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Phyton (Austria)	Vol. 17	Fasc. 3—4	319—328	18. 8. 1976

„Genus *Coleostephus* Cassini in Europe" (Asteraceae)

By

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Summary

The history, taxonomy and nomenclature of the 3 European species of the genus *Coleostephus* is explained. *Coleostephus paludosus* is a new combination.

Zusammenfassung

Geschichte, Systematik und Nomenklatur der Gattung *Coleostephus* werden dargestellt. *Coleostephus paludosus* ist eine neue Kombination.

Linnaeus (1763) in the second edition of "Species Plantarum" described *Chrysanthemum myconis* L. from Spain. Post-Linnaean authors gave various treatments to the plants referable to this species. While some like GRENIER & GODRON (1850), BOISSIER (1875) and BENTHAM (1875) accepted the Linnaean disposition for this species with minor changes, others like MOENCH (1802), HOFFMANSEGG & LINK (1825), SPRENGEL (1826) and DE CANDOLLE (1838) transferred it to *Pyrethrum* ZINN. Still others like CASSINI (1826), WILLKOMM (1865), SCHULTZ Bipontinus (1842) and BRIQUET & CAVILLIER (1916) transferred it to a genus of its own; the first two relegated it to *Coleostephus* CASSINI while the other two changed the generic name to *Myconia* SCH: BIP.

In 1846 DURIEU described a species very closely related to *C. myconis* under a new genus *Kremeria* as *K. paludosa* DURIEU, while describing another related species in the genus *Coleostephus* as *C. macrotus* DURIEU. The plants referable to the latter species were described by KUNZE in the same year under a new generic name *Glossopappus* as *G. chrysanthemoides* KUNZE. WILLKOMM (1865) and BRIQUET & CAVILLIER (1916) also followed KUNZE in keeping *C. macrotus* DURIEU under *Glossopappus* KUNZE.

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GIROUX (1930) demonstrated that contrary to the claims of BRIQUET & CAVILLIER (1916), on the basis of the micro-morphological characters of the cypsela and the orientation of the cotyledons in the cypsela, *C. myconis* is much closer to that of *Leucanthemum*. Further, *C. myconis* and *C. macrotus* on the basis of these characters form a natural group. HARLING (1951) has shown that *Chrysanthemum* sensu BRIQUET & CAVILLIER (except *C. viscidohirtum* (SCHOTT) THELLUNG), *Leucanthemum*, *C. myconis* and *C. macrotus* have monosporic embryo sac. He suggested that on the basis of the cypselar morphology and orientation of the cotyledons, the latter two species should be included in the genus *Leucanthemum*.

HEYWOOD (1958) following the evidence put forward by GIROUX (loc. cit.) and HARLING (loc. cit.) treated this group of species as a part of *Leucanthemum*. He grouped *C. myconis* and related species, *C. clausonis*, under the genus *Leucanthemum* sub-genus *Kremeria* (DURIEU) HEYWOOD while separating another related species namely *C. macrotus* at a subgeneric level of its own, namely *Leucanthemum* sub-genus *Glossopappus* (KUNZE) HEYWOOD.

The presence of the satellite genera in the *Chrysanthemum* and *Leucanthemum* complex present great difficulties of judgement in the circumscription of the genera in this natural group. Though a careful study of the literature shows that at present there is considerable agreement in assigning the species of this complex to natural or nearly natural groups, either at the sectional, sub-generic or generic level, the taxonomic status of these natural groups still is a matter of personal preference of a taxonomist. ALAVI (1970) has shown that when the *Chrysanthemum*-like, *Leucanthemum*-like and *Tanacetum*-like characters of the satellite genera of this complex are tabulated then these satellite genera have the same small number of characters common with each of these three genera. Further the contents of each satellite genus are very homogeneous in themselves. Thus any attempt to unite either them with each other or with any three major genera of the complex would produce a too heterogeneous group. He further advocated that in such natural complexes if the size of genera is small, then they would be more homogeneous. He also advocated that as in this particular complex the stability of the nomenclature was not at any serious risk and as there is a considerable agreement in recognising *Chrysanthemum* and *Tanacetum* at generic level among authorities, therefore it would be more consistent to treat the intermediate or satellite natural groups of the species at a generic level.

When *Chrysanthemum*-like and *Leucanthemum*-like characters are tabulated for the plants referable to *C. myconis*, *C. clausonis* and *C. macrotus* (table 1) it becomes clear that they share equal number of characters with either genus. Thus the present author has not been able to uphold HARLING's (1951) view that these species should be considered as a component of the genus *Leucanthemum*.

