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MATERIALS FOR A FLORA OF TURKEY XXX: COMPOSITAE, I

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ABSTRACT. New or misunderstood Turkish taxa of Compositae are described or discussed in the following genera: *Achillea*, four new species and a new subspecies; *Anthemis*, two new species and discussions of several confused taxa including *A. cretica*, *A. montana* and *A. orientale*; *Centaurea*, fifteen new species, two new sections and numerous new names and combinations; *Chondrilla*, one new species of somewhat problematical generic alliance; *Crepis*, one new species and a discussion of some polymorphic species; *Echinops*, one new species; *Helichrysum*, one new species and some infraspecific taxa; *Hieracium*, six new species and a discussion of the generic status of *Pilosella*; *Inula*, reduction of the genus *Codonocephalum* to synonomy, infraspecific taxa of *I. helenium*; *Lamyropsis*, one new species; *Matricaria*, discussion of *M. chamomilla* and its typification; *Onopordum*, one new species; *Pilosella*, one new species; *Pulicaria*, typification of *P. odora*; *Scorzonera*, two new species; *Senecio*, two new species and some new infraspecific taxa; *Sonchus*, one new species; *Tanacetum*, two new species, new combinations and infraspecific taxa, typification of *T. coccineum*; *Taraxacum*, three new species.

INTRODUCTION

In the course of preparing accounts for the Compositae volume (no. 5) of the *Flora of Turkey*, several contributors have recognised new species and other taxa which, following the general policy of the Flora, are published prior to the appearance of the volume.

The following paper brings together the contributions of 13 authors: D. F. Chamberlain, A. Danin, P. H. Davis, A. J. C. Grierson, I. C. Hedge, A. Huber-Morath, F. K. Kupicha, J. M. Lamond, V. A. Matthews, P. D. Sell & C. West, J. L. van Soest and G. Wagenitz.

For convenience of reference the genera and their constituent species, with the exception of *Centaurea* and *Hieracium*, are dealt with in alphabetical order. Unless otherwise indicated, all specimens cited have been examined. Attention is drawn to the provenance of the following private herbaria: K. P. Buttler (Munich), A. Huber-Morath (Basel), F. Sorger (Vienna), F. Holtz (Göttingen). Thanks are due to these botanists for the loan of their excellent material, and to the directors of numerous herbaria indicated in this paper. The contributions from V. A. Matthews and F. K. Kupicha were carried out under a grant from the United Kingdom Science Research Council who generously continue to support the University's *Flora of Turkey* project.

A second (smaller) paper under the same general heading will cover those genera not yet fully worked up and include new combinations in the family.

Achillea

A. HUBER-MORATH*

A discussion of the following new species and subspecies will be included in a forthcoming paper in *Berichte der Schweizerischen Botanischen Gesellschaft*, which will give a general revision of all the Turkish species.

Achillea gypsicola Hub.-Mor., **sp. nov.** (Sect. *Santolinoideae*).

Herba perennis, rhizomate indurato-caespitosa, pluricaulis. *Caulis* humilis, 5–20 cm altus, simplex, ascendenter-erectus, dense patule albo-lanatus ± teres et longitudinaliter striatus, modice foliatus, in tertia parte superiore subnudus. *Folia* dense patule albo-lanata; folia basalia emarcida; folia caulina inferiora et media linearia, 1·5–2 cm longa, 1·5–2 mm lata, pinnatifida, segmentis minutissimis fere contiguis, tripartitis vel trifidis, lobulis rotundis, crebre denticulatis, 1–1·5 mm longis latis: folia superiora similia decrescentia. *Capitula* 1–6, corymbosa, corymbus 1·5–2·5 cm latus, pedunculis 3–16 mm longis. *Involucrum* dense patule lanatum, ovatum vel subglobosum, 5–6 × 3·4–4(–6) mm longum latum; phyllis obtusis, late ovatis vel suborbiculatis, 4–5 mm longis, 2·5–3·5 mm latis. *Ligulae* 4–6, flavae vel aureae, 2·5–3(–6) mm latae, 2–2·5(–4) mm longae, ± indistincte tricrenatae. *Flores* disci 15–35, 3·5 mm longi. *Paleae* hyalinae, late lanceolatae, ad apicem ± denticulatae. Turkey. A4 Çankiri: ad oppidum Çankri in aridissimis vallis Çakmaklidere, 800 m, 3 vii 1929, *Bornmüller* 14255; Çankiri, gypsum hills, 800 m, 5 vi 1954, *Davis* 21521; Kalecik-Çankiri, steppe, gypsum hills 5 km S of Çankiri, 700–750 m, 29 vi 1958, *Huber-Morath* 15832 (holo. herb. Hub.-Mor.); gypsum hills 10 km S of Cankiri, 670 m, 11 vii 1964, *Huber-Morath* 17278. A5 Çorum: 13 km SW of Çorum, *Artemisia*-steppe, 780 m, 11 vii 1963, *M. Zohary, Orshan & Plitmann* 117315; 33 km from Çorum to Iskilip, 800 m, bare chalk and gypsum slopes, 29 v 1965, *Coode & Jones* 1702.

