Tribe IV. Cytineae.

*Cylineae* R. Br. in Trans. Linn. Soc. XIX. (1844) 245.

Flowers small to medium sized, unisexual or bisexual, in terminal spikes, racemes or umbels, rarely individually. Perigone hollow or trochlear [pulley-shaped]. Stamens of the male flower united into a column which carries a stunted scar at the apex; Anthers dithecal, extrorse, parallel. Ovary one-locular, with several parietal septum-like placentae; Stigma on a thick style, broadly capitate; Ovules numerous, small, atropous, with only one complete integument. Fruit berry-like, multi-seeded; Seeds tiny, embedded in a sticky-slimy pulp.

7. **Cytinus** L. Gen. ed. 6. (1764) 566 (Druckfehler statt 576); Praelect. Ordin. pl. ed. Giseke (1792) 301 *(Hypocistis)* [Ludwig, Def. gen. (1737) 24] Adans. Fam. II. [1763] 76; Spach, Hist. nat. végét. X. [18451] 551; Fourreau in Ann. Soc. Linn. Lyon Nouv. ser. XVII. [1869] 1458; *Thyrse* Gleditsch. Syst. pl. [17645] 286; *Phelypea* Thunb. Nov. gen. pl. V. [17845] 81; *Citinus* All. Fl. pedem. II. [1785] 214; *Hypolepis* Pers. Synops. II. [1807] 598; *? Hisbanche* Sparm. in Meissner, Gen. Comm. [18453] 275; *Haematolepis* C. Presl, Epim. bot. [1849] 238. – Flowers unisexual, without or with vestiges of the other sex, monoecious or dioecious. Perigone tubular, with 4-6 sections; tube at the base connected to the staminal column or the stylar column by perpendicular small bands (lamellae), which leave deep pits between themselves. Anthers 8-20 (?) (also 5-7 is indicated sometimes for *C. Hypocistis*, which however after Heinricher is probably wrong; 20 with *C. Baronii* and *C. malagascicus*, which do not apply meanwhile after Jumelle to *C. Baronii*, where only 9-10 exist), fastened around the summit of the staminal column, which has a remaining scar at the apex, narrow, dithecal, with extrorse, parallel, longitudinal dehiscing locules; Connective usually extending over the pollen locules. Ovary one-locular (variable at the top with *C. Hypocistis* and perhaps also with other species), formed from several carpels 1), with 8-14 undivided or branched out at the sides placenta; ovules very numerous, on the sides of the placenta, tiny, atropous, with one complete integument (exterior completely degenerated); Stigma spadiceous at the point of the stylar column, with just as many rays as there are placenta present. Fruit a berry with numerous tiny light-yellow seeds 2) in a sticky pulp. – shoots simple or branched (rarely being missing), beset with scales. Flowers shortly pedicellate in terminal raceme, spike or umbel, usually with subtending bract and 2 prophylls: more rarely single and terminal, sometimes 3-4 surrounded by an envelope of 6 or more bracts [Hochblättern].

1) After Lutz who shows, by cross sections of young ovaries of *Cytinus Hypocistis*, how the placental plates unite in the center. The arrangement shows clearly that with this genus that an originally multi-locular ovary is present, which however later changes in the process of development. The ovules sit on lateral extensions of both sides of the septa; by “mucilagination”of the central axis the ovule bearing internal parts of the septa later an apparently parietal placation is brought about (placentation pseudopariétale, acquérant cette disposition par gélification d'un axe primitif formé par la réunion d'un certain nombre de cloisons) [placentation pseudoparietal, acquiring this provision by gelatination of a primitive axis formed by the meeting of a certain number of partitions].

2) Fr. Netolitzky, Anat. Angiospermen-Samen (1926) 108, *Cytinus Hypocistis* (Fig. 19): Epidermal cells of the seed coat flat, thick-walled with wall pores, which are missing at both seed poles and are replaced by small cellular tissue, which comes at least at the seed base from the nucellus. The from one- to two-layered, starch-free endosperm is enclosed by a membrane (embryo sac wall after Solms, remainders of the nucellus and internal integuments after Bernard in Journ. de Bot. XVII. [1903]), which probably corresponds to an internal cuticle. Embryo recognized with difficulty.

