palmeri* (Poaceae) (Spjut 1994).

antheridia: male sexual organs producing and containing the male ►gametes.

anthocarp = anthocarpous fruit = accessory fruit = pseudocarp = false fruit: a ►pericarpium with attached floral parts that have undergone a marked development during post-fertilisation to aid in the dissemination of the seed. The accessory structures to the pericarpia usually enlarge or become fleshy after fertilisation (e.g. the hypanthium of an apple), or disarticulate as in grass fruits (Spjut 1994).

anthocarpous fruit: ►anthocarp

anticlinal: perpendicular to the surface

antipodal cells: ►embryo sac

antiraphe: the side of the ►ovule or ►seed that lies opposite the ►raphe.

apocarp: a unicarpellate ►fruitlet of an ►apocarpous gynoecium (Spjut 1994).

apocarpous gynoecium: ►gynoecium composed of two or more separate carpels, each carpel forming an individual pistil.

apocarpous: condition in a flower and ovary where the individual carpels are free from each other. See also ►apocarpous gynoecium.

apogynous: lacking female reproductive organs.

apomict: an organism reproducing by ►apomixis. Facultative apomicts can reproduce both sexually and apomictically (e.g. *Potentilla*) while obligate apomicts can only

reproduce apomictically. The latter are often polyploids (e.g. triploids or pentaploids) that lost the ability to produce viable pollen.

apomictic: see ▶ apomixis.

apomixis: a form of ▶ asexual reproduction whereby the ▶ ovule develops into a ▶ seed without prior ▶ meiosis or ▶ fertilisation. In this narrow sense the term is synonymous with the term ▶ agamospermy. In a wider sense the term apomixis is sometimes also considered to include any type of asexual reproduction including vegetative propagation (i.e. asexual reproduction from cells other than ovules). See also ▶ parthenogenesis.

apogamy: the entry of the pollen tube into the ▶ ovule by some way other than through the ▶ micropyle.

apotropous: referring to ▶ ovules; an apotropous ovule is an ▶ anatropous or ▶ hemi(ana)tropous ovule with a dorsal ▶ raphe whereby "dorsal" refers to the relative position of the ovule to the ▶ placenta (i.e. facing away from the, for example, axile or parietal placenta); hence, the term cannot be applied, for example, to basally attached ovules. See also ▶ epitropous.

arceuthida: a fleshy ▶ cone of the conifers consisting of one to several ▶ seeds with their attached ▶ scales adnate to the ▶ bracts - similar to a ▶ drupe; *Juniperus virginiana* (Cupressaceae), *Gnetum* (Gnetaceae). --- Note: This fruit encompasses different cone structures, and the fleshy ▶ scales should not be confused with the ▶ integuments of the Ginkgoaceae seed that are differentiated as fleshy and hardened layers (Spjut 1994).

archegonia: female sexual organs producing and containing the female ▶ gametes; fully developed in bryophytes and pteridophytes in the broadest sense, only rudimentary in ▶ gymnosperms, true archegonia absent in ▶ angiosperms (with the three-celled ▶ egg apparatus as the homolog).

aril: pulpy structure which grows from some part of the ovule or ▶ funiculus after fertilisation and invests part or the whole seed (Corner 1976). Other authors sometimes distinguish so-called localised arils or "arillodes" which develop from some part of the ovule (e.g. ▶ exostome, ▶ raphe, ▶ chalaza) from "true", funicular arils. If the aril is of a double origin, arising from both the ▶ funiculus and the testa, it is called a "complex" aril.

arillocarpium: a ▶ fruit of the ▶ conifers characterised by a seed being covered by a fleshy ▶ aril as in species of Cephalotaxaceae and Taxaceae; e.g. *Taxus brevifolia* (Taxaceae). --- Note: The arillocarpium is kept

separate from the ▶ epispermium of the Podocarpaceae because of the meaning of ▶ epimatium that is specifically applied to the seed-supporting structure in species of the Podocarpaceae.

arillode: ▶ aril

article: a seed-bearing segment of a ▶ lomentaceous fruit.

atropy: ▶ orthotropy

axile placentation: type of ▶ placentation in which the ▶ ovules are borne in the centre of ▶ syncarpous ovary in the angle formed by the ▶ septae (i.e. the fused margins of the ▶ carpels).

bacca = berry: In most modern textbooks simply defined as an indehiscent ▶ fruit in which all layers of the ▶ pericarp become fleshy. A morphologically more accurate definition is given by Spjut (1994): An indehiscent ▶ pericarpium, or ▶ simple fruit, consisting of one or more seeds embedded in a solid fleshy mass supported by an ▶ epicarp less than 2 mm thick, the ▶ pericarp not differentiated internally by a hardened ▶ endocarp or airspace. e.g. *Persea americana* (avocado), *Vitis vinifera* (grape), *Actinidia sinensis* (kiwi), *Lycopersicon esculentum* (tomato).

baccarium: a ▶ fruit derived from a ▶ schizocarpous gynoecium of fleshy-indehiscent ▶ fruitlets with a ▶ pericarp in which all layers become fleshy, e.g. *Phytolacca*, *Saururus*, *Tropaeolum* (Spjut 1994).

baccetum: a ▶ multiple (= ▶ aggregate) fruit consisting of fleshy-indehiscent ▶ carpels (▶ apocarps) with an undifferentiated ▶ pericarp of a determinate shape (Spjut 1994); e.g. *Hydrastis canadensis* (Ranunculaceae); *Asimina* (Annonaceae), *Kadsura japonica* (Schisandraceae), *Drimys winteri* (Winteraceae).

balausta: (Greek: pomegranate flower), an indehiscent, ▶ anthocarpous fruit composed of a ▶ coriaceous ▶ exocarp (rind), a spongy ▶ endocarp, and ▶ sarcotestas (fleshy seed coats). The balausta of *Punica* spp. is derived from an ▶ inferior ovary and has characteristics of a ▶ pome and a ▶ hesperidium (Spjut 1994).

ballistic fruits: catapult fruits, discharging their seeds through an explosive mechanism.

berry: ▶ bacca

bibacca: a ▶ compound fruit composed of two ▶ pericarpia that are partially fused by their mature ▶ ovaries but otherwise the surrounding parts are distinct and not notably

► accrescent; e.g. *Lonicera tatarica* (Caprifoliaceae), *Didymanthus roei* (Chenopodiaceae); *Mitchella repens* (Rubiaceae) (Spjut 1994).

bilomentum: a simple, multicarpellate, pericarpial (► pericarpium) fruit that develops transverse constrictions between each maturing ► seed, and at maturity disarticulates at the constrictions (Spjut 1994); e.g. *Raphanus raphanistrum* (Brassicaceae), *Hypocoum procumbens* (Fumariaceae). This fruit type is very similar to the ► lomentum which, however, develops from a single ► carpel.

bract: simplified leaf (often ► cataphyll-like) in the region of the flower/inflorescence from in whose axil a flower, a partial inflorescence or an entire inflorescence originates. Bracts can either be small, green and inconspicuous or rather large, conspicuously coloured and petal-like. Some bracts of palms can reach more than a metre in length.

bracteole: secondary order ► bract, i.e. a bract subtending a flower in an inflorescence that itself is subtended by a bract.

bullate chalaza: an expanded, dome-shaped ► chalaza protruding into the ► seed.

calyx: the summary of the ► sepals of a flower (i.e. the outer whorl of a ► perianth).

camara: an indehiscent or tardily dehiscent ► pericarpium or ► fruit, composed of one ► carpel with a ► pericarp of a determinate shape; this includes internally dry and internally fleshy ► "nuts" (Spjut 1994); e.g. *Arachis hypogaea*, peanut (Leguminosae-Papilionoideae), *Ceratonia siliqua*, carob tree (Leguminosae-Caesalpinioideae), *Degeneria vitiensis* (Degeneriaceae), *Inga* (Leguminosae-Mimosoideae, fruit with ligneous ► mesocarp and pulpy ► endocarp), *Krameria lappacea* (Krameriaceae); *Medicago* spp., *Melilotus* spp., *Tamarindus indica* (Leguminosae-Caesalpinioideae, fruit with fleshy ► mesocarp).

camaretum: an ► aggregate (= multiple sensu Spjut 1994) fruit of dry, indehiscent ► carpels, each carpel usually containing many ► seeds free from the ► pericarp; e.g. *Xylopiacarminativa* (Annonaceae), *Decaisnea* (Lardizabalaceae) (Spjut 1994).

camarium: a ► fruit derived from a ► schizocarpous gynoecium, often a deeply lobed ► ovary, in which the ► fruitlets are either ► indehiscent and contain more than one ► seed, or are irregularly dehiscent and contain 1-many seeds, the seeds mostly free from the ► pericarp; e.g. *Malva neglecta* (Malvaceae), *Abutilon theophrasti*

(Malvaceae), Sapindaceae, Zygophyllaceae (Spjut 1994).

campylotropy: ► ovules and seeds with curved longitudinal axes (resulting in a curved embryo) are called campylotropous. The ► nucellus and ► integument(s) develop more extensively on the antiraphal (► raphe) side which becomes (up to 10 times) longer than the raphal side. Rarely, the converse development takes place in which the ► raphe of the ► anatropous ovule enlarges more than the ► antiraphe (some legumes, Vitaceae); such seeds are called "obcampylotropous". Depending on whether a campylotropous ovules and seeds are derived from the ► orthotropous (= atropous), ► hemi(ana)-tropous or ► anatropous condition, orthocampylotropous, hemi(ana)-campylotropous and anacampylotropous ovules and seeds are distinguished. The primary advantage of campylotropy is that the embryo can reach up to twice the length of the seed and therefore give rise to a larger, more successfully competing seedling. Campylotropous ovules or seeds occur (predominantly or as an exception) in more than 65 families belonging to both dicotyledons and monocotyledons.

capsiconum: a ► compound fruit composed of ► capsular ► fruitlets; e.g. *Liquidambar styraciflua* (Hamamelidaceae), *Pancheria elliptica* (Cunoniaceae), *Eucalyptus lehmannii* (Myrtaceae), Salicaceae, *Anemopsis californica* (Saururaceae) (Spjut 1994).

capsular fruit: a series of fruits characterised by being composed of more than one carpel and dispersing the seeds as a result of the opening of the pericarp (Spjut 1994) (see also ► capsule).

capsule: a dehiscent fruit composed of more than one carpel and dispersing the seeds by opening the pericarp.

carcerulus: a ► simple, ► multicarpellate, indehiscent ► fruit consisting of one or more ► seeds and an air space enclosed by an undifferentiated ► pericarp; in simpler terms a carcerulus could be described as an "indehiscent ► capsule"; e.g. *Pararistolochia* (Aristolochiaceae; fruit described as a woody, cucumber-like, indehiscent fruit), Cannaceae (a warty ► capsule, reputedly sometimes indehiscent), *Vaccinium lanecifolium* (Ericaceae, described as a dry globose ► berry"), *Scaevola* (Goodeniaceae, fruit described as an indehiscent dry ► nut or slightly succulent ► drupe), *Brexia madagascariensis* (Grossulariaceae), *Lawsonia inermis* (Lytraceae, fruit described indehiscent ► capsule), *Circaea* (Onagraceae;

fruit described as indehiscent ► capsule), *Pterodiscus* spp. (Pedaliaceae) (Spjut 1994).

carpel: the fertile leaf of the ► spermatophyta (seed plants) producing the ► ovules (► megasporophyll).

carpophore: "fruit carrier"; central column (axis) of a schizocarpous fruit along which the fruitlets separate from one another at maturity, but remain attached to it at one point; mostly used in connection with the fruit of the Apiaceae (► polachenarium).

caruncle (= caruncula): a localised ► aril as the result of a proliferation of the ► testa around the ► exostome.

caryopsis: term traditionally applied to the fruit of the grasses (Gramineae); similar to the ► achene, but ► pericarp not distinguishable from the seed coat except under high magnification (Spjut 1994).

cataphyll (= scale leaf): rudimentary or simplified, often scale-like leaf protecting vegetative and floral apical meristems (shoot buds and flower buds) or subtending axillary buds on rhizomatous shoots. Scale leaves associated with flowers and inflorescences are called ► bracts, ► bracteoles, or ► hypsophylls.