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Table 1

Chrysanthemum-like and *Leucanthemum*-like characters of the genus *Coleostephus* CASSINI

Chrysanthemum-like characters	*Leucanthemum*-like characters
i. Annual	i. Heterogamous capitula
ii. Heterogamous capitula	ii. Homomorphic cypsela
iii. Ligulate florets yellow	iii. Cypselas 10-ribbed
iv. Basal tube of the ray florets strongly compressed	iv. Cypselas with epicarpic mucilagenous cells and resiniferous canals

HEYWOOD's (1958) treatment of *Leucanthemum* in Portugal, while appearing consistent within the context of the restricted geographical distribution of the species he considered, however is not tenable when all the European species of the genus are considered together. In fact, at present, any attempt to group the European species of *Leucanthemum* into natural sections or at any other infra-generic level, usually leads to the production of artificial groups. Further, his treatment of the species in question does not appear logical as *C. myconis* and *C. clausonis* are segregated at a sub-generic level from a related species namely *C. macrotus*.

BOHLMANN et al. (1964) have shown in a study of Acetylenic compounds in the genus *Chrysanthemum* L. sensu lato that on the bases of various acetylenic substances present in the roots and leaves, the components of the genus fall into four groups, which more or less correspond to the genera *Tanacetum* L., *Leucanthemum* Miller and *Chrysanthemum* L. sensu stricto and the fourth group comprising of *Chrysanthemum myconis* L., *C. multicaule* Desf. (a native of North Africa) and *C. flosculosum* L.

In the light of the preceding discussion it appears logical to consider the three European species namely *C. myconis*, *C. clausonis* and *C. macrotus* in a genus of their own i. e. *Coleostephus*, which can be differentiated from *Leucanthemum* on the basis of the following characters:

1. All of them are annuals
2. Capitula have neutral ray florets
3. Cypselas have characteristic basal callus
4. Ovaries of the ray florets have typical sheathing pappus.

Summary of the treatment of the European *Coleostephus*:

Coleostephus CASSINI, Dict. Sci. Nat. 41: 43 (1826); Willk. in WILLK. & LANGE, Prodr. Fl. Hisp. 2: 105 (1865); TZVELEV in KOMAROV, Fl. URSS. 26: 146 (1961).

Syn.:

Myconia Sch. Bip. in Webb & Berth., Phyt. Canar. 2: 247 (1842) ...

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non *Miconia* Ruiz & Pavón (1794); Briq. & Cavillier in Burnat, Fl. Alp. Marit. 6: 77 (1916) nom. invalid.

Kremeria Durieu in Duchartre, Rev. Bot. 1: 364 (1846).

Glossopappus Kunze, Flora 47: 748 (1846).

Chrysanthemum L. sect. *Coleostephus* (Cassini) Bentham in Bentham & Hooker, Gen. Pl. 2: 425 (1873).

Myconella Sprague, Kew Bull. 1928: 269 (1928).

Key to the sections and species:

1. Disc florets slightly zygomorphic; pappus twice as long as the cypselas, enclosing the disc florets..... sect. *Glossopappus*
   * *C. macrotus*
1. Disc florets actinomorphic; pappus as long as or shorter than the cypselas ..... sect. *Coleostephus*

2. Cypselas 1.2—1.8 mm long with a thick basal callus; pappus about as long as the cypselas, sheathing ..... * *C. myconis*
2. Cypselas much smaller than the preceding species, basal callus small; pappus coroniform ..... *C. paludosus*

Sect. *Coleostephus*

Syn.:

Coleostephus Cassini, Dict. Sci. Nat. 41: 43 (1826) sensu stricto; Willk. in Willk. & Lange, Prodr. Fl. Hisp. 2: 105 (1865).

Chrysanthemum L. sect. *Coleostephus* (Cassini) Bentham in Bentham & Hooker, Gen. Pl. 2: 425 (1873).

Kremeria Durieu in Duchartre, Rev. Bot. 1: 364 (1846).

Leucanthemum Miller subgen. *Kremeria* (Durieu) Heywood, Agron. Lusit. 20 (3): 212 (1958).

Ray florets oblong or oblong-linear; pappus auriculiform, as long as or shorter than the basal tube of the ray floret. Disc florets actinomorphic, hermaphrodite, 5 (—6) toothed; pappus auriculiform or coroniform.