Achillea magnifica [Heimerl ex] Hub.-Mor., **sp. nov.** (Sect. *Santolinoideae*).

Herba perennis, e rhizomate indurato pluricaulis, *Caulis* appresse albo-tomentosus, 50–60 cm altus, simplex, erectus, robustus, angulato-sulcatus, basi 3–3·5 mm diametro, valde foliatus. Folia linearia, subteretia, modice subappresse pilosa vel demum subglabra, pinnatipartita, segmentis minutis transverse imbricatis; folia basalia emarcida; folia caulina inferiora usque ad 6 cm longa, 4 mm lata, segmentis lanceolatis mucronatis, indivisis vel sublobatis, laxe imbricatis, glabrescentibus, lobulis 1–1·5 mm longis; folia media breviora et angustiora, segmentis contiguis, tripartitis, lobulis ovatis vel late ovatis, denticulatis; folia superiora decrescentia, usque ad 1·5 cm longa, 1 mm lata. *Capitula* 15–25, in corymbum densum compositum, 5–6·5 cm latum disposita, pedunculis crasses, ± angulatis, 10–15 mm longis. *Involucrum* hemisphaericum vel depressum, 5–6 mm longum, 6–8 mm latum, appresse albo-tomentosum; phyllis lanceolatis vel oblongis, externis obtusiusculis, mediis et internis obtusis, hyalino-marginatis, intimis late hyalino-laceris. *Ligulae* 4–6, flavae, trilobae, minutae, 1·5 mm latae, 1 mm longae. *Flores* disci c. 55, 3 mm longi. *Paleae* hyalinae, glabrae, lanceolatae, denticulatae.

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Turkey. B6 Maraş: Gujuk sou (Göksun) to Kapalak (Kabaağaç), 11 vii 1906, *G. & B. Post* 584. B7 Erzincan: Kurutschai (Kuruçay), in collibus arenosis ad Hassanar, 27 vi 1889, *Sintenis* 969 (holo. LD); Erzincan to Selepür, steppe 30 km E of Erzincan, 1250 m, 6 vii 1955, *Huber-Morath* 12992. B7 Malatya: Malatya airport, steppe, 900 m, 11 vi 1949, *Huber-Morath* 8925; idem, 23 vi 1959, *Simon*: 35 km W of Malatya, steppe, 28 vii 1962, *M. & D. Zohary* 2825. B7 Elâziğ: Elâziğ airport, steppe, 11 vi 1950, *Reese*.

Achillea nobilis L. subsp. **kurdica** Hub.-Mor., **subsp. nov.** (Sect. *Millefoliatae*).