catoclesium: a ► compound fruit of ► indehiscent ► fruitlets enclosed within leaves, ► bracts or fused ► perianth parts (basically a "collective nut"); e.g. *Beta vulgaris* (Chenopodiaceae) (Spjut 1994).

ceratium: a capsular fruit that opens by a separation or break in the pericarp layers, usually the inner parts - ► replum, styles, ► parietal ► placentae - persistent and often setaceous, skeletal or partitional, or the endocarp dehiscent; e.g. *Aristolochia littoralis* (Aristolochiaceae), *Tecoma stans* (Bignoniaceae), *Campanula rapunculoides* (Campanulaceae), *Cleome viscosa* (Capparaceae), *Operculina* (Convolvulaceae), *Lyona ferruginea* (Ericaceae), Gesneriaceae, Hamamelidaceae, Melastomataceae, Nymphaeaceae, Papaveraceae (e.g. *Argemone hispida*, *Bocconia frutescens*, *Chelidonium majus*, *Papaver orientale*, *Papaver somniferum*), Pedaliaceae (*Proboscidea aletheifolia*). --- Note: Ceratia can usually distinguished from ► septifragal capsules by the presence of a replum, fruits of the Bignoniaceae with partitional placentae that lack a replum are also included in this type (Spjut 1994).

chalaza: a merely topographic term to describe the region at the base of the ► ovule where the ► integument(s) are inserted. ► Funiculus, chalaza and ► raphe form a

continuous tissue without any sharp delimitations.

chalazal plug: ► hypostase.

chartaceous: = paper-like, papery

choricarpous gynoecium = ► apocarpous gynoecium.

circinotropous: ► circinotropy

circinotropy: in the circinotropous ► ovule the curvature of the ► funiculus exceeds 180 degrees it reached in ► anatropous ovules; the funiculus then encircles the ovule more or less completely (e.g. Cactaceae, Plumbaginaceae).

circumscissile capsule = ► pyxidium.

climacteric fruit: a ► fruit that undergoes a sudden burst of metabolism and ripening (the climacteric) as the last step of maturation (from Mauseth 2003).

coccarium: a ► schizocarpic fruit derived from a ► schizocarpous gynoecium characterised by ► fruitlets opening along their ventral ► sutures and sometimes the dorsal sutures as a result of their separation from one another or from a central axis, the typical fruit of the Euphorbiaceae but it is also found in Campanulaceae (e.g. *Apetahia margaretae*), Cunoniaceae (e.g. *Callicoma serratifolia*), Eucryphiaceae (e.g. *Eucryphia lucida*), Greyiaceae (e.g. *Greya radlkoferi*), Hamamelidaceae (e.g. *Hamamelis virginiana*), Liliaceae (e.g. *Acanthocarpus*), Linaceae (e.g. *Linum austriacum*), Malvaceae (e.g. *Wissadula rostrata*), Melianthaceae (e.g. *Bersama abyssinica*), Myrothamnaceae (e.g. *Myrothamnus flabellifolius*), Podostemonaceae (e.g. *Leiothylax warmingii*), Rhamnaceae (e.g. *Ceanothus integerrimus*), Rubiaceae (e.g. *Chimarrhis latifolia*), Rutaceae (e.g. *Esenbeckia flava*, *Zanthoxylum setuloum*, *Z. arborescens*), Sterculiaceae (e.g. *Helicteres baruensis*), Theaceae (e.g. *Franklinia alatamaha*), Verbenaceae (e.g. *Nyctanthes arbortristis*) (Spjut 1994).

cocchetum: an ► aggregate fruit with dehiscent ► fruitlets opening along the ► dorsal and ► ventral ► sutures ; e.g. *Tetracera boiviniana* (Dilleniaceae), *Magnolia grandiflora* (Magnoliaceae), *Vauquelinia californica* ssp. *sonorensis* (Rosaceae) (Spjut 1994).

coccum: a ► simple dehiscent ► fruit consisting of one ► carpel that opens along two ► sutures and contains one to several basally attached ► seeds, not belonging to the Fabales; e.g. *Hakea* spp. (Proteaceae), *Myristica fragrans* (nutmeg, Myristicaceae) (Spjut 1994).

coenocarpium: a ► compound fruit derived from ► ovaries, floral parts and ► receptacles

of many coalesced flowers; e.g. *Ananas comosus* (pineapple, Bromeliaceae; ► sorosus) (Radford 1974).

coenocarpous gynoecium: a gynoecium of more than two partly or entirely united carpels. A coenocarpous gynoecium can be ► syncarpous (i.e. septate) or ► paracarpous (without septae).

coenocarpous ovary = ► coenocarpous gynoecium.

coleoptile: protective sheath covering the shoot apex of the ► embryo of some ► monocotyledons, e.g. the grasses.

coleorhiza: protective sheath covering the apex of the radicle of the ► embryo of some ► monocotyledons, e.g. the grasses.

coma: seed appendage assisting wind dispersal (► anemochory); one or two -sided tufts of hairs in plumed seeds, usually formed by the testa in the region of the exostome (exostome ► aril) and/or ► chalaza; e.g. Apocynaceae-Asclepiodeae (with exostomal tuft), Onagraceae (*Epilobium* with chalazal tuft).

complex aril: ► aril

compound cone: a type of cone structure, or fruit of gymnosperms, consisting of dry seed-bearing scales imbricately compacted together into a cone with each scale subtended by a ► bract that is distinct or fused to the scale (Spjut 1994); e.g. Pinaceae.

compound fruit: ► fruit derived from more than one flower. Most modern textbooks refer to fruits of this type as ► multiple fruits, a term which according to Spjut (1994), should, however, correctly be used on the same sense as ► aggregate fruit.

cone: spike-like flowers or inflorescences with persistent woody bracts and a woody axis (► compound cone).

coriaceous: = leathery

corolla: the summary of the ► petals of a flower (i.e. the inner whorl of a ► perianth).

cotyledon: the first leaf (► monocotyledons) or pair of leaves (► dicotyledons) of the ► embryo; they more or less protect the ► plumule during germination and can also store nutrients (► storage embryo).

craspedium: a fruit consisting of a monocarpellate pericarpium incompletely disarticulating into one-seeded segments, the seed-bearing segments separating transversely from each other and separating longitudinally from a marginal replum (basically a "framed lomentum"); e.g. *Mimosa pudica* (Leguminosae).

crassinucellate ovule: an ovule in which the megagametophyte is located deep in the usually thick and multicellular nucellus (i.e. covered by at least three layers of cells).

cremocarp ► cremocarpium.

cremocarpium = ► polachenarium.

cryptogams: (Greek: kryptos = hidden, concealed; gamos = marriage) plants that "copulate in secrecy", referring to thallophytes, mosses and liverworts, clubmosses, ferns, and horsetails.

cupula (= cupule): general term used to address the fruits of the Fagaceae (e.g. acorns) which bear a green involucre of fused bracts around their ► pericarpia (see also ► glans).

cupule: ► cupula.

cuticle: membrane of ► cutine covering the outer wall of ► epidermis cells. A cuticle serves as a protection against water loss or uptake and enhances the mechanical durability of the epidermis cells. The cuticle is often also covered with wax. In the ► ovule and often later also in the ► seed, cuticles are present on both the inside and the outside of the ► integument(s) as well as on the outside of the ► nucellus.

cutine: fatty or waxy substance which is deposited on or within plant cell walls; chemically esters of fatty acids which are secreted in the liquid phase through the cell wall of the developing cell.

cypsela: commonly defined as a single-seeded, dry, indehiscent fruit that develops from an inferior ovary; sometimes included with achenes; typical fruit of the Dipsacaceae and Compositae, e.g. *Taraxacum officinale* (dandelion). According to Spjut (1994): A simple ► anthocarpous fruit bearing longitudinally oriented awns, bristles, feathery ► staminodia (► staminodium), or similar structures derived from accessory parts that extend beyond the apical part of the ► pericarpium.

dehiscent fruit: any ► fruit, ► anthocarp or ► pericarpium in which the fruit wall splits open at maturity (Spjut 1994).

denticidal capsule: a ► capsular fruit dehiscing regularly along ► sutures but incompletely - not more than one-fifth the length of the ► capsule (Spjut 1994); e.g. *Cyclamen*, *Cerastium*, *Lythrum salicaria* (Lythraceae), *Menyanthes calthifolia* (Menyanthaceae), *Saponaria* (Caryophyllaceae), *Silene* (campion; Caryophyllaceae), *Primula* (primrose; Primulaceae), *Dianthus* (pink).

diaspore: the smallest unit of ► seed dispersal in plants (may be a fruit, ► mature ► floret of an ► anthercarium, a ► pericarpium, a ► fruitlet, ► mericarp, seedling or ► seed) (Spjut 1994).

diclesetum: an aggregate fruit of carpels enclosed by an accrescent, indehiscent, fruiting perianth; e.g. *Coriaria terminalis* (Coriariaceae), *Cabomba* (Cabombaceae) (Spjut 1994).

diclesium: a ► simple fruit consisting of a dry or fleshy ► pericarpium covered in part or entirely by loose (utricular) to tightly adhering (achene-like), dry, accrescent, indehiscent, fruiting-perianth (Spjut 1994); e.g. *Corylus* spp. (Betulaceae), *Atriplex* spp. (Chenopodiaceae; female flowers with a pair of bracteoles which are fused around the seed and often bear various appendages), Didiereaceae (*Alluaudia comosa*, *Alluaudia humbertii*, *Didierea madagascariensis*, *Decarya madagascariensis*), *Mirabilis jalapa* (Nyctaginaceae), *Trifolium* spp. (Leguminosae), *Diospyros* (Ebenaceae, drupes often enclosed in calyx), *Physalis* spp. (Solanaceae) etc.

dicotyledons: (Greek: di = two; cotyledon: sucker) group of the ► angiosperms characterised by ► embryos with two opposite ► cotyledons instead of only one as in the ► monocotyledons. Apart from that, dicotyledons show numerous differences to monocotyledons, e.g. such as the long-lived primary root, the circular rather than scattered arrangement of the vascular bundles in the stem, the presence of secondary thickening by a cambium, and leaves with usually reticulate venation.

diplospory: a form of ► apomixis in which an ► embryo develops directly from the diploid ► megaspore mother cell. This type of apomixis is found, for example, in *Antennaria* (Compositae).

dispersule: ► diaspore

disseminule: ► diaspore

dorsal suture: a predetermined line of dehiscence in the mid region of the ► carpel (Spjut 1994).

dorsicidal dehiscence: the opening of a capsular fruit along a dorsal suture, usually referred to as loculicidal dehiscence (Spjut 1994).

double fertilisation: ► embryo sac.

drupaceous fruit: group of ► simple fruits characterised by the inner layer of the ► pericarp being hardened, the ► endocarp often forming one or more stones (Spjut 1994) (► drupe).

druparium: a ► fruit derived from a ► schizocarpous gynoecium consisting of indehiscent ► fruitlets with a ► pericarp differentiated into outer soft and inner hardened layers; e.g. *Castela emoryi* (Simaroubaceae) (Spjut 1994).

drupe: indehiscent, fleshy ► fruit with the hard, woody ► endocarp producing one or more stones. Drupes are mostly single-seeded and then with one stone only (e.g. *Prunus P. avium*, *P. persica*), but sometimes also multiseeded and then with several stones which are then often called ► pyrenes; e.g. *Arctostaphylos uva-ursi*, *Sambucus nigra*.

drupelet: a ► carpel of a ► multiple (= aggregate) fruit displaying the characteristics of a ► drupe.

drupetum: a ► multiple (= aggregate) fruit of indehiscent fleshy ► carpels (► drupelets), each carpel with a hardened endocarp (Spjut 1994), e.g. *Rubus idaeus* (Rosaceae).

egg apparatus: the egg cell plus the two synergids at the micropylar end of the ► embryo sac (= ► megagametophyte) of the ► angiosperms.