Type: *C. myconis* (L.) Cassini

Coleostephus myconis (L.) Cassini, Dict. Sci. Nat. 41: 43 (1826); Willk. in Willk. & Lange, Prodr. Fl. Hisp. 2: 105 (1865); Tzvelev in Komarov, Fl. URSS. 26: 147 (1961).

Syn.:

Chrysanthemum myconis L., Sp. Pl. ed. 2, 2: 1254 (1763); All., Auct. Fl. Pedem. no. 693 (1789); Gren. & Godron, Fl. Fr. 2: 146 (1850); Boiss., Fl. Or. 3: 335 (1875); Coutinho, Fl. Port. 632 (1913); Fiori, Nuova Fl. Anal. Ital. 2: 622 (1927); Fourn. P., Quatre Fl. Fr. 973 (1946).

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Matricaria myconia (L.) Desr. in Lam., Encycl. Méth. Bot. 3: 736 (1972).
Pyrethrum myconis (L.) Moench, Suppl. Méth. 247 (1802); Hoffsgg. & Link, Fl. Port. 2: 342 (1825); DC., Prodr. 6: 61 (1838).
Myconia chrysanthemum Sch. Bip. in Webb & Berth., Phyt. Canar. 2: 247 (1842).
Myconella myconis (L.) Sprague, Kew Bull. 1928: 269 (1928); Giroux, Bull. Soc. Hist. Nat. Afr. Nord. 21: 172 (1930).
Kremeria myconis (L.) Maire in Jahandiez & Maire, Cat. Pl. Maroc. 3: 777 (1934).
Leucanthemum myconis (L.) P. Giraud, Ann. Univ. Grenoble sect. Sc.-Med. 11: 197 (1934); Heywood, Agron. Lusit. 20 (3): 212 (1958).

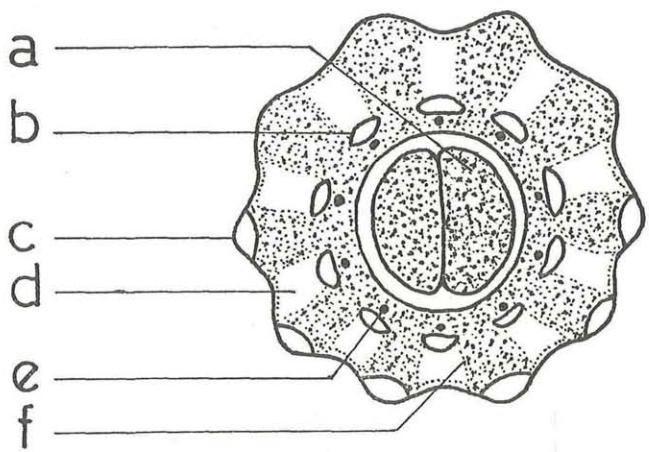

Fig. 1. *Coleostephus myconis*, T. S. of Cypsela (adopted from Giroux, 1930). (a) Cotyledons, (b) Resinifercus canal, (c) Epicarpic mucilaginous glands, (d) Lacuna (secretory), (e) Vascular bundle, (f) Stone cells

Citations of specimens:

Crete: Khania, La Canee, lieux incultis, 8. 6. 1883, Reverchon: 75 (MANCH; K); Kissamos, lieux incultis, 22. 5. 1884, Reverchon: 75 (K); Chikalaria, 21. 3. 1915, Gandoger: 7540 (K).

Corsica: Serra di Scopamène, par Sarténe, 20. 6. 1879, Reverchon: 164 (MANCH; K; W-Halacsy); Bastia, on the edges of the meadow, 13. 6. 1849, Karlik: 656 (MANCH) Bonifacio à la Pianturella, 1. 7. 1849, Reverchon: 164 (MANCH; K; W-Halacsy); cultivated at Saint-Emiland, 25. 6. 1882, Ozanon & Gillot in Magnier Exs.: 576 (MANCH; W-Halacsy); Etang de Biguglia, in meadows, 11. 6. 1866, Mabille: 147 (MANCH); Vico, 9. 8. 1879, F. Glastiengh: s. n. (W-Halacsy); Taermina, in cultivated fields, 27. 4. 1898, G. Rigo: 188 (W-Halacsy).