Herba perennis, e rhizomate laxe caespitosa pluricaulis. *Caulis* dense appresse vel subappresse pubescenti-lanatus, 35–70 cm altus, simplex vel plerumque in parte superiore ramosus, ± teres et longitudinaliter striatus, erectus, gracilis vel robustus, basi usque ad 4·5 mm diametro, modice foliatus. *Folia* parce vel modice vel densiuscule subappresse vel patule pilosa, 2–3-pinnatipartita; folia basalia oblonga, usque ad 10 cm longa, 2 cm lata, tripinnatipartita, segmentis non regulariter pectinato-pinnatifidis, sed irregulariter partitis, laciniis mucronatis 0·3–0·7 mm latis, usque ad 4 mm longis, rachide angusta, lobulata; folia caulina elliptica vel ovata, usque ad 5 cm longa, 2·5 cm lata. *Capitula* numerosa, in corymbum densum compositum, usque ad 7 cm latum disposita. *Corymbus* dense patule lanato-velutinus. *Involucrum* ovato-oblongum, 3–3·5 mm longum, 2–2·5 mm latum, dense subpatule pilosum; phyllis anguste brunneo-marginatis, externis anguste lanceolatis, acutiusculis, internis oblongis obtusis. *Ligulae* 4–5, parvae, supra ochroleucae, subtus albae, obsolete tricrenatae, 1–1·2 mm latae, 0·8–1 mm longae. *Flores* disci c. 15, 2 mm longi. *Paleae* lanceolatae, hyalinae, ad apicem pilosae.

Turkey. B9 Ağri: 5–10 km from Hamur to Tutak, 1650 m, rocky igneous slopes, 2 vi 1966, *Davis* 44111 (holo. E). B9 Van: 10 km from Gürpinar (Havasor) to Hoşap, steppe, 10 vi 1966, 1850 m, *Davis* 44679; S shore of Erçek Gölü, 1900 m, dry meadows, 5 vi 1966, *Davis* 44265. C10 Hakkâri: 26 km from Yüksekova to Şemdinli, 2000 m, steppe slopes, 15 vi 1966, *Davis* 45114 p.p.

Achillea pseudoaleppica [Hausskn. ex] Hub.-Mor., **sp. nov.** (Sect. *Santolinoideae*).

Syn.: *A. aleppica* DC. var. *ramosa* Bornm. in Notizbl. Bot. Gart. Mus. Berlin-Dahlem 7 (Nr. 64): 154 (1917).
A. aleppica DC. f. *ramosa* (Bornm.) Bornm. in Beih. Bot. Centralbl. 60:191 (1939).

Herba perennis, rhizomate indurato-caespitosa, pluricaulis. *Caulis* minute appresse tomentosus, saepe demum glabratus et rubescens, 20–40 cm altus, gracilis, basi 1–1·5 mm diametro, teres, longitudinaliter striato-angulatus plerumque longe et patule ramosus, modice vel dense foliatus. *Rami* sat numerosi, arcuato-ascendentes. *Folia* breviter linearia, ± curvata vel flexuosa, dense subappresse albo-lanata, vermiformia, pinnatifida, segmentis minutissimis contiguis, tripartitis, lobulis orbiculatis vel oblongis, crebre denticulatis, c. 0·5 mm longis latis; folia basalia emarcida; folia caulina inferiora et media sessilia, (0·5–)1–2(–2·5) cm longa, 1–1·5 mm lata, basi saepe subauriculata: folia superiora parva, ± bracteiformia. *Corymbum*

compositum, 15–40-cephalum, parvum, confertum, 1–2·5 cm latum, pedunculis brevissimis vel usque ad 2·5 mm longis. *Involucrum* oblongo-cylindricum, angulatum, 3–4 mm longum, 1·5–2·5 mm latum, breviter patule albo-lanatum; phyllis externis minutis, subulatis vel linearibus vel lineari-lanceolatis, ± patentibus, phyllis mediis appressis, lanceolatis, acutiusculis, phyllis intimis oblongis, obtusis. *Ligulae* 2–3, aureae, tricrenatae, parvae, 1–2(–2·5) mm latae, 0·8–1·5 mm longae. *Flores* disci 8–14, 2·2–2·5 mm longi. *Paleae* hyalinae, lanceolatae, acutae, ad apicem pilosae.