egg cell: ► ovum

elaiosome: "Oil body", synonym of ► aril but mostly referring to the arils of myrmecochorous (► myrmecochory) ► seeds containing nutritious fatty oils to attract ants which carry the seeds to their nest, thereby facilitating their dispersal.

embryo sac: the seed plants' homolog of the ► megagametophyte of their prehistoric progenitors. The embryo sac develops from the functional ► megaspore through three mitotic divisions which produce a total of eight nuclei. Three of the nuclei migrate to the micropylar end of the nucellus and form the "egg apparatus" (one egg cell flanked by synergids), another three migrate to the base of the embryo sac to form the so-called antipodal cells and two nuclei, the so-called polar nuclei, migrate to the middle to later fuse with one of the sperm nuclei from the pollen (so-called "triple fusion" giving rise to a triploid storage tissue called ► "endosperm"). The union of one sperm nucleus with the egg cell and the other one with the polar nuclei is called "double fertilisation" and typical for the ► angiosperms.

embryo: (Greek: embryon = unborn fetus, germ) young ► sporophyte of the ► embryophyta (embryo plants) developing from the egg cell in the ► embryo sac after fertilisation, generally consisting of a ► hypocotyl-root-axis, the ► radicle, one (► monocotyledons) or two cotyledons

(▶ dicotyledons) and the plumule (shoot apex); also the first stage of the sporophyte of the bryophytes from the ▶ zygote to the bursting of the calyptra.

embryonic root = ▶ radicle.

embryophyta: plants which produce an ▶ embryo at some point of their life cycle, comprising bryophytes, pteridophytes in the broadest sense, and ▶ spermatophyta.

endocarp: the innermost layer of the ▶ pericarp (often hard, bony or papery like in ▶ drupes).

endosperm haustorium: ▶ haustorium.

endosperm: nutritive tissue in the developing and mature seeds of the ▶ spermatophyta. In gymnosperms the endosperm is represented by the haploid ▶ megagametophyte (also called "primary endosperm", while in angiosperms, it is a triploid tissue (also called "secondary endosperm") as the result of the double fertilisation (▶ embryo sac).

endostome: ▶ micropylar opening of the inner ▶ integument.

endotegmen: in the mature ▶ seed coat the inner epidermis of the inner ▶ integument.

endotesta: in the mature ▶ seed coat the inner epidermis of the outer ▶ integument.

endothelium: the inner epidermis of the integument, next to the nucellus, in those cases where its cells become densely cytoplasmic and apparently secretory; also called "integumentary tapetum" (from Fahn 1990).

endozoochory: dispersal of the ▶ diaspores of a plant by being eaten and carried inside an animal.

epiblast: a small tongue-shaped outgrowth opposite the ▶ scutellum in the ▶ embryo of most Poaceae. The epiblast is formed by the ▶ coleorrhiza.

epicarp: the outermost layer of the pericarp, mostly a skin or peel (see also ▶ exocarp).

epicotyl: the first shoot segment (internode) above the ▶ cotyledons.

epidermis: "outer skin", the external tissue layer of an organ, usually one cell layer thick.

epigeal germination: type of germination during which the ▶ cotyledons and ▶ epicotyl are raised above the surface of the ground as a result of the elongation of the ▶ hypocotyl. In some species, e.g. *Allium cepa* (onion, Alliaceae) the single cotyledon is raised above ground level by the rapid growth of the cotyledon itself rather than by extension of the hypocotyl (last part of definition from Bailey 1999).

epigynous flower: flower with an ▶ inferior ovary, i.e. ▶ calyx and ▶ corolla insert above the ▶ ovary.

epigyny: ▶ epigynous flower.

epimatium: a swollen appendage subtending or covering the ▶ seed in species of *Podocarpus*.

epispermium: a ▶ gymnospermous ▶ seed of the Podocarpaceae subtended or enclosed by a swollen receptacular (▶ receptacle) appendage (▶ epimatium); e.g. *Nagei wallichiana* (Podocarpaceae) (Spjut 1994).

epistase: cap-like structure (usually derived from the nucellus epidermis) occluding the micropyle in the mature seed, often stained deep reddish-brown by tanniferous materials. The epistase has similar functions as the ▶ hypostase.

epitropous: referring to ▶ ovules; an epitropous ovule is an ▶ anatropous or ▶ hemi(ana)tropous ovule with a ventral ▶ raphe whereby "ventral" refers to the relative position of the ovule to the ▶ placenta (i.e. facing the, for example, axile or parietal placenta); hence, the term cannot be applied, for example, to basally attached ovules. See also ▶ apotropous.

epizoochory = exozoochory: dispersal of the ▶ diaspores of a plant on the surface of the body of an animal (e.g. hooked or sticky fruits).

etaerio (= etaerium): a ▶ multiple (= ▶ aggregate) fruit (Spjut 1994).

eucarpium: a ▶ fruit characterised by the ▶ seeds developing within closed ▶ megasporophylls (▶ carpels), but including fruits that also develop by ▶ parthenocarpy.

exalbuminous: referring to seeds without endosperm or perisperm.

exarillate = "without ▶ aril".

exendospermous: referring to ▶ seeds without ▶ endosperm.

exocarp: the additional layer(s) beyond the ▶ pericarp of ▶ anthocarpous fruits.

exostome aril: special case of a localised ▶ aril represented by a proliferation of the ▶ exostome. A small, disc-like exostome aril as it is found in many Euphorbiaceae is traditionally called a "caruncle".

exostome: micropylar (▶ micropyle) opening of the outer ▶ integument.

exotegmen: in the mature ▶ seed coat the outer epidermis of the inner ▶ integument.

exotesta: in the mature ▶ seed coat the outer epidermis of the outer ▶ integument.

exozoochory: ▶ epizoochory.

false fruit: ▶ pseudocarp.

false septum: a false partition (▶septum) in an ▶ovary or a ▶fruit produced by ingrowths of the ▶placenta as opposed to a true septum originating from the ▶carpel walls.

fibre: an elongated sclerenchymatous cell with tapered ends and with more or less thick secondary walls; the walls may or may not contain lignin and a living protoplast may or may not be retained in the fibre (from Fahn 1990).

fissuricidal capsule: a ▶capsular fruit opening irregularly by one or more parallel slits, or regularly along ▶sutures between a closed apex and base; e.g. *Canna indica* (Cannaceae), *Cypripedium acaule* (Orchidaceae), *Mimulus guttatus* (Scrophulariaceae), *Staphylea trifolia* (Staphyleaceae), *Xyris pauciflora* (Xyridaceae). --- Note: Dehiscence of fissuricidal capsules has evidently evolved a number of times from regular types of ▶capsules as a consequence of a persisting ▶calyx or the development of an ▶inferior ovary. Those that open along ▶sutures (e.g. Convolvulaceae, Flacourtiaceae, Oxalidaceae, Restionaceae, Staphyleaceae) might be treated as a distinct type of fruit from those that appear to develop secondary slits near the carpellary ribs (Spjut 1994).

floral axis: ▶receptacle

floret: the protective structure of the Poaceae which is formed by the ▶lemma and ▶palea typically enclosing a single flower (Spjut 1994).

flower: a shoot with determined growth bearing modified leaves (▶carpels and ▶stamens or ▶mega- and ▶microsporophylls) which serve sexual reproduction.

flowering plants: ▶angiosperms

follicarium: a fruit derived from a ▶schizocarpous gynoecium (even if only united by their ▶styles and ▶stigmas as, for example, in Apocynaceae) where ▶carpels are distinctly separate from one another before maturing and dehiscing along their ventral ▶sutures; e.g. *Sterculia caribaea* (Sterculiaceae), Apocynaceae (e.g. *Rhazya stricta*, *Ceropegia barkii*), Cunonaceae, Hippocrateaceae (= Celastraceae) (Spjut 1994).

follicetum: a multiple (= aggregate) fruit of dehiscent ▶apocarps that open only along one ▶suture, dorsally or ventrally (Spjut 1994), e.g. Annonaceae, Crassulaceae, Magnoliaceae, Paeoniaceae, Ranunculaceae.

follicle: a ▶fruit derived from a single ▶carpel dehiscing along one (usually the ventral) ▶suture, e.g. *Cercidiphyllum* (Cercidiphylla-

ceae), *Grevillea* (Proteaceae), *Rourea* (Connaraceae).

folliconum: a compound fruit composed of many united follicular fruitlets; e.g. *Banksia menziesii* (Proteaceae) (Spjut 1994).

follicular anthecetum: a ▶compound fruit of 1-many distinct, dehiscing ▶fruitlets that disperse collectively from ▶bracteate ▶pseudanthia, each ▶fruitlet opening along one or more ▶sutures; e.g. *Centrolepis banksii* (Centrolepidaceae), *Eleusine multiflora* (Poaceae) (Spjut 1994).

follicular fruits: a series of fruits characterised by being monocarpellate and dehiscing along the ventral and/or dorsal sutures.

foraminicidal capsule: a capsular fruit opening by irregular diverging cracks or slits; e.g. *Burmannia australis* (Burmanniaceae), *Cuscuta gronovii* (Cuscutaceae = Convolvulaceae), *Tephrocactus* (Cactaceae), *Garrya elliptica* (Garryaceae), *Genlisea snariapoana* (Lentibulariaceae), *Antirrhinum majus* (Scrophulariaceae), *Solanum rostratum* (Solanaceae) (Spjut 1994).

free-central: a ▶placentation in which the ▶ovules are borne on a free-standing central ▶placenta within the ▶ovary.

fruit: commonly defined the product of a flower or a ▶gynoecium, however, this simplistic definition causes difficulties in cases where, e.g. entire inflorescences form the ▶diaspore (e.g. figs, pineapple etc.). Spjut (1994) offers a much more complex but more logic definition of the fruit: A fruit is a propagative unit consisting of one or more mature ▶ovules and their ▶megasporophylls, or megasporophyll-scale complexes (conifers), or parthenocarpic ovaries, in a ▶strobilus, ▶cone, gynoecium, concrescent gynoecia, or gynoecia that disseminate together, at the time it or its seed disperses from the plant, or just prior to germination on the plant, including any attached scales, bracts, modified branches, ▶perianth, or inflorescence parts.

fruitlet: fragment of a ▶fruit that functions as a ▶diaspore; according to Spjut 1994 a fruitlet may be (1) a ▶carpel or half-carpel of a mature ▶schizocarpous gynoecium, (2) a carpel of a mature ▶apocarpous gynoecium, or (3) a mature ▶multicarpellate ovary of a compound gynoecial structure (▶compound fruit), with or without accessory parts. A ▶unicarpellate fruitlet is referred to as an ▶apocarp in an ▶apocarpous gynoecium (e.g. *Ranunculus*), and as a ▶monocarp in a ▶schizocarpous gynoecium (e.g. *Acer*), ▶mericarp is a half-carpelled fruitlet derived from a ▶schizocarpous gynoecium (e.g. *Salvia*).

funicle = ▶ funiculus

funicular aril: ▶ aril

funicular: being part of or originating from the ▶ funiculus.

funiculus: the stalk by which the ▶ ovule and later the ▶ seed is connected to the ▶ placenta. The funiculus acts like an "umbilical cord", supplying the developing ovule and seed with water and nutrients.

galbulus (fruit of the cypress): a dry ▶ cone or ▶ fruit of the conifers composed of fused ▶ scales and ▶ bracts, the individual scales usually terminally peltate; e.g. *Cupressus lusitanica* (Cupressaceae), *Sequoiadendron giganteum* (Taxodiaceae) --- Note: The galbulus has been interpreted by others to include the ▶ aresthida (fruit of *Juniperus*) which differs by being fleshy; the fused ▶ bract and scale form a fleshy ▶ aril-like covering over the entire seed. The galbulus has scales that separate and become dry and woody at maturity; the scales may persist (*Cupressus*), or disintegrate (*Araucaria*) (Spjut 1994).

gametes: haploid male and female germ cells which fuse upon copulation. The female germ cells are generally larger than the male ones and then the terms ▶ "megagametes" and ▶ "microgametes" apply. Contrast to ▶ spores, gametes can only give rise to a new individual or generation after they fused with a gamete of the opposite sex.