*Cytinus L.* (1764) is the name conserved over *Hypocistis* Adanson (1763); Briquet, Règles internat. Nomencl. bot. éd. 2. (1912) 85.’


φυεται δε παρα τας ριζας του χιστου η λεγομενη υποχιστις, υπενυων δε θρυβηθρον . . . η χυτινος χαλωμενη, ομοιοντι χυτινο ρωιας. – υποχιστις vel υποχιστις est memorabilis ea herba, Cistorum radicibus adnascens, quae et Hodie Cytini Hypocistidis nomine venit (Sprengel, l. c. II. [1830] 401).

6 species, parasitic on roots, rarely on stems. 1 species in Mediterranean area, 2 in South Africa, 3 in Madagascar.

**Sect.1. Eucytinus** Bak. f. in Journ. Linn. Soc. XXIV. (1888) 465 (*Hypocistis* Adans. l. c). – vegetative bodies normally on roots. Flowers monoecious (rarely bisexual), rarely dioecious, in one-member thick spikes, with 2 prophylls; perigone four-parted (rarely five-parted). Anthers 8-10 (whether also sometimes 5-7?). Pollen grains individual, free. Placentae 8-10 (after Bernard usually 9 with *C. Hypocistis*), which branch out at the sides. - 2 species.

3) For fertilization perhaps *Bombus agrorum* Fab. var. *pascuorum* is possible; for seed dispersal, the very small, fruit-eating ant (*Formica*).
**C. Hypocistis** L. (*Asarum Hypocistis* L Spec. pl. ed. 1. [1753] 442; *Hypocistis kermesina* [Guss.] O. Ktze. Rev. gen. II. [1891] 563), type species of the genus, widespread in the Mediterranean area from the Iberian peninsula to Asia Minor, Syria and Palestine; preferably in the proximity of the coasts, more rarely toward the inside of the country (is missing only in the extreme southeast); furthermore in Macaronesia.

Fig. 146. *Cytinus Hypocistis* L. A plant on the root of *Cistus monspeliensis*. B diagram of the σ flower (in Ψ flower often left lateral tepal covers the lefthand front median side of the tepals with its right side), σ connecting borders of the staminal column with the perigone tube. C cross section of the ovary, schematically; n stigmas. D σ flower in longitudinal section. E Ψ flower in longitudinal section. F cross section of the ovary. G longitudinal section of Ψ flower, H through the σ flower; b perigone, v prophyll, n stigma, ne nectary, a anther. A-F from E. P. 1. Aufl. III. 1, 281, Fig. 187; G-H from Hayek.

1) after Ch. Bernard (l. c. 169) the number 10 is constant with *C. Hypocistis*, whereas 8 or fewer occur particularly in the terminal flowers that are not fully developed. - Heinricher also determined the number of 10 and doubts a reduction under 8. - Heinricher (l. c. 517) found well developed anthers on the Columna genitalis of a female flower; perhaps after examination of extensive material it would result that such “hermaphrodite flowers” arise more frequently with *Cytinus* in the transition zone from the male to the female flowers.

The name Hypocistis is among other things with Tournefort (Inst. Coroll. [1703] 46, t. 477). - illustrations: L Trattinnick, Thes. bot. (1819) t. 29; Schnizlein, Icon. I. (1844) t. 40; Hooker, Exot. Fl. II. (1825) t. 153; Reichenb., Icon. Fl. Germ. X. (1849) t. 540; Schlechtendal, Langethai und Schenk, Fl. Deutschl. ed. 5. XXII. (1885) t. 2195; Fiori e Paoletti, Ic. Fl. Ital. (1898) 110. – A. Kerner, Pflanzenleben 1. (1890) 183, 189: “the scale-like leaves, which dress the stem of this
parasite, are scarlet colored, and the *Hypocist* is not isolated, but occurs in large quantities, such that one sees flaming red partly shining out from the gaps of the rock-rose stocks, through which one already from a distance becomes attentive to the occurrence of the parasite”. - O. Penzig (Pflanzenenteratologie 2. Aufl. III. [1922] 186) mentions the following deformations of *C. Hypocistis*: after Clos an abnormal form, where exists a stem without the usual scales. After A. Liron hermaphrodite flowers, in which develop on one side of the stylar column anthers and on the other side stigmas. Chatin described a kind of hypertrophie of the placenta in which the ovules were aborted.