Turkey. B7 Malatya: Malatya, dry conglomerate rock and scree, 1020 m, 19 v 1935, *E. K. Balls* 2297; Malatya airport, steppe, 900 m, 11 vi 1949, *Huber-Morath* 8923, *Reese*; Malatya, Yeşilyurt, 2 vi 1965, *J. Eiselt*; Malatya to Doğanşehir, rocky slopes 44 km SW of Malatya, 14 vi 1949, *Reese*. B7 Tunceli: 14 km N of Pertek, 1050 m, 4 vii 1963, *Orshan & Plitmann* 472219, 472228. B7 Elâziğ; Kharput (Harput), in montosis supra Miadun (Miyadin), 23 v 1889, *Sintenis* 205 (holo. LD); Kharput, in monte Kisil Depe (Kizildağ), 10 v 1889, *Sintenis* 205; Malatya to Elâziğ, 53 km W of Elâziğ, rocks near the Euphrat river, 610 m, 24 v 1956, *Huber-Morath* 14586; Elâziğ to Pertek, steppe 24 km N of Elâziğ, 910 m, 24 vi 1951, *Huber-Morath* 11479; 8 km S of Elâziğ, 10 vii 1950, *Reese*; N side of Hazar Gölü, igneous slopes, 1300 m, 2 vi 1957, *Davis & Hedge, D.* 29004. B7 Diyarbâkir: 5 km NE of Ergani, calcareous slopes, 1000 m, 2 vi 1957, *Davis & Hedge, D.* 29041.

Achillea sintenisii Hub.-Mor., **sp. nov.** (Sect. *Santolinoideae*).

Syn.: *A. goniocephala* Bornm. p.p. (*Sintenis* 1039) in Feddes Rep. Beih. 89, 2:328 (1944), non Boiss. & Bal.

A. spinulifolia Bornm. p.p. (*Bornmüller* 1687, 3379). l.c. 328, non Fenzl.

Herba perennis, rhizomate indurato-caespitosa, pluricaulis, surculos steriles e basi arcuata ascendentes, 5–10 cm longos emittens. *Caulis* minute appresse vel subappresse albo-tomentosus, demum glabratus, 10–25 cm altus, simplex, tenuis, basi 0·8–1·5 mm diametro, teres, longitudinaliter striato-angulatus. *Folia* anguste linearia, dense appresse albo-lanata vel demum subglabra, vermiformia, pinnatifida, segmentis minutissimis contiguis, indivisis vel tripartitis, lobulis suborbiculatis, denticulatis, 0·5–1 mm longis latis; folia basalia emarcida; folia caulina inferiora et media laxe disposita, 1–3 cm longa, 0·7–1·2 mm lata, brevissime mucronata; folia superiora sensim breviora; folia surculos steriles congesta, breviora (0·5–1 cm longa) et latiora (1–1·5 mm lata). *Corymbum* laxum, simplicem 1–4-cephalum, 1–4 cm latum. Pedunculis (1–)3–5 cm longis. *Involucrum* late ovatum vel hemisphaericum vel depressum, 4–5 mm longum, (5–)6–10 mm latum, umbilicatum, appresse albo-tomentosum, demum glabratum; phyllis appressis, lanceolatis, carinatis, acutiusculis vel acutis, brevissime brunneo-marginatis. *Ligulae* 6–8, albae, breviter tricrenatae, 3–5·5 mm longae latae. *Flores* disci 50–60, 3–5·5 mm longi. *Paleae* hyalinae, lanceolatae, acutae vel fimbriatae, ad apicem parce ciliatae.

Turkey. B6 Sivas: 7 km W of Sivas, 13 vi 1939, *Reese & Skřivánek*; Sivas to Şarkişla, 17 km SW of Sivas, 13 vi 1939, *Reese*; Kayseri to Sivas, Yasibel pass, 37 km SW of Sivas, 1360 m, 12 vi 1969, *Simon* 69–537; in apricis calcareis E of Sivas, 1200–1400 m, 9 vi 1890, *Bornmüller* 1687 (as "*A. goniocephala* Boiss. & Bal. var. *longepedunculata* Hausskn. & Bornm. inedit."); Sivas to

Hafik, steppe 12 km E of Sivas, 1400 m, 30 vi 1953, *Huber-Morath* 12985; on gypsum slopes, Zara-Sivas road, 1500 m, 3 vi 1960, *Stainton & Henderson* 5321; Hafik to Zara, hot dry slopes, 23 vi 1934, *Balls* 1457; prope Zara, 1300–1400 m, v 1893, *Bornmüller* 3379; Sivas to Ulaş, gypsum hills, steppe, 9 km S of Sivas, 1540 m, 27 vi 1955, *Huber-Morath* 12988, *Simon*. B7 Erzincan: Kurutschai (Kuruçay), in montosis inter Hassanar et Nerskiep, 28 vi 1889, *Sintenis* 1039 (holo. LD).