gametophyte: (Greek: gametes = spouse; phyton = plant) haploid generation (e.g. the ▶ prothallium of the ferns or the ▶ embryo sac of the ▶ angiosperms) plant which produces the ▶ gametes.

generative cell: the cell in a ▶ pollen grain which on division produces two male ▶ gametes (from Fahn 1990).

glandarium: a fruit formed by a ▶ schizocarpous gynoecium upon an ▶ accrescent, fleshy ▶ receptacle; e.g. *Ouratea odora* (Ochnaceae) (Spjut 1994).

glandetum: a ▶ multiple (= aggregate) fruit of indehiscent ▶ carpels that mature on an accrescent ▶ receptacle, the ▶ fruitlets embedded in the receptacle, or stipitate (Spjut 1994); e.g. *Fragaria vesca*.

glandispermidium: a ▶ capsular fruit with an evanescent ▶ pericarp (basically an early dehiscent fruit) and accrescent seeds on a ▶ receptacle; e.g. *Caulophyllum thalictroides* (Berberidaceae), *Ophiopogon* (Liliaceae), *Gymnorinorea* (Violaceae) (Spjut 1994).

glandosum: a ▶ compound fruit of clustered ▶ fruitlets in which the bulk of the fruit is formed by an ▶ accrescent ▶ peduncle,

▶ receptacle or ▶ involucre; e.g. *Procris laevigata* (Urticaceae), *Mirabilis nyctaginea* (Nyctaginaceae) (Spjut 1994).

glans (Latin for acorn): an indehiscent ▶ fruit composed of a ▶ pericarpium subtended or enclosed by a fruiting-cupulate (aril-like) ▶ involucre that is derived from a swelling of ▶ bracts, ▶ pedicel, ▶ receptacle, or ▶ perianth; e.g. *Quercus robur*, *Anacardium occidentale*.

glume (Lat. Gluma): membranous ▶ bracts of the Poaceae present in pairs (superior and inferior glume) at the base of an individual ▶ spikelet.

gymnosperms: (Greek: gymnos = naked; sperma = seed) inhomogenous, polyphyletic group of the ▶ spermatophytes comprising the three recent monophyletic entities: Coniferatae (conifers), Cycadatae (cycads) and Gnetatae. In contrast to ▶ angiosperms, gymnosperms do not bear their ▶ ovules within closed ▶ megasporophylls, instead, they lie "naked" on the megasporophylls and are openly exposed to the environment.

gynoecium: the carpels of a flower together form the gynoecium; the carpels can be separate (▶ apocarpous gynoecium) or united (▶ coenocarpous or ▶ syncarpous gynoecium).

gynophore: an elongation of the ▶ receptacle (floral axis) between the ▶ stamens and the ▶ carpels thus forming a stalk that elevates the ▶ gynoecium.

haustorium: generally referring to an organ (e.g. an outgrowth of stem, root, hyphae etc.) that functions as a sucker to provide the plant/fungus or a specific organ with water and/or nutrients. The term is usually applied in connection with parasitic or hemiparasitic plants, but so-called haustoria can also be formed in developing seeds, e.g. by the endosperm. Endosperm haustoria can be micropylar, chalazal or both and facilitate the absorption of nutrients from surrounding tissues. They can be persistent in the mature seed and then serve in blocking the micropyle or chalaza.

hemiana-campylotropy: ▶ campylotropy

hemianatropy: ▶ orthotropous and ▶ anatropous ▶ ovules are connected by a complete range of transitional stages depending on the insertion of the ▶ funiculus. If the funiculus meets the ovule or seed at an angle of about 90 degrees, the ovule or seed is called hemi(ana)tropous.

hep: colloquial term for the fruit of the genus *Rosa* ▶ pometum.

hesperidium: in most modern textbooks simply described as a ▶ berry in which the

► **endocarp** consists of a mass of succulent "juice sacs", the actual edible portion of the ► fruit. These "juice sacs" develop from multicellular trichomes (hairs), the distal part of which becomes enlarged. When then interior cells finally break down, the cavity becomes filled with juice; e.g. Rutaceae such as *Citrus sinensis* (orange), *Citrus medica* (citron), *Citrus x paradisi* (grapefruit), *Fortunella* (kumquat), *Citrus limon* (lemon), *Citrus aurantifolia* (lime), but also Nymphaeaceae (e.g. *Nymphaea odorata*). A morphologically more precise definition is given by Spjut (1994): A simple, indehiscent fruit with axile ► placentae and a ► pericarp that is internally fleshy and externally of a leathery rind. This ► fruit has been maintained in most textbooks, but it can only be defined by its ► placentation and thickness of the outer layer.

► **heterocarpy**: the phenomenon that the same plant produces two or more morphologically different types of ► fruits; most common in the Compositae and Chenopodiaceae.

► **heteromorphism**: ► heterospermy
► heterocarpy.

► **heteropyle**: also called "false ► micropyle"; chalazal (► chalaza) opening in the mechanical tissue of the ► seed coat to allow access of the vascular bundle(s). In the ripe seed the heteropyle is usually closed by the ► hypostase.

► **heterospermy**: the phenomenon that the same plant produces two or more morphologically different types of ► seeds; known, for example, from Brassicaceae and some Leguminosae.

► **heterospory**: formation of spores that differ with respect to their size and sexual differentiation. The larger, female spores are called ► "megaspores", the smaller, male ones are called ► "microspores".

► **hilar seeds**: hilar seeds are characterised by a large, expanded ► hilum constituting part of the ► seed coat. They are usually flattened and campylotropous with a short ► raphe and ► antiraphe (found in some Meliaceae, Leguminosae like *Mucuna*, *Erythrina*).

► **hilum**: point of attachment of the seed to the ► funiculus or (if a funiculus is absent) to the placenta.

► **hip**: a common name applied to the ► berry-like fruit of the rosebush or dogrose (*Rosa canina*) composed of an enlarged and fleshy ► hypanthium surrounding numerous achenes (= ► pometum)

► **hydrochory**: dispersal of the ► diaspores of a plant by water.

► **hypanthium**: cup-shaped or tubular organ in the flower carrying the ► sepals, the ► petals and the ► stamens. A hypanthium that surrounds the ► gynoecium but stays separate from it is called a "perigynous hypanthium" (► perigynous flower). If the dorsal parts of the ► carpels of a ► coenocarpous gynoecium are included in the formation of the hypanthium, the result is an ► inferior ovary which wall is then called "gynoecial hypanthium".

► **hypoblast**: a term used for the suspensor of the mature grass embryo (Fahn 1990).

► **hypocotyl**: axis of the ► embryo delimited by the ► radicle at one end and by point of insertion of the ► cotyledons at the other.

► **hypodermis**: a specific layer or layers of cells beneath the epidermis, which differ structurally from the tissue below them. In the narrow sense of the term, refers only to such layers which arise from a meristem other than the protoderm (from Fahn 1990).

► **hypogeal germination**: type of germination during which the thick storage ► cotyledons remain inside the ► seed coat underground as there is no substantial elongation of the ► hypocotyl.

► **hypogynous flower**: a flower with a ► superior ovary, ► stamens, ► petals and ► sepals or ► tepals are attached to the ► receptacle below the ► ovary.

► **hypogyny**: ► hypogynous flower.

► **hypostase**: cup-, disc- or plate-like, sometimes even globular or pyriform tissue of the ► nucellus ► in the region of the ► chalaza at the level of the origin of the ► integuments. The cells forming the hypostase differ from the remaining nucellar tissue in their size, shape, contents and cell walls. In the mature seed, the cells are often filled with tanniniferous materials letting the hypostase appear as a dark reddish-brown "chalazal plug". One of the potential functions of the hypostase is to seal the chalazal opening (► heteropyle) against dehydration or microbiological and mechanical damage, especially when the cells are thick-walled.

► **hypsophyll**: ► bract.

► **ichthyochory**: dispersal of the ► diaspores of a plant by fish.

► **imbibition lid**: ► operculum

► **indehiscent fruit**: a ► fruit that does not open at maturity to expose or release the ► seeds.

► **inferior glume**: ► glume.

► **inferior ovary**: an ► ovary which is fused with the ► receptacle, situated below the point of attachment of ► stamens, ► petals and

► sepals or ► tepals (see also ► hypanthium and ► epigynous flower).

infructarium: a ► compound fruit of the Poaceae consisting of an ► infructescence that breaks apart at maturity into various kinds of fruiting fragments as a result of disarticulation occurring below and above the ► glumes and/or at the base of a ► spikelet cluster; e.g. *Munroa squarrosa* (Poaceae) (Spjut 1994).

infructescence: commonly referred to the flowers of an ► inflorescence at the fruiting stage. According to Spjut (1994) an infructescence is an inflorescence that is comprised of one or more pericarpia (► pericarpium).

infructum: a ► compound fruit consisting of many ► pericarpia that are collectively dispersed by disarticulation at the base of an entire ► infructescence; e.g. *Aegilops kotschy* (Poaceae) (Spjut 1994).

integument: on its outside the ► nucellus is usually covered by one or two layers, the so-called integuments. The ► ovules of the choripetalous ► dicotyledons and the ► monocotyledons usually have two integuments (hence bitegmic ovules) while the sympetalous dicotyledons usually have only a single one (hence unitegmic ovules). The integument(s) usually give rise to the ► seed coat unless the seed is ► pachychalazal.

integumentary tapetum = ► endothelium.

intermediate ovary = ► perigynous ovary

involucre: outer ► calyx produced by a circle of bracts at the base of an inflorescence (e.g. the flower heads or capitulae of the Compositae).

jaculator: the dorsal, lignified, hook-like outgrowth in the ► seeds of Acanthaceae which remains attached to the ► fruit after seed expulsion.

labyrinth seed: ► ruminant seeds which show an intricate network of lobes when the seed is cut in any plane.

legume: typical dehiscent fruit of the Leguminosae developed from a ► monomerous ovary (i.e. a ► gynoecium consisting of a single ► carpel) opening along two ► sutures (dorsally and ventrally) with the ► seeds attached to the ventral suture; e.g. *Acacia* spp., *Medicago sativa* (alfalfa), *Glycyrrhiza glabra* (liquorice), *Delonix regia* (flamboyant), *Pisum sativa* (pea), *Phaseolus coccineus* (runner bean), *Wisteria sinensis*. --- Note: A legume is similar to a ► follicle except that it splits on both ► sutures. Spjut has restricted the application of legume to the Leguminosae (= Fabaceae) with respect to Cronquist (1988) but he does not regard all

fruits of this family as a legume. Detailed descriptions and illustrations of fruits and seeds for all genera of Mimosoideae and Caesalpinioideae can be found in Gunn (1984) and Gunn (1991) (Spjut 1994).

lemma (Lat. *Palea inferior*): the lower of the two membraneous ► bracts enveloping an individual flower in the Poaceae. It is from the axil of the ► palea that an individual flower originates. The lemma can bear an ► awn that morphologically corresponds to the tip of foliate leaves.

lens: a raised zone in the area of the chalaza of the seeds of the Leguminosae which externally often appears as a lens-shaped structure near the hilum, also called "marca rapheale" or "macula raphae". In some legumes (e.g. *Albizzia*, *Acacia*) the lens forms a plug that erupts on heating the seed. This structure has also been described by some authors under the term ► "strophiole" or "strophiolar plug" which, however, refers to a localised ► aril assisting the dispersal of the seed by animals. [remark: Gunn (1981) and Lersten & Gunn (1981) and Lersten et al. (1992) have not agreed with the inclusion of the lens area under the term strophiole].

light line: ► linea lucida

linea fissura (= linea sutura) a line (actually a crack in the testa) defining the ► pleurogram in the seeds of many Mimosoideae; the linea fissura is open at the hilar end. According to Corner (1976) the seeds of Caesalpinioideae are also often characterised by a pleurogram but lack the linea fissura.

linea lucida = light line: ► Malpighian cells usually possess a so-called "light line" or "linea lucida" which is a zone of the cell that differs in its light refraction and therefore appears brighter than the rest.

linea sutura = ► linea fissura

localised aril: ► aril

locule: ► loculus.