In this section also belongs the South African *C. capensis* Marloth (in Trans. Roy. Soc. S. Africa II. 3. [1912] 237; Fl. S. Africa 1. [1913] 175, t. 43), there one finds it in the Cape Flats inhabiting the roots of the composite *Metalasia muricata*; in contrast to *C. Hypocistis* it is dioecious. The sections of the dark-wine or magenta-red perigones are occupied with short lobed or various divided hair stuctures.

E. Heinricher (see above) succeeded in growing *C. Hypocistis* from seeds. In July 1913 seeds from Athens were sown in 37 pots with different *Cistus* species in the way that, by blending the earth with the dust-fine seeds, to which were brought a somewhat opened root system of the host plant. In January 1917 the emerging inflorescences became recognizable as *Cytinus*, in the followed March still another two, both with *Cistus populifolius* as host plant from one of the pots from the first time. The developmental duration of the parasite up to mature flower required over three years; it is impossible to pursue the development more exactly since it obviously runs completely within the feeding root. In addition Heinricher cultivated the parasite on excavated afflicted host plants, which were with him on the island Lussin; they came to flower. Whether the *Cytinus* forms insist on so close a specialization with certain host plants, as Wettstein assumes, Heinricher appears doubtful; it would also be possible that from the seed of the same *Cytinus* mother plant under the influence of material peculiarnesses could be due to a difference in the coloring of the descendants of the host plant. In January 1927 he demonstrated a plant from *Cistus salvifolius* (?) that for the first time had a male inflorescence, thus only to 14 years. - Heinricher proved that the parasite can also migrate into the trunk.

Use: The juice of *Cytinus Hypocistis* (Hypocist) from the whole plant in form of an extract and particularly the fruits (Succus Hypocistidis, Hypocistis juice, Zistensaft) serves as an astringent means against blood flow, dysentery and also surface wounds; the extract came into the trade in former times as black-red cakes (Kosteletzky, Allg. med. pharm. Flora 11. [1833] 320; H. Karsten, Pharm. med. Bot. [1883] 445; Moeller und Thoms, Real-Enzykl. Pharmazie IV. [1905] 250). The young plants are eaten like asparagus. Lindley (Nat. Syst. ed. 2. [1836] 393): “*Cytinus* contains gallic acid, and, according to Pelletier it has the singular property of precipitating gelatine without containing tannin”. J. Pelletier, Examen chim. du suc d’Hypocistis, in Bull. Phatm. V. (1813) 289.

**Sect. 2. Hypolepis** (Pers.) Bak. f. l. c. 465; Solms Laubach in Engler, Pflanzenreich number 5. (1901) 16 (*Hypolepis* Pers.; *Phelypea* Thunb.; *Haematolepis* C. Presl). Vegetative body close-clustered branching, on roots of shrubs or subshrubs or on trunks; sometimes vegetative bodies nearly missing (plant stemless). Flowers dioecious, individual or to 3-4 surrounded by an involucre of bracts (after Solms-Laubach the branches of the stem are one-flowered); usually 2 prophylls. Perigone six-parted (rarely five-parted). Anthers 7-20 (or only 8 to 10 ?); Pollen in tetrads. Placentae simple, normally.