Anthemis

A. J. C. GRIERSON

Anthemis antitaurica Grierson, **sp. nov.** (Sect. *Cota*) a *A. triumfettii* habitu non fastigiato, folia minora, involucris campanulatis corollis florium disci longioribus distincta.

Perennis, basi rhizomatoso, surculos plures steriles et caules fertiles emittens. *Caules* fertiles 25–30 cm alti, plus minusve dense albo-lanati, simplices vel infra media ramosi; rami tres, foliati, omnes capitulum singulare gerentes. *Folia* basalia bipinnatisecta, 4–7 cm longa (petiolis 1·5–4 cm inclusis) ambitu ovato-elliptica, segmentis primariis 4-jugis, 5–10 cm longis, segmentis secondariis lanceolatis, 3–5-jugis, 2·5–3 mm longis, 0·75–1 mm latis, apice acutis, utrinque albo-tomentosa; folia caulina similia, magnitudine decrescentia, sessilia. *Involucra* late campanulata, 1–1·3 cm lata; phyllaria imbricata, 3–4-seriata, exteriora ovata, 3·5–5 × 2 mm, interiora oblongo-lanceolata, 7 × 1·5 mm, omnia auguste fusco-marginata, parce lanata. *Paleae* auguste oblanceolatae, 7·5 mm longae, carinatae, apice acuminatae. *Flores radii* c. 20, ligulis albis 10–12 × 4–5 mm. *Flores disci* lutei, corollis 4.5 mm longis. *Achenia* immatura, oblanceolata, 2·5–2·75 mm longa, apice coronis 0·5–0·75 mm longis cincta.

Turkey. B6 Adana: d. Saimbeyli, Bozoğlan Da. above Obruk Yayla, 2100–2200 m, rocky slopes, rare, 7 vii 1952, *Davis* 19746 (holo. K).

The white-liguled perennial members of Sect. *Cota* that have previously been described (*A. tinctoria* var. *pallida*, *triumfettii*, *melanoloma*) all have a northerly distribution in Turkey and belong to the *A. tinctoria* complex, i.e. their leaves have relatively broad rachises and involucres that are more or less hemispherical. The present species seems further removed from this group and the shape of its involucre at once distinguishes it. The indumentum in the *tinctoria* group is at most thinly appressed-tomentose but here is denser and more lanate. Its disc corollas and achenes, though immature, are both somewhat longer than in those species of the *tinctoria* group. Finally, *A. antitaurica* is also more strongly rhizomatous than other members of Sect. *Cota*.

Anthemis calcarea Sosn. var. **discoidea** Grierson, **var. nov.** A var. *typica* capitulis discoideis differt.

Turkey. A8 Erzurum: 7 km N of Tortum, 1500 m, *Davis* 47556 (holo. E); Tortum to Artvin, west shore of Tortum Gölü, 1070 m, *Huber-Morath* 15850 (herb. Hub.-Mor.).

The type variety, which grows in the Oltu district of Kars, has not apparently been re-collected since the original gatherings in 1911.

Anthemis coelopoda Boiss. var. **longiloba** Grierson, **var. nov.** Var. *bourgaei* Boiss. similis sed segmentis secondariis foliorum 6–8 mm longis 0·5–1 mm latis differt.

Turkey. C5 Içel: Namrun, *Deaver* T.32(E). C6 Adana: E of Yeniköy near Haruniye, 630 m, *Huber-Morath* 12379 (herb. Hub.-Mor.). Hatay: dist. Iskenderun, Anamas Da., Akarca Koyu, 850 m, *Akman* 464 (herb. Hub.-Mor.). C6 Adana: 10 km E of Osmaniye, 600 m, *Sorger* 71–34–4 (holo. herb. Sorger).