loculicidal capsule: a capsular ► fruit (or ► pericarpium) opening completely along a dorsal ► suture, the valves consisting of the two halves of adjoining carpels; a very common fruit type found in e.g. Aizoaceae, Aloeaceae, Balsaminaceae, Bixaceae, Celastraceae, Cistaceae (e.g. *Helianthemum* spp.), Diapensiaceae (e.g. *Diapensia himalaica*), Haemodoraceae, Iridaceae (*Iris* spp.), Juncaceae, Liliaceae (e.g. *Lilium* ssp., *Tulipa* spp.), Malvaceae (e.g. *Hibiscus rosa-sinensis*), Moringaceae (e.g. *Moringa oleifera*), Onagraceae (e.g. *Oenothera* spp.), Orobanchaceae, Salicaceae, Sarraceniaceae (e.g. *Darlingtonia californica*),

Simmondsiaceae (*Simmondsia chinensis*), Sterculiaceae, Theaceae, Violaceae (e.g. *Viola* spp.), Zingiberaceae (e.g. *Renealmia*) --- Note: A ►loculicidal capsule is easily identified when ►septae are present; however, if ►placentation is ►parietal, then the relative position of the sutural dehiscence has to be determined, or if placentation is basal or apical, then the relative position of the stigmas has to be ascertained (Spjut 1994).

loculicidally dehiscent: opening along dorsal sutures (i.e. along the middle of the dorsal side of the carpel).

loculus (= locule): compartment of a multicarpellate, ►syncarpous ovary containing the ►ovule(s) (sometimes also referred to the homologous compartment in a ►fruit).

lomentaceous fruit: a group of ►fruits characterised by a ►pericarp that at maturity disarticulates into seed bearing segments, often constricted between the seed bearing joints where disarticulation occurs (Spjut 1994).

lomentarium: a ►fruit derived from a ►schizocarpous gynoecium where each ►fruitlet disarticulates at maturity into seed-bearing segments; e.g. *Alyxia* (Apocynaceae), *Platystemon californicus* (Papaveraceae; the ►carpels separating at maturity, fragmenting into 1-seeded ►"nutlets") (Spjut 1994).

lomentetum: a ►fruit derived from an ►apocarpous gynoecium with the ►pericarp of each ►carpel developing constrictions between the maturing ►ovules and at maturity disarticulating at the constrictions; e.g. *Monoxanthoxis schweinfurthii* (Annonaceae). (Spjut 1994).

lomentum: a ►fruit (or ►pericarpium) composed of a single ►carpel that disarticulates transversely into seed bearing segments (diaspores) (Spjut 1994), mostly found in the Leguminosae; e.g. *Laburnum anagyroides*, *Prosopis argentina*, *Sophora* spp.

lyscarpous gynoecium: a ►paracarpous gynoecium with central (or basal) ►placentation as a result of a post- or congenital reduction of the septae.

lyscarpous ovary = ►lyscarpous gynoecium.

megagametophyte = ►megagametophyte.

macrosclereid: A shortly elongated, columnar ►sclereid, often palisade-like, constituting the mechanical layer in many seed coats (►Malpighian cell).

macrospore = ►megaspore

macrosporocyte (= macrospore mother cell): the cell that differentiates into the macrospores.

macula raphae: ►lens

Malpighian cell: Highly specialised, palisade-like ►macrosclereid with unevenly thickened walls (the narrow remaining lumen usually at the distal end of the cell), and usually hexagonal facets (in surface view), often with a ►linea lucida. A Malpighian palisade layer is a common feature of the ►exotesta of Cannaceae, Leguminosae and Rhamnaceae or of the ►exotegmen of Bombacaceae (= Malvaceae), Celastraceae, Cistaceae Malvaceae etc.

mammaliochory: dispersal of the ►diaspores of a plant by mammals.

marca rapheale: ►lens.

marginal placentation: type of ►placentation in which the ►ovules are borne along the fused margin of a single ►carpel (e.g. like in the pods of the Leguminosae).

megagamete: The larger, female gametes formed by anisogamous (►anisogamy) organisms.

megagametophyte = megagametophyte = macroprothallium: Prothallium developed from the ►megaspore; in ►gymnosperms giving rise to the ►archegonia and primary ►endosperm, the homolog of the megagametophyte in the ►angiosperms is the ►embryo sac.

megaprothallium = ►megagametophyte.

megaprothallium = ►megagametophyte.

meegasporangium = macrosporangium: Organ (►sporangium) in which the ►megaspores of the ►cryptogams are formed, the ►spermatophytes' homolog of which is the ►nucellus.

megaspore = macrospore: The larger spores formed by heterosporous (►heterospory) plants which give rise to a female ►gametophyte.

meegasporophyll = macrosporophyll: Fertile leaf bearing the ►meegasporangia, called ►"carpel" in the ►spermatophyta.

meiosis (= reduction division): a type of nuclear division which results in daughter nuclei each containing half the number of chromosomes of the parent, i.e. chromosome number is reduced from diploid to haploid. Meiosis is preceded by chromosome replication and comprises two distinct nuclear divisions, the 1st and 2nd meiotic divisions, which may be separated by cell division. The reduction in chromosome number takes place during the 1st division, when paired

homologous chromosomes separate and are segregated into different nuclei. The second division resembles mitosis, when the two chromatids of each replicated chromosome separate and are segregated into different nuclei. The 1st division of meiosis is conventionally divided into the following stages: leptotene, zygotene, pachytene, diplotene, diakinesis, metaphase I, anaphase I, telophase I. (Definition taken from Lawrence 2000)

mericarp: A half-carpelled ► fruitlet derived from a ► schizocarpous gynoecium (Spjut 1994).

meristem: (Greek: merizein = divide) A tissue which cells are capable to divide mitotically and to give rise to new cells, or tissues and organs. Meristems are generally located at shoot and root apices (apical meristems), in leaf axils, in developing fruits as well as in the stems of plants with secondary thickening (cambium and cork cambium).

meristematic: capable to divide mitotically (see also ► meristem).

mesocarp: the middle layer of the pericarp (often fleshy like in ► drupes).

mesocotyl: often refers to the internode between the scutellar node (► scutellum) and the ► coleoptile in the Poaceae (from Fahn 1990).

mesotegmen: in the mature ► seed coat the middle layer between the inner and outer epidermis of the inner ► integument.

mesotesta: in the mature ► seed coat the middle layer between the inner and outer epidermis of the outer ► integument.

microbasarium: a ► fruit derived from a ► schizocarpous gynoecium of separate or separating ► carpels having a common ► style, and at maturity each ► carpel disarticulates into discrete, seed-containing, half-carpels (► mericarps); e.g. *Cynoglossum officinale* (Boraginaceae), *Callitriche muelleri* (Callitrichaceae), *Falckia canescens* (Convolvulaceae), *Monarda fistulosa* (Lamiaceae), *Clerodendrum philippinum* (Verbenaceae).

microgamete: smaller, male gametes formed by anisogamous (► anisogamy) organisms.

microgametophyte (= microprothallium): prothallium developed from the ► microspore; in ► cryptogams giving rise to ► antheridia which produce male ► gametes, in ► spermatophytes, however, they don't form any ► antheridia anymore, only sperm nuclei.

microprothallium = ► microgametophyte.

microprothallium = ► microgametophyte.

micropyle: opening of the ► integument(s) at the apex of the ► ovule and later the ► seed, usually acting as a passage for the pollen tube.

microsporangium: organ (► sporangium) in which the ► microspores are produced, called "pollen sac" in the ► spermatophyta.

microspore: the smaller spores formed by heterosporous (► heterospory) plants which give rise to a male ► gametophyte, called "pollen grains" in the ► spermatophyta.

microsporocyte (= microspore mother cell): the cell that differentiates into the microspores.

microsporophyll: fertile leaf bearing the ► microspores; ► called "stamen" in the ► spermatophyta.

monocarp: ► fruitlet.

monocarpellate (= monomerous) = ► unicarpellate.

monocotyledons: (Greek: monos = single; cotyledon: sucker) group of the angiosperms (→) characterised by ► embryos with only one ► cotyledon instead of two as in the ► dicotyledons. Apart from that, monocotyledons show numerous differences to dicotyledons, e.g. such as the short-lived primary root, the scattered rather than circular arrangement of the vascular bundles in the stem, the general lack of secondary thickening by a cambium, parts of the flowers usually in threes, and leaves with usually parallel venation.

monomerous (= monocarpellate = ► unicarpellate): referring to a ► gynoecium consisting of only one single ► carpel (see also ► monomerous ovary).

monomerous ovary: A ► gynoecium consisting of only a single carpel.

mother cell: a cell which gives rise to other cells as a result of its division (from Fahn 1990).

multicarpellate: referring to an gynoecium composed of more than one carpel.

multiple fruit: in most modern textbooks the term is applied to a ► fruit developed from more than one flower (► compound fruit). Spjut (1994), however, applies the term to fruits developed from an ► apocarpous gynoecium (► aggregate fruits), suggesting that Lindley (1832, 1848) erroneously switched the meanings of aggregate and multiple fruits and that later botanists have not differentiated between Lindley's rationale and his errors. The author adopts Spjut's view here and uses the term here in the sense of ► aggregate fruit.

myrmecochory: (Greek: mirmekos = ant; chorizein = disperse) dispersal of the

► diaspores of a plant (usually ► fruits and ► seeds) by ants.

nucellus: core of tissue in the centre of the ► ovule in which the female ► gametophyte develops, morphologically the seed plants' homolog of the ► megasporangium of their prehistoric progenitors.

nuculanium: a ► simple fruit with a dry ► pericarp differentiated by a hardened ► endocarp, or of one or more stones, the external layer(s) crustaceous or fibrous or coriaceous, indehiscent or occasionally dehiscent (basically a "dehiscent ► drupe"); e.g. *Cocos nucifera* (Palmae), Burseraceae, *Licania britteniana* (Chrysobalanaceae), *Prunus dulcis* (Rosaceae), *Valerianella* (Valerianaceae) (Spjut 1994).

nut: general term referring to an indehiscent ► fruit with a dry, woody ► pericarp.

nutlet: an individual ► carpel (► monocarp) of a ► fruit derived from an ► apocarpous gynoecium displaying the characteristics of a ► nut.

obcampylotropous: ► campylotropy

obturator: an outgrowth of the ► funicle, ► placenta or styler canal which brings the transmitting tissue closer to the ► micropyle (from Fahn 1990).

operculum: plug-like structure in the micropylar region of the seed which detaches during germination by circumscissile dehiscence; also called germination lid, imbibition lid, seed lid, micropylar (► micropyle) collar etc. Opercula are best known from ► monocotyledonous families (e.g. Araceae, Marantaceae, Commelinaceae, Arecaceae etc.).

ornithochory: dispersal of the ► diaspores of a plant by birds.

orthotropy (= atropy): an ovule or seed is called orthotropous (or atropous) when funiculus, chalaza and micropyle lie in a straight line, the hilum, as a result, lying adjacent to the chalaza. Such ovules have no ► raphe. They are typical for gymnosperms but they are also found in 20 angiosperm families (e.g. in Juglandaceae, Piperaceae, Polygonaceae, Urticaceae) and there mostly in one-seeded fruits.

osteosclereid: a bone-shaped sclereid, usually forming a distinct ► hypodermal layer in the ► seed coat of the Leguminosae.

ovary: the enlarged, usually lower portion of the ► pistil containing the ► ovules.

ovule: the coated (by one or two ► integuments) megasporangium of the Spermatophytes (seed plants) containing the

megagametophyte = ► embryo sac. The ► ovule generally consists of one or two ► integument(s), the ► nucellus, the ► raphe, the ► chalaza, and the ► funiculus. After fertilisation of the ► embryo sac, the ovule develops into a ► seed.

ovuliferous: bearing or containing ► ovules.

ovulode: a sterile ovule (counterpart to ► staminode); e.g. the ovules in the distal part of in the ovary of certain *Eucalyptus* species are sterile and represent a kind of "sacrifice" for predated insect larvae entering the ovary from its tip.

ovum: a female gamete (= egg, egg cell).

pachychalazaly: ► seeds are called pachychalazal when through intercalary growth the ► chalaza replaces the ► seed-coat partly or entirely. Pachychalazaly is considered a derived condition and has developed independently in many families (e.g. Sapindaceae, Lauraceae, Meliaceae, Tropaeolaceae).

palea (Lat. *Palea superior*): the upper of the two membranous bracts enveloping an individual flower in the Poaceae.