Marseille XXIII. 2. [1915] 38, pl. IV), which has about 20 anthers in the staminal column, contrary to *C. dioicus* which has 7-8. Two rows of 3 bracts each envelope a 3-flowered group of glabrous male flowers. This species grows in Madagascar on the roots of a tree, which perhaps belongs to *Dombeya*. – *C. Baronii* Bak. f. is missing a clear vegetative body or it is very short; numerous bracts form an involucre around the glomerule of 3-4 flowers (after Solms Laubach: “Proles brevissima, squamis ut videtur sparsis obista, fasciulatim ramosa, ramis ternis vel quaternis squamosis flore unico terminatis”); flowers whitish, anthers after Baker f. 20 (after Jumelle 10), placentae 9-12. In Madagascar on the trunk of a *Dicoryphe* (Hamamelidaceae), also found on a Rubiaceae. – Baker f. based his *Botryocytinus* on this species (in Journ. Linn. Soc. XXIV. [ 1888 ] 466). – *C. glandulosus* Jumelle (in Compt. Rend. Acad. Sc. Paris CLXXVII. [1923] 1431) has brownish glomerules; perigone five-parted (therefore it Sect. *Pentacytinus* Jumelle), 10-12 anthers, 10-13 placentae; on bracts and perigone sections characteristic [peculiar?] thick, capitate-like hair, which are sometimes 2 or 3 divided, on wart-like emergences. In Madagascar (Tsaratana), as both a root parasite and also on the lower parts of the trunk of the host plant (*Croton*).

The development of the parasite *C. Hypocistis* in the host plant and its influence on its tissue is particularly represented in the following work: A. Fraysse, Contribution à la biologie des plantes phanérogames parasites (Montpellier 1906). – In Part 3 of this work the development of *Cytinus Hypocistis* is discussed (after C. Queva in Bot. Centralbl. Bd. 102. II. [1906] 52). Germination of the tiny seeds was not observed. In the host plant the parasite consists of a cord-shaped thallus between the wood and cambium of the feeding root. It consists of 2 tissue plates, which are separate by a meristematic zone (zone génératrice). In it lain against the wood of the host plant forms the tracheid and vessel tissues; the peripheral elements of the thallus develop absorption filaments. The parasite progressing with the host plant does not cause trauma. The wood of the stricken parts fills with tyloses and slime. The stem consists of the superficial tissue of the thallus and the bud which endogenously breaks through the stricken root; the phloem of the stem is parenchymatous, without seive tubes. The scales have on their upper surface stomata; they receive from the stem a ramifying bundle. The plant does not contain starch, however sugar and tannin. The course of the thallus in the host plant is due to a mechanical effect in connection with the chemical effect of diastase, which loosens cell walls. – Confirmations and additions supplied this work: R. Perotti, Contribuzione alla conoscenza dei rapporti fra *Cytinus Hypocistis* e *Cistus salvifolius*, in Annali di Bot. XIII. 2. (1915) 151-156 (mit 3 Fig.). The irregular process and the deformation of the wood elements of the host plant caused by the parasite, particularly the vessels, are described.


The name *Scytanthus* Liebm. cannot be accepted, there it the older genus *Skytanthus* Meyen (Reise I. [1834] 376) given to the Apocynaceae and both names are in this regard orthographic variants of the same derivative; σχυτος skin or leather ανϑος flower. The name *Bdallophyton* is derived from βδαλλω (suck).
4 species in Mexico, partly still unsatisfactorily known. – A. Perigone exterior glabrous. – Aa. Connective of the anther subulate [awl-shaped] beaked: B. americanum (R. Br.) Harms (Cytinus americanus R. Br. [1845]; Bdallophyton ceratantherum Eichl.; Scyタンス americanus [R. Br.] Solms Laubach), in the province Huasteca; perigone soon 3-5 divided, soon seen as 8-9 divided. – Ab. Connective blunt: B. Andrieuxii Eichl. – B. Perigone outside scaly or granulated. Fruits fused. – Ba. Flowers hermaphrodite. Anthers blunt: B. oxylepis (Robinson) Harms (Cytinus oxylepis Robinson in Proc. Amer. Acad. XXIX. [1894] 321), on roots of Bursera, in Zapotlan (Jalisco) on lava; Fruits themselves at the base of the bracts grown together into a fleshy mass as with the pineapple, which is towered above by the points of the bracts; flowers of the same plant hermaphroditic and carpellate; perigone 6-lobed; stigma radiate capitate, irregularly lobed. – Bb. Flowers dioecious. Connective beaked: B. bambusarum (Liebm.) Harms, in the thick bamboo forest between Papantla und Paso del Correo; Perigone 7-8-lobed, anthers 9, placentae 9; ovary of the female flower grow down together with one another. Fig. 147.