The three varieties of *A. coelopoda* may be keyed out as follows:

1 Leaves (2–)3-pinnatisect, segments narrow, 0·5–1 mm . . . 2
\+ Leaves 2(–3)-pinnatisect, segments rather broad, 1–2 mm; (involucres 1·5–2 cm broad) N & W Anatolia . var. *coelopoda*
2 Involucres 1·5–2 cm broad; secondary segments of leaves 6–8 mm long (S Anatolia) . . . . . var. *longiloba*
\+ Involucres 1–1·5 cm broad; secondary segments of leaves (2–)4–5 mm long (N, W & Cent. Anatolia) . . . var. *bourgaei*

Anthemis cretica L., **A. montana** L. **and A. orientalis** (L.) Degen.

Linnaeus in his Species Plantarum ed. 2, 1261 (1763) published the name *Anthemis montana* and gave it the following diagnosis: "*foliis pinnato-multifidis planis: laciniis linearibus acutis trifidis pedunculo longissimo* Hort. Cliff. 415* Roy. Ingdb. 172. . . habitat in Italie Helvetia".

A. montana does not appear in the first edition of the *Species Plantarum* (1753) but the same diagnosis is found against *Anthemis cretica* which bears a different habitat note: "Habitat in Creta". The diagnosis itself originated in Linnaeus' earlier *Hortus Cliffortianus* 415 (1737) which concluded "crescit forte in Creta?" and, as in the *Species Plantarum* ed 1, Tournefort's *Chamaemelum orientale foliis absinthii* Cor. 37 is cited as a synonym and this phrase name appears on the specimen in the Clifford Herbarium. Linnaeus possibly considered, after the publication of the first edition, that the doubtful Cretan synonym was not the same as the plant in the *Hortus Cliffortianus* because the Tournefortian synonym does not appear under *A. montana* in the second edition, nor is there any mention in it of *Anthemis cretica*. Both names, therefore, have the same type and *A. montana* must be regarded as an illegitimate synonym of *A. cretica*. The latter name was widely used, again illegitimately for a different annual species that is common around the shores of the eastern Mediterranean. This is *A. cretica* (L.) Nym. which was based on *Anacyclus creticus* L. (1753) and is now correctly called *A. rigida* Boiss. ex Heldr. (see Greuter in Boissiera 13:142, 1967 and Candollea 23:262–263, 1968).

The type specimen of *Anthemis cretica* clearly belongs somewhere in the range of variability previously encompassed by the name *A. montana*. Bearing in mind, however, that it was a cultivated plant and, therefore, somewhat distorted in character as compared with its wild progenitor, it must be regarded as of dubious affinity at subspecific level.

The name *A. montana* has largely been superseded, especially since the publication of Hayek's *Prodromus Florae Peninsulae Balcanicae* (in Feddes Repert. Beih. 30, 2:622, 1931), by *A. orientalis* (L.) Degen. This was based on *Anacyclus orientalis* L. which appears in the first edition of the *Species Plantarum* (p. 892) wherein he cited *Anacyclus foliis compositis setaceis acutis rectis* from his *Hortus Cliffortianus* as a synonym. Consulting the Clifford herbarium, however, the specimen to which this name refers is not the plant usually understood as *A. montana* but the related *A. pectinata* (DC.) Boiss. and is the oldest name for that species. The combination *Anthemis orientalis*, however, should not now be used in its correct sense as it has already been wrongly ascribed to a different type based on the mistaken statement that *Anacylus orientalis* was synonymous with part of *Anthemis montana* (see Boissier Fl. Or. 3:291, 1875). *Anthemis orientalis* must therefore be regarded as a *nomen confusum*.

The names *A. cretica* and *A. orientalis* have both suffered a history of misapplication and the following synonymy is presented as clarification :—

Anthemis cretica Linn., Sp. Pl. 895 (1753) non (L.) Nym. (1854–55).
Syn.: *A. montana* Linn., Sp. Pl. ed. 2, 1261 (1763) *nom. illeg.*
A. orientalis auctt. non (L.) Degen.; Degen., Exs. It. Turc. 189 non *Anacyclus orientalis* L.