Palea inferior: ► lemma.

Palea superior: ► palea.

palisade cells: the term "palisade cells" (i.e. radially elongate) cells often found in seed coats. Palisade layers are usually found either in the ► exotesta (e.g. Leguminosae) or the ► exotegmen (e.g. Malvaceae, Euphorbiaceae).

paracarpous gynoecium: a unilocular (or at most with a false ► septum) ► ovary as the result of the fusion of two or more carpels (► coenocarpous gynoecium) which are fused only along their margins. The ► placentation can be ► parietal or ► central.

paracarpous ovary = ► paracarpous gynoecium.

parietal: meaning "attached to the margins of a structure"; referring to type of ► placentation, having the ► ovules attached to ► placentas on the wall of the ovary.

parthenocarpic ► parthenocarpy

parthenocarpy: the development of fruits without seeds. Parthenocarpy may require stimulation by pollination (e.g. seedless grapes in which the embryo aborts following fertilisation) or not (e.g. cucumber).

parthenogenesis: the development of a female ► gamete (e.g. ► egg cell) into an ► embryo without ► fertilisation by a male ► gamete (e.g. ► sperm nucleus).

parthenogenetic: see ► parthenogenesis.

parthenogenesis: a form of asexual reproduction whereby an egg cell develops into an embryo without fertilisation by a male gamete. Parthenogenesis is usually the result of an abnormal meiosis resulting in an egg nucleus with an unreduced number of chromosomes (e.g. *Taraxacum officinale*, Compositae). Sometimes the megaspore is replaced by a cell of the nucellus that develops into an embryo (e.g. *Hieracium*, Compositae) (▶ apomixis).

pedicel: the stalk of an individual flower.

peduncle: the main stem (axis) of an inflorescence.

pepo (Greek: a pumpkin): a ▶ simple, indehiscent, pulpy ▶ fruit having a thick-leathery rind with ▶ parietal placentae, or with an apical placenta; familiar gourds often contain a thick rind, and this character attribute, along with the parietal or apical ▶ placentation, distinguishes the pepo from the ▶ berry and ▶ hesperidium; e.g. *Carica papaya* (Caricaceae), *Cucumis sativus* (Cucurbitaceae), *Musa x paradisiaca* (the banana of the commerce, Musaceae), *Passiflora glandulosa* (Passifloraceae) (Spjut 1994).

perianth: floral envelope that is clearly differentiated into ▶ calyx (outer perianth whorl) and ▶ corolla (inner perianth whorl).

pericarp: the wall of the ovary at the fruiting stage, consisting of ▶ epicarp, ▶ mesocarp, and ▶ endocarp (these three layers are typically differentiated in ▶ drupes, but not in fleshy and dry fruits where the pericarp is more or less homogenous) (see also ▶ pericarpium).

pericarpium: a ripened ovary (including the seed(s)) without any attached parts; its wall referred to as ▶ pericarp (Spjut 1994).

perichalazaly: in perichalazal ▶ seeds the ▶ chalaza only expands in the median plane of the seed and one of the raphal (▶ raphe) vascular bundles extends around the periphery of the seed from ▶ funiculus to ▶ micropyle. Perichalazaly is rather rare, and known mainly in the Annonaceae and Meliaceae.

periclinal: parallel to the surface.

perigon: floral envelope composed of uniform floral leaves, i.e. without differentiation into ▶ calyx and ▶ corolla.

perigynium: the sac that surrounds the ▶ pericarpium in *Carex* (Cyperaceae).

perigynous flower: flower with a cup-shaped or tubular ▶ receptacle that is not fused with the ▶ carpel(s); considered a transitional stage between ▶ hypogynous and ▶ epigynous flowers (see also ▶ hypanthium).

perigynous ovary: an ▶ ovary which is surrounded by a cup-shaped or tubular ▶ hypanthium, sometimes also called "intermediate ovary" (see also ▶ perigynous flower).

perigyny: ▶ perigynous flower.

perisperm channel: channel produced chalaza penetrating the ▶ perisperm in the seeds of Marantaceae and other Zingiberales.

perisperm: a diploid storage tissue derived from the ▶ nucellus of the ▶ angiosperms. Perisperm is found both in ▶ monocotyledons (mainly Zingiberales) and ▶ dicotyledons (mainly Caryophyllales but also Nymphaeaceae and Piperaceae). Perispermous seeds usually also contain (if only little) ▶ endosperm. The reserve substance that is usually stored in the perisperm is starch.

petal: in flowers where the outer whorl of the perianth is different from the inner whorl, the elements of the inner whorl are addressed as petals. The summary of the petals forms the ▶ corolla.

phytin: magnesium calcium phytate, the magnesium salt of phytic acid acting as a phosphate storage substance in seeds. Phytin is a mixture of calcium-magnesium salts of inositehexaphosphoric acid, known as phytic acid. Salts of phytic acid are found in plants (predominantly in seeds) and in animal tissues and organs. In the human body phytic acid exercises the function of phosphate depot.

pistil: the summary of the carpels when fused into a single ovary or each individual carpel in flowers with ▶ apocarpous gynoecia.

pit: another word for ▶ stone.

placenta: a region within the ▶ ovary where the ovules are formed and stay attached (usually via a ▶ funiculus) until seed maturation.

placentation: the arrangement of the ▶ placentas, and hence of ▶ ovules, in the ▶ ovary, e.g. ▶ parietal placentation, ▶ axile placentation, ▶ marginal placentation.

pleurogram: specialised structure on the seeds of many Mimosoideae and Caesalpinioideae and some Cucurbitaceae, appears externally on both sides of the seed as a horse-shoe-shaped depression or furrow which is open towards the hilum, the enclosed area called "areole". It has been suggested that the pleurogram functions as a hygroscopic valve. In mimosoid seeds the pleurogram is usually defined by a ▶ linea fissura (= ▶ linea sutura) while the pleurogramatic seeds of the Caesalpinioideae lack a linea fissura.

plicate = folded; in connection with seeds referring to folded ► cotyledons (e.g. in Convolvulaceae, Malvaceae).

plumule: shoot apex of the ► embryo, later giving rise to the first shoot.

pod = general for a dry ► fruit composed of one or more ► carpels with a firm ► epicarp surrounding a cavity and containing one or more seeds. This may include ► camara, various ► capsules, ► legume, ► lomentum, ► follicle, ► carcerulus, ► utricle (Spjut 1994).

podosperm: a term created by Richard (1808) for funiculus.

polachenarium: a ► fruit derived from a ► schizocarpous gynoecium where the ► fruitlets at maturity longitudinally separate from one another and remain attached to a ► carpophore or ► columella, dehiscent or indehiscent; e.g. Apiaceae, Geraniaceae, Juncaginaceae, Malpighiaceae, Medusagynaceae, Ochnaceae (*Rhytidanthera magnifica*), Rubiaceae (e.g. *Anthospermum*), Rutaceae (e.g. *Calodendrum capense*) (Spjut 1994).

polar nuclei: ► embryo sac.

polospermatium: a ► capsular fruit with seeds that persist at the apex of a columella after the valves have fallen; e.g. *Spondianthus preussii* (Phyllanthaceae), *Austrobuxus carunculatus* (Pseudanthaceae), *Ctenolophon parvifolius* (Hugoniaceae). --- Note: While it is not uncommon for ► capsular fruits to display fleshy-coloured sarcotestal or arillate seeds (e.g. suspended seeds from a funiculus in Magnoliaceae, arillate seeds persistent on valves in Celastraceae), the ► glandispermidium and polospermatium are distinctive by the manner in which ► pericarp dehiscence has evolved towards in situ seed development for animal dispersal. The glandispermidium differs by seeds that persist on a ► receptacle and become visible through seed accrescence and pericarp evanescence; this is certainly a unique mode of seed dispersal, and it also is apparently a rare occurrence (Spjut 1994).

polyanthecetum: a ► compound fruit containing many antheceae - a cluster of ► spikelets that fall together as a result of disarticulation at a node or base of primary branch of the ► inflorescence, each spikelet containing one or more ► pericarpia; e.g. *Pennisetum purpureum*, *Phalaris paradoxa* (Poaceae) (Spjut 1994).

polychory: dispersal of the ► diaspores of a plant by more than one mode, e.g. the fruits of *Petalostigma* spp. (quinine tree, Pseudanthaceae, Australia) have a three-phase dispersal mechanism. The fruits are first eaten by emus

and the stony endocarps discharged with the faeces of the birds. Upon desiccation in the hot sun, the endocarps dehisce explosively to catapult the seeds over a distance of up to 3 meters. The seeds themselves bear an oily ► elaiosome (morphologically a ► caruncle or ► exostome aril) which attracts ants who first carry the seeds to their home and later, after they have eaten the elaiosome, dispose of them outside around their nest.

polyembryony: formation of multiple ► embryos within one ► ovule, either through formation of multiple ► zygotes or one zygote giving rise to more than one embryo (e.g. Pinaceae).

pomarium: a ► multiple (= aggregate) fruit of ► carpels sunken in a chambered ► receptacle or ► hypanthium, each ► fruitlet in its own chamber (Spjut 1994); e.g. *Nelumbo lutea* (Nelumbonaceae), *Siparuna* spp. (Monimiaceae), *Ravensara* (Lauraceae).

pome: in most modern textbooks simply defined as an indehiscent, fleshy ► pseudocarp with a fleshy ► receptacle. A morphologically more accurate definition is given by Spjut (1994): an indehiscent ► simple fruit composed of a fleshy to coriaceous ► epicarp and a ► pericarp differentiated by a crustaceous or stony ► endocarp, the fleshy layer primarily formed by the receptacle, ► hypanthium, or ► perianth; e.g. *Malus domestica* (apple), *Pyracantha* (firethorn), *Crataegus* (hawthorne), *Mespilus germanicus* (medlar), *Pyrus communis* (pear), *Cydonia oblonga* (quince). Spjut (1994) explains further: The pome, which has often been misclassified as a type of ► pericarpium, is an ► anthocarp that is distinguished from other fleshy anthocarps by the differentiation of the ► endocarp. In the Rosaceae and Olacaceae, the endocarp of a pome exhibits a transition of forms from consisting of distinct stones to merely being plurilocular-cartilaginous. Those with many stones (e.g. *Mespilus germanica*) might be regarded as a distinct fruit type, pyrenarius. This should not be confused with the pometae (► pometum) in the Sorbeae, the fruits of which are derived from an ► apocarpous gynoecium.

pometum: a ► multiple fruit of ► carpels embedded in a ► hypanthium or ► receptacle that is not divided into more than one cavity (Spjut 1994); e.g. *Rosa canina* (Rosaceae), *Eupomatia laurina* (Eupomatiaceae), *Glossocalyx* (Monimiaceae), *Calycanthus fertilis* (Calycanthaceae).

poricidal capsule = porose capsule: in most modern textbooks defined as a ► capsule opening with pores or holes around the top;

According to Spjut (1994), a poricidal capsule is defined as a ►capsular fruit that deshisces by a localised pore on each cell, the pore developing from a circular membrane or suture; e.g. *Triodanis perfoliata* (Campanulaceae) --- Note: The name poricidal capsule has been applied to capsules with various types of openings; however, Spjut (1994) makes a distinction between those that dehisce by a localised circular suture on each carpel (poricidal capsule) as opposed to those that open by a tearing of the pericarp due to an internal rupture (foraminicidal capsule), and those that produce a single circumscissile opening that cuts across all carpels (pyxidium). The fruit of *Papaver somniferum* has been commonly thought of as a poricidal capsule, but Spjut (l.c.) recognises this as a ceratium because the valves separate from a replum, sometimes opening only part way an appearing porous (Spjut 1994).

porose capsule = ►poricidal capsule.

primordium: an organ, cell or organised group of cells in the earliest stages of development (from Fahn 1990).