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France: Var, near Toulon, 1848, BOURGEAU in H. C. WATSON Bot. Soc. London: 225 (MANCH); Luc, on cultivated, granite land, 5. 6. 1848, BILLOT: 1692 (MANCH); 20. 6. 1860, F. SCHULTZ: 506 (MANCH); Antibes, in meadows, 5. 6. 1861, BOURGEAU: 355 (MANCH).

Greece: Auf Wiesen an der Potamos (Corcyra, Cerigo), 19. 5. 1896, BRUCK in BAENITZ Herb.: s. n. (MANCH).

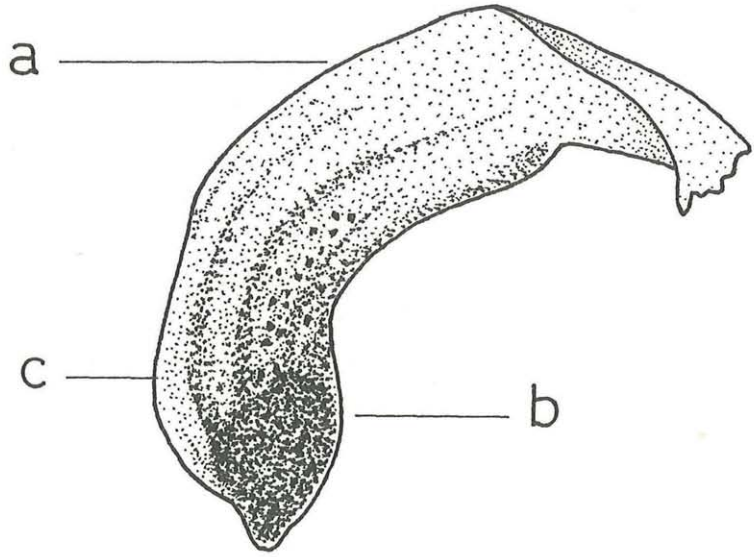

Fig. 2. *Coleostephus myconis*, Cypsela. (a) Pappus, (b) Basal callus, (c) Main body of the fruit

Italy: Pistoia, Monte Albano near Pistoia, 19. 6. 1885, COSTA-REGHINI in BAENITZ herb.: s. n. (MANCH; W-Halacsy). Pisa, 1868, Henri van HEURCK: s. n. (MANCH).

Portugal: Algarve, Cabo de S. Vicente, in meadows, 14. 5. 1853, BOURGEAU: 1922 (MANCH). DOURO LITRORAL, Porto, 6. 1891, Buchtien: s. n. (MANCH). MINHO, Gerez, 6. 1888, Murray: s. n. (MANCH).

Sardinia: Tempio Pausania, lieux humides des moissons, 14. 6. 1882, REVERCHON: 49 (MANCH; W-Halacsy); Santa Teresa Galaura par Tempio, 24. 6. 1881, REVERCHON: 49 (K).

Sicily: Mont S. Angles supra Cefalu, 15. 4. 1874, STROBL: s. n. (MANCH; K); Palermo, in montis calcareis supra S. Maria de Gesu prope Panorum, 18. 4. 1874, STROBL; s. n. (MANCH; K); Mondello in meadows, 21. 5. 1855, E. & A. HUET DU PAVILLON: s. n. (MANCH); TODARO: 1371 (MANCH; K; W-Halacsy); 15. 4. 1830, LANZA: s. n. (W-Halacsy).

Spain: Almeria, Almeria in herbidis, ad rivulas, sol. schistoso, alt.

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20—100 m, 4. 1890, PORTA & RIGO: 224 (MANCH; K). AVILA, nr. Navalmoral, 30. 5. 1863, BOURGEAU: s. n. (MANCH). Extremadura, 1848—50, WELWITSCH: 1107 (MANCH).

Coleostephus paludosus (DURIEU) ALAVI, comb. nova

Syn.:

Kremeria paludosa DURIEU in Duchartre, Rev. Bot. 1: 364 (1846).

Coleostephus hybridus LANGE, Kjoeb. Vidensk. Meddel. (Pugillus: 127): 77 (1861); WILLK. in WILLK. & LANGE, Prodr. Fl. Hisp. 2: 105 (1865) quoad desc. excl. basionym, non *Chrysanthemum hybridum* GUSS.

C. clausonis POMEL, Nouv. Mat. Fl. Atl. 59 (1874).

Chrysanthemum clausonis (POMEL) BATT. in BATT. & TRABUT, Fl. Algér. (Dicot.) 463 (1889); COUTINHO, Fl. Port. 632 (1913).