Anthemis pectinata (Bory & Chaub.) Boiss. & Reut., Diagn. Pl. Nov. Hisp. 17 (1842).
Syn.: *Anacyclus pectinatus* Bory & Chaub., Expéd. Sci. Morée (Fl. Pélop.) 3, 2:251 (1832).
A. orientalis Linn., Sp. Pl. 892 (1753) sed non *Anthemis orientalis* (L.) Degen. quoad typ. (excl. spec.)

Anthemis rigida (Sibth. & Sm.) Boiss. ex Heldr. in Schedis Autogr. Herb. Graec. Norm. a 1856 No. 503 (1857), non Nábělek (1925).
Syn.: *Anacyclus creticus* Linn., Sp. Pl. 892 (1753).
Santolina rigida Sm. in Sibth. & Sm., Fl. Graec. Prod. 2:166 (1816); Fl. Graec. t. 853 (1839).
Anthemis creticus (L.) Nym., Syll. 7 (1854–55) non Linn.

Anthemis fulvida Grierson, **sp. nov.** *A. oxylepidi* Boiss. (Sect. *Cota*) affinis, a qua imprimis differt indumento sericeo, forma et proportione phyllarium dissimilis.

Perennis; caudex suffrutescens multicaulis. *Tota planta* pilis sericeis fulvidis obsita vel ad basim caulium glabrescens. *Caules* ad 30 cm alti, semper simplices, monocephali, inferne ± dense foliati, in quarta parte superiore nudi. *Folia* bipinnatisecta, 1·5–5 cm longa 0·75–1·5 cm lata, ambitu oblanceolata vel late elliptica, segmentis primariis 4–6-jugis (in additione plures segmentis simplicibus minoribus stipuliformibus) 0·5–1·0 cm longis, pinnatifidis; segmentis secondariis 4–5-jugis lanceolatis setaceo-acuminatis ad 3 mm longos. *Capitulum* 1·5–2 cm latum, discoideum. *Phyllaria* quadriseriata, imbricata, extima lanceolata 4·5 mm longa, concolora, intima

oblonga 10 mm longa, ± obtusa, marginibus anguste fuscimarginatis fimbriatis. *Paleae* rigidae acuminatae, c. 7 mm longae 1·25 mm latae, aureae. *Ligulae* nullae; flores hermaphroditi immaturi, c. 3·5 mm longi.
Turkey. B3 Afyonkarahisar: Sultandagh in jugis alpinis supra Engeli (Geneli?), 1850 m, 28 vi 1899, *Bornmüller* 4656 (holo. E; iso. K, W).

Within sect. *Cota* this species is most closely related to *A. oxylepis* (from C5 Niğde and Içel), under which name the above material was distributed by Bornmüller, but it differs from *A. oxylepis* in several important respects. The yellowish indumentum of *A. fulvida* is densely sericeous and consists of hairs c. 0·65 mm long, 17–22 μm in diameter, which may be detached singly. This contrasts with the scanty covering of white arachnoid hairs in *A. oxylepis* that measure 1–2 mm long, 12–15 μm in diameter, and become entangled or almost floccose. The involucres of the two species differ sharply in the detail of their phyllaries: not only are those of *A. oxylepis* glabrous but they are of different proportions. The outer phyllaries in the latter are about a third as long as the innermost series, whereas in *A. fulvida* the outer ones are half as long as the innermost. All the phyllaries in *A. oxylepis* are acuminate and blackish margined; in *A. fulvida* the outer phyllaries are acuminate but the inner ones are oblong and obtuse, and only these have dark brown fimbriate margins.

Anthemis marschalliana Willd., Sp. Pl. 2187 (1803).

This species appears to consist of four subspecies that have been variously combined as varieties or independent species. Although only one of them, subsp. *pectinata* is indigenous in Turkey, their synonymy is confused and the following elucidation is presented here.

1 Leaves tripinnatisect . . . . . subsp. *biebersteiniana*
\+ Leaves bipinnatisect 2
2 Primary segments of leaves few (5–6–paired); secondary segments linear-oblanceolate, 0·5–1 mm broad, forming 30–40° angles with their rachises, subglabrous