proembryo: the ►embryo at its earliest stage of development, i.e. from the first unequal division of the ►zygote until ►suspensor and embryo proper can be distinguished.

protein body = ►aleurone grain.

prothallium = prothallus: haploid gametophyte developing from a ►spore and producing either ►antheridia or ►archegonia or both; well developed in algae, pteridophytes in the broadest sense, and some ►gymnosperms, highly reduced in the ►angiosperms (no more formation of antheridia and archegonia) with the pollen tube and ►embryo sac as the homologs of the ►microprothallium and ►megaprothallium.

prothallus: ►prothallium

pseudanthecium: a fruit characterised by a pericarpium of the Cyperaceae enclosed by a loose or inflated sac of modified connate bracts; e.g. *Carex nebraskensis* (Cyperaceae) (Spjut 1994).

pseudocarp (= ►anthocarp = "false fruit"): term used in many textbooks where a simplistic definition of a ►fruit is adopted to address fruits in which parts other than the ►gynoecium are integrated such as, for example, the ►receptacle or parts of the ►perianth (e.g. ►cypsela, ►glandetum).

pseudodrupe ("false drupe"): an ►anthocarpous fruit with an undifferentiated indurate ►pericarp surrounded by a fleshy or coriaceous ►exocarp (Spjut 1994); e.g. Elaeagnaceae (e.g. *Elaeagnus*), Lauraceae

(*Cryptocarya*), Juglandaceae (e.g. *Juglans nigra*, *Juglans regia*, walnut, in which the soft husk originates from fused involucre bracts), Moraceae (*Pseudolmedia*), Myricaceae (*Mryica javanica*), Trapaceae (*Trapa bicornis*).

pseudogamy: a form of ►apomixis in which the ►sperm only induces the development of the ►embryo without ►fertilisation taking place. The male ►gamete only provides a stimulus (thus ►pollination is necessary) but plays no further part in the development of the ►embryo. See also ►parthenogenesis.

pseudosamara: an ►anthocarpous fruit bearing distal ►wings two or more times the length of the ►pericarpium (Spjut 1994); e.g. accrescent ►sepals in *Gyrocarpus americanus*, *Shorea* spp., *Dipterocarpus* spp.; other examples of pseudosamaras are: Apiaceae (*Actinolema macrolema*), Betulaceae (*Carpinus caroliniana*), Juglandaceae (*Engelhardia*), Lemnaceae (*Wolffiella lingulata*), Tiliaceae (= Malvaceae, *Tilia* spp.) etc.

putamen (Lat. = shell): a term given by Gaertner (1788) to the ►stone of a drupe.

pyrenarius: see under ►pome.

pyrene: Greek, referring to the stone of a ►fruit, i.e. a ►seed surrounded by a hard, bony ►endocarp, the term often employed when a ►drupe contains more than one stone; sometimes also used to describe the fruit (a multi-seeded drupe) itself.

pyxidium (= circumscissile capsule): popularly described as a ►capsule which deshisces by a split around the equator of the fruit. Spjut (1994), however, provides a morphologically more accurate definition: a ►capsular fruit deshisces by a lid, or by a transverse ►suture across the cells, or through apical or basal pores on each ►carpel, that enlarge and unite at maturity to a single pore; e.g. many Lecythidaceae, *Amaranthus hybridus* (Amaranthaceae); *Jeffersonia diphylla* (Berberidaceae), *Ecballium* spp. (Cucurbitaceae), *Eucalyptus* spp. (Myrtaceae), *Callistemon* spp. (Myrtaceae), *Anagallis arvensis* (Primulaceae), *Hyoscyamus niger* (Solanaceae), *Reseda odorata* (Resedaceae).

racharium: a ►compound fruit of the Poaceae that disperses its ►pericarpia by the breaking part of a ►rachis of ►spikelets, the spikelets sessile or embedded in the rachis; e.g. *Schizachyrium scoparium* (Poaceae).

rachilla: the axis bearing the ►florets in ►spikelet of the Poaceae. Also used to refer to a small or secondary ►rachis.

rachis: referring to the main axis of a racemose inflorescence or the midrib of a compound leaf.

radicle (= embryonic root): the first root of the ► embryo (i.e. the basal continuation of the hypocotyl).

raphe: the continuation of the ► funiculus that runs parallel to the ► nucellus and ends in the ► chalaza. In fact, funiculus, raphe, chalaza and nucellus form a continuous tissue and no sharp demarcation lines can be drawn between them.

receptacle (= receptaculum = floral axis): the "axis" of the ► flower on which the floral organs (► sepals, ► petals, ► stamens, ► carpels) are borne; the term is also applied to the ► inflorescence axis of, for example, the Compositae.

reduction division = ► meiosis.

regma = ► regmatus.

regmatus (= regma): = term used by Mirbel (1813) to address the typical fruit of the Euphorbiaceae and some other plants ► coccarium.

replum (Lat. frame): a longitudinal partition in an ► ovary, formed between ► parietal ► placentas. E.g. in the fruits of the Brassicaceae the frame formed by the margins of the two ► carpels and the ► placentae between which the ► false septum is attached and which remains attached to the stalk after dehiscence.

rhexocarpic fruits: a classification term for one of the five categories of angiosperm fruit (► (simple, schizocarpic, rhexocarpic multiple, compound) characterised by a pericarp that breaks open to disperse the seed(s), includes capsular and follicular fruits (Spjut 1994)

ruminant seeds: a seed is called ruminant if the surface of its endosperm shows any degree of irregularity due to ingrowths of the seed coat. "Ruminatus" is Latin and means chewed reflecting that the original concept was that the endosperm is eaten away by the ingrowths of the seed coat which is not the case. The term, nevertheless, has been retained. Ruminant seeds are found, for example, in Myristicaceae, Annonaceae and Rubiaceae.

ruminant endosperm: see ► ruminant seed.

ruminant: ► ruminant seeds.

samara: basically a winged ► achene or more accurately: a dry, indehiscent, flattened pericarpium, or fruit, characterised by a pericarp that is compressed to the surface of one or more seeds and forming a wing at the margins longer than the length of the seeded

portion (Spjut 1994); e.g. *Pterolobium hexapetalum* (Leguminosae-Caesalpinioideae), *Ulmus* spp. (Ulmaceae), *Fraxinus* spp. (Oleaceae), *Zinowiewia integerrima* (Celastraceae), *Eucommia ulmoides* (Eucommiaceae), *Polygala covellii* (Polygalaceae).

samareum: an ► aggregate fruit of winged indehiscent ► apocarps, the wing of each apocarp exceeding the length of the seed (Spjut 1994); e.g. *Liriodendron tulipifera* (Magnoliaceae).

samarium: a ► schizocarpic fruit derived from a ► schizocarpous gynoecium consisting of indehiscent ► monocarps that bear ► wings two or more times longer than that of the seeded portion; e.g. *Banisteriopsis schizoptera* (Malpighiaceae), *Acer* spp. (Aceraceae), *Ailanthus altissima* (Simaroubaceae), *Zygophyllum aurantiacum* (Zygophyllaceae) (Spjut 1994).

sarcocarp: any internal fleshy layer of a fruit (Spjut 1994).

sarcotesta: if the outer ► integument or ► testa partly (e.g. only the mesotesta) as in Magnoliaceae) or entirely (e.g. *Baccaurea*, Phyllanthaceae) differentiates into a fleshy tissue it is called a "sarcotesta".

saurochory: dispersal of the ► diaspores of a plant by reptiles.

schizocarp (Greek: schistos = splitting; carpos = fruit) a ► fruit derived from a ► schizocarpous gynoecium - one in which the ► carpels are partially to completely united at the time of pollination but separate at maturity into their carpellary constituents, sometimes further dividing into ► mericarps, each part functioning as a seed dispersal unit (► schizocarpic fruit).

schizocarpic fruit: a ► fruit derived from a compound ► pistil that divides into its carpellary constituents (► schizocarpous gynoecium), each carpellary part being a separate seed-containing unit (Spjut 1994).

schizocarpic fruits: a category of fruits characterised by seeds being dispersed separately by the carpellary components of the gynoecium, the separating carpels in some taxa dividing further into half-carpels.

schizocarpous gynoecium: a ► gynoecium of partly or entirely united ► carpels that separate from each other into distinct seed-containing units in ► fruit (Spjut 1994).

sclereid: a relatively short cell with thick and often lignified cells walls.

sclerenchyma: mechanical tissue in plants composed of ► sclereids and/or ► fibres.

scutellum: part of the embryo of the Poaceae. Generally considered to be the modified single ▶ cotyledon of the ▶ embryo which lies attached to the ▶ endosperm. The scutellum functions as a sucker for the absorption and transfer of nutrients from the endosperm to other parts of the embryo during germination.

seed coat: protective layer of the ▶ seed usually produced by the ▶ integument(s) or rarely by the ▶ chalaza (▶ pachychalazaly).

seed heteromorphism: ▶ heteromorphism:

seed: A young plant (▶ embryo) in a resting state surrounded by a nutritive tissue (▶ endosperm) and protected by a ▶ seed coat.

sepal: in flowers where the outer whorl of the perianth is different from the inner whorl, the elements of the outer whorl are addressed as sepals. The summary of the sepals forms the ▶ calyx; it usually covers and protects the the other floral parts during their development.

septicidal capsule: in most modern textbooks simply defined as a ▶ capsule in which the ▶ carpels separate along the ▶ septae. A morphologically more accurate definition has been given by Spjut (1994): A capsular ▶ fruit opening completely along the ventral ▶ suture, each valve consisting of the whole carpel with the ▶ placenta attached; e.g. *Septotheca tessmannii* (Bombacaceae = Malvaceae), *Agave* spp. (Agavaceae), *Burchardia* spp. (Liliaceae), *Tillandsia* spp. (Bromeliaceae), *Datura* spp. (Solanaceae), *Guaicum angustifolium* (Zygophyllaceae).

septicidally dehiscent: opening along the ▶ ventral suture (and mostly at the same time along the middle of the septae (▶ septum)).

septifragal capsule: In most modern textbooks simply defined as a ▶ capsule in which the seeds remain attached to a central column (additionally, the carpels can be ▶ loculicidally or ▶ septicidally dehiscent). A morphologically more accurate definition has been given by Spjut (1994): A capsular ▶ fruit that incompletely opens along the dorsal or ventral ▶ sutures by a break in the partitions near the central axis, leaving a persistent columella after the valves have separated, or is incompletely dehiscent by having developed from an ovary with ▶ free central ▶ placentation; e.g. *Rhododendron* spp. (Ericaceae), *Ipomoea* (Convolvulaceae), *Lagerstroemia speciosa* (Lythraceae), *Swietenia humilis* (Meliaceae), *Mollugo verticillata* (Molluginaceae), *Monotropa uniflora* (Monotropaceae), *Schima* spp. (Theaceae) --- Note: The septifragal capsule is distinguished from the ▶ ceratium by the break occurring nearer the central axis. In the ceratium, the

break in the partition occurs further away from the central axis, which leaves most of the partition behind.

septum: partition (diaphragm within an ovary as the result.

sessile: lacking a stalk, e.g. referring to leaves without petioles or flowers without pedicels.

silicle = ▶ silicula.

silicula (= silicle): a short (less than one fourth as long as broad) ▶ siliqua.

siliqua (= silique): the typical ▶ fruit of the Brassicaceae, in most modern textbooks simply described as a dehiscent ▶ fruit derived from a ▶ syncarpous, bicarpellary ▶ ovary in which the two ▶ carpels detach from a ▶ replum. A morphologically more accurate definition has been given by Spjut (1994): A capsular ▶ fruit with a nonplacental partition bordered by a ▶ replum that persists after the valves have separated from the replum; e.g. e.g. *Brassica oleracea*, *Erysimum cheiri*, *Lunaria annua*, *Raphanus raphanistrum*. --- Note: The siliqua is distinguished from the ▶ ceratium and the ▶ septifragal capsule by the "false partition" inserted between the ▶ parietal ▶ placentae, the placentae thus do not form the partition as in other kinds of fruits with a replum.

silique: ▶ siliqua.