Myconia paludosa BRIQ. & CAVILLIER in BURNAT, Fl. Alp. Marit. 6: 76 (1916).

Myconella paludosa MAIRE ex GIROUX, Bull. Soc. Nat. Afr. Nord. 21 (8): 177 (1930).

Leucanthemum clausonis (POMEL) GIRAUD, Ann. Univ. Grenoble sect. Sc.-Med. 11: 198 (1935); HEYWOOD, Agron. Lusit. 20 (3): 212 (1958).

Citations of specimens:

Spain: Almeria, in paludosis subsalsis ad Almeria, 28. 9. 1865, 28. 9. 1865, LANGE: s. n. (K).

Sect. *Glossopappus* (KUNZE) ALAVI, comb. nova.

Syn.:

Glossopappus KUNZE, Flora 47: 748 (1846); WILLK. in WILLK. & LANGE, Prodr. Fl. Hisp. 2: 106 (1865).

Leucanthemum subgen. *Glossopappus* (KUNZE) HEYWOOD, Agron. Lusit. 20 (3): 213 (1958).

Ray florets ovate-elliptical; pappus auriculiform, twice as long as the basal tube of the ray floret. Disc florets zygomorphic, $^2/_3$-toothed; pappus auriculiform, as long as the corolla tube.

Type: *C. macrotus* DURIEU.

Coleostephus macrotus DURIEU in DUCHARTRE, Rev. Bot. 1: 363 (1846); BOISS. & REUTER, Pugillus 58 (1852).

Syn.:

Glossopappus chrysanthemoides KUNZE, Flora 47: 748 (1846); WILLK. in WILLK. & LANGE, Prodr. Fl. Hisp. 2: 106 (1865).

Pyrethrum myconis var. *pullatum* COSSON, Not. Pl. Crit. 38 (1849)

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Chrysanthemum macrotum (DURIEU) BALL, Jour. Linn. Soc. London (Bot.) 16: 509 (1878).

Glossopappus macrotus (Durieu) BRIQ. & CAVILLIER in BURNAT, Fl. Alp. Marit. 77 (1916).

Leucanthemum macrotum ssp. *chrysanthemoides* (KUNZE) HEYWOOD, Agron. Lusit. 20 (3): 213—14 (1958).

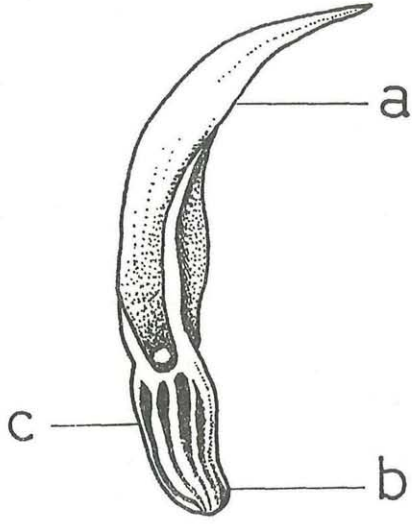

Fig. 3. *Coleostephus macrotus*, Cypsela. (a) Pappus, (b) Basal callus, (c) Main body of the fruit

Citations of specimens:

Spain: Cadiz, dans les champs a Medina Sidonia, 21. 3. 1849, BOURGEAU: 284 (K). — Jaén, between the Olive yards and foot of Sierra, above road to Los Banos de Jabalcuz, 21. 5. 1926, ELLEMAN & SANDWITH: 758 (K); Blanco, 7. 1850, GAY: 521 (K). — Malaga, loc. lapidos ad Chario et pr. Yunquera, 5—30th May, 1879, HUTER, PORTA & RIGO: 558 (MANCH; E; K); loc. cultis ad Nasciemento del Rio Granda pr. Yunquera sol. schist. calc. alt. 3—400 m, 14. 6. 1895, PORTA & RIGO: 241 (MANCH; K; W-Halacsy); above Velez Málaga road, grassy slopes, in large masses also seen in Morocco, 8. 4. 1963, STOCKEN: 181.63 (E); Velez Málaga, 8. 6. 1845, WILLKOMM: 744 (K).

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Zeitschrift/Journal: Phyton, Annales Rei Botanicae, Horn

Jahr/Year: 1976

Band/Volume: 17_3_4

Autor(en)/Author(s): Alavi Sifat A.

Artikel/Article: "Genus Coleostephus Cassini in Europe" (Asteraceae). 319-328