simple cone (conus simplex): a dry, cylindrical fruit with seeds attached to woody scale-like ▶ megasporophylls spirally arranged around a central axis (Spjut 1994); e.g. *Zamia integrifolia* (Zamiaceae), Cycadaceae, Stangeriaceae, *Ephedra* spp. (Ephedraceae).

simple dry fruits: a group of ▶ fruits characterised by being dry and indehiscent, composed of one to many united ▶ carpels (Spjut 1994).

simple fleshy fruits: a group of ▶ fruits characterised by being fleshy and indehiscent, composed of one to many united ▶ carpels (Spjut 1994).

simple fruit: ▶ dehiscent or indehiscent ▶ fruit derived from a single flower with only one ▶ pistil (one carpel or two or more united ▶ carpels), the ▶ gynoecium not dividing into ▶ fruitlets, the seeds contained in a single dispersing unit composed of one carpel or many united carpels (Spjut 1994).

sorosis = ▶ sorosus

sorosus (syn. coenocarpium): a ▶ compound fruit composed of many succulent ▶ pericarpia or ▶ fruitlets that developed on a ▶ peduncle (adapted from Spjut 1994); e.g. Araceae (e.g. *Symplocarpus foetidus*, *Syngonium podophyllum*), Balanophoraceae (e.g. *Helosis*

mexicana), Bromeliaceae (e.g. *Ananas comosus*), Cornaceae, Cyclanthaceae (e.g. *Carludovica rotundifolia*), Moraceae (e.g. *Artocarpus* spp., *Maclura pomifera*, *Morus alba*), Pandanaceae (e.g. *Pandanus thurstonii*, *Freycinetia angustifolia*, Rafflesiaceae (e.g. *Bdallophytum oxolepis*), Rubiaceae (e.g. *Morinda citrifolia*).

spermatocarpium: a ► fruit characterised by ► ovules not maturing within closed ► megasporophylls (► carpels) = ► gymnospermous fruits.

spermatophytes: (Greek: sperma, spermato = seed; phyton = plant) "seed plants"; division of the plant kingdom, characterised by the female gametophyte being developed and retained within the megasporangium (i.e. the ► nucellus) which itself is covered by one or two ► integument(s), the entire structure producing a ► seed after fertilisation of the egg cell (► embryo sac).

spermidium: a fruit of the Ginkgoales characterised by the seed of *Ginkgo* with remnants of a ► cupule at the base, an evolutionary product of a ► strobilus by modification - a reduced ► cupule; e.g. *Ginkgo biloba*.

spike: a (usually elongate) ► inflorescence with alternate, ► sessile ► flowers along a single axis, if branched then the branches forming smaller, secondary spikes (called ► spikelets).

spikelet: a (usually secondary) branch of a branched ► spike; the term is mostly referred to the unit of the ► inflorescence of the Poaceae (grasses) that consists of one or several ► florets along a thin axis subtended by the superior and inferior ► glume.

sporangium: (Greek: sporos = semen, germ; aggeion = container) multicellular container with an outer wall and a core of sterile cells giving rise to ► spores.

spore: cells serving asexual reproduction.

sporophyte: ► diploid generation in the heterophasic life cycle (alternation of generations) producing asexual, haploid ► spores which give rise to the haploid ► gametophytes.

staminode = ► staminodium.

staminodium = staminode: a sterile (i.e. bearing not fertile ► pollen) ► stamen; staminodia can either be metamorphosed, leaf-like stamens and resemble part of the ► corolla or ► perigon or they can simply be imperfect and rudimentary stamens which lost the ability to produce fertile pollen.

stigma: the upper end of a ► carpel which is designed to receive the pollen grains, usually connected with the ovary by a ► style; the stigma is usually covered with papillae and secreting a sticky liquid to help retain the pollen grains.

stomatochory: dispersal of the ► diaspores of a plant by being carried in the mouth of animals; this dispersal mode mainly refers to ants (► myrmecochory) but also to primates.

stone: an inner layer of the ► pericarp (► endocarp) that forms a hard shell around one or more ► seeds.

storage cotyledons: ► storage embryo.

storage embryo: ► embryo which during its maturation absorbed all the nutrients from the ► endosperm, in the end filling the entire seed with little or no endosperm left. The storage of nutrients usually takes place in the ► cotyledons, rarely also in the ► hypocotyl (e.g. *Bertholletia excelsa*, Lecythidaceae)

strobilus: (Greek: strobilos, pine cone or nut): the typical ► fruit of the Cycadaceae. An aggregation of frond-like ► sporophylls spirally arranged along a longitudinal axis and recognised as a ► fruit of the Cycadaceae when the ► ovules on ► megasporophylls of a megastrobilus (= female strobilus) have reached maturity and are dispersed as ► seeds (Spjut 1994); e.g. *Cycas* spp., *Dioon* spp. --- Note: In modern textbooks the term is also sometimes applied to the fruits of hops (*Humulus lupulus*) as a dry, ► compound fruit of ► achenes incorporating ► bracts; the correct term for this type of fruit, however, is ► achenoconium.

strophilar plug: ► lens.

strophiole: special case of a localised ► aril represented by a glandular or spongy proliferation of the ► raphe (see also ► lens).

style: the part of a ► carpel or ► pistil connecting ► stigma and ► ovary.

stylopodium: the disc-like swelling or enlargement at the base of the style in the Apiaceae; this is also the point where the ► carpophore is attached)

superior glume: ► glume.

superior ovary: an ► ovary that is situated above the point of attachment of ► stamens, ► petals and ► sepals or ► tepals.

suspensor: the suspensor ("embryo carrier") of the ► spermatophyta develops from ► zygote into a stalk-like organ, which carries the ► embryo at its tip. It was assumed that the suspensor's function is to push the embryo deeper into the ► endosperm, however, it has

been shown that the suspensor itself plays a major role in the nourishment of the embryo.

suture: predetermined line along which a ►carpel of a dehiscent ►fruit opens; the dorsal suture usually coinciding with the central vascular bundle ("midrib") of the carpel, the ventral suture usually coinciding with the line of fusion of the carpellary margins.

syconium: (Greek: sykon = a fig) in most modern textbooks defined as a fleshy ►compound fruit with ►achenes attached to an infolded ►receptacle. A morphologically more accurate definition is given by Spjut (1994): A ►compound fruit composed of ►fruitlets enclosed in a ►receptacle or ►peduncle; e.g. Moraceae (*Ficus carica*) ---

Note: The syconium is comparable to a pomaceous (►pome) fruit by the ►fruitlets being sunken in a ►receptacle but unlike the ►apocarps in a ►pometum, the fruitlets are derived from many distinct flowers.

syncarp: ►syncarpium.

syncarpium (= syncarp): a ►multiple (= aggregate) fruit derived from a flower with distinct ►carpels in the flowering stage that become fused (concrecent) together at maturity (Spjut 1994); e.g. *Annona squamosa* (Annonaceae), *Duquetia hydrantha* (Annonaceae), *Magnolia ashtonii* (Magnoliaceae), Winteraceae. --- Note: Syncarpium has frequently been used to describe fleshy fruits formed from an inflorescence, but ►sorus is considered the appropriate term for this type of fruit. The fruit of *Rubus* is regarded as a ►drupetum because the ►fruitlets are mostly distinct except near the base.

syncarpous gynoecium: a multilocular ►ovary as the result of the fusion of two or more ►carpels (►coenocarpous gynoecium) retaining their walls (septae ►septum).

syncarpous ovary = ►syncarpous gynoecium.

synergids: the two cells flanking the egg cell in the ►embryo sac of the ►angiosperms.

tegmen: part of the ►seed coat derived from the inner ►integument.

tenuinucellate ovule: an ovule in which the megagametophyte is located close to the upper surface of the usually few-celled and slender nucellus (i.e. covered by less than three layers of cells).

tepal: floral leaf of a ►perigon.

testa: part of the seed coat derived from the outer or single ►integument.

tryma: a simple ►anthocarpous fruit with a ►pericarpium that is dispersed by an active

►calyx, ►hypanthium or ►involucre, "active" meaning" by movement, unfolding, or by splitting of the surrounding ►bracts, in simplified terms a "dehiscent drupe" (definition modified after Spjut 1994); e.g. *Astrocaryum munbaca* (Palmae), *Carya* spp. (Juglandaceae), *Thymelaea velutina* (Thymelaeaceae).

trymarium: a ►fruit derived from a ►schizocarpous gynoecium where ►fruitlets are dispersed by an active fruiting ►perianth - one that unfolds or dehisces upon maturity to release the ►monocarps or ►mericarps; e.g. *Scutellaria galericulata* (Lamiaceae) (Spjut 1994).

trymetum: an ►aggregate fruit characterised by ►pericarpia that develop within a ►hypanthium, or united ►bracts, and upon maturity are dispersed by the unfolding or splitting of the hypanthium or bracts; e.g. *Dryadodaphne crassa*, *Tambourissa* spp. (Monimiaceae) (Spjut 1994).

trymoconum: a ►compound fruit composed of ►fruitlets imbricately arranged in a conelike structure, and each ►fruitlet disperses its ►pericarpium by dehiscent ►bracts (Spjut 1994); e.g. *Casuarina* spp.; *Allocasuarina* spp. (Casuarinaceae), *Cyclanthus* spp. (Cyclanthaceae).

trymosum: a ►compound fruit consisting of ►pericarpia that develop within united ►bracts or a ►receptacle, and at maturity are released by splitting or other movement of the ►bracts or receptacle (Spjut 1994); e.g. Fagaceae (e.g. *Fagus sylvatica*, *Castanea mollissima*, *Castanopsis costata*), Moraceae (*Dorstenia* spp., fruit developing within the ►receptacle, protruding only at maturity and sometimes expelled with force [the ►exocarp remains in the receptacle]). --- Note: The distinction between the ►trymoconum of *Casuarina* and the trymosum of *Castanea* is the former consists of an cluster of ►tryma-like ►fruitlets - each ►pericarpium is surrounded by dehiscent ►bracts, while the latter has several to many pericarpia enclosed within a single series of bracts, similar to a ►catoclesium.

unicarpellate fruit: ►fruit derived from a ►monomerous ovary.

unicarpellate: referring to a ►gynoecium consisting of only one single ►carpel (= ►monocarpellate = monomerous).

utricle: in most modern textbooks simply defined as a small, bladder-like, single-seeded dry ►fruit. A morphologically more accurate definition is given by Spjut (1994): A small bladder-like or vase-like ►fruit composed of more than one ►carpel with a 1-loculed thin

► pericarp, sometimes urn-shaped, often inflated and with only 1 ► seed, ► dehiscent or ► indehiscent; e.g. *Amaranthaceae* (*Amaranthus* spp.), *Barbeyaceae* (*Barbeya oleoides*), *Brassicaceae* (*Lesquerella angustifolia*), *Capparaceae* (= *Brassicaceae*, *Capparis spinosa*), *Leguminosae* (*Astragalus lentiginosus*), *Lemnaceae* (*Lemna* spp.), *Passifloraceae* (*Barteria* spp.), *Polygalaceae* (*Polygala vulgaris*).

valvate capsule (= ► denticidal capsule): in most modern textbooks described as a ► capsule which tips split to form valve-like segments; e.g. *Dianthus* (pink; *Caryophyllaceae*), *Silene* (campion; *Caryophyllaceae*), *Primula* (primrose). See also Spjut's (1994) definition of a ► denticidal capsule.

valve: the portion of the ► pericarp between the regular ► sutures after dehiscence, along the ventral or dorsal sutures (Spjut 1994).

ventral suture: a predetermined line of dehiscence along the ► placental margins of the ► carpel (Spjut 1994).

wing: wings assisting wind dispersal (► anemochory) can be formed by the ► ovary wall (e.g. ► samara, ► samarium), floral elements (► pseudosamara) or the ► seed coat itself (so-called ► "alate" seeds).

zoochory: dispersal of the ► diaspores of a plant by animals; e.g. ► ichthyochory, ► mammaliochory, ► myrmecochory, ► ornithochory, ► saurochory, ► stomatochory.

zygote: fertilised (diploid) egg cell (► embryo sac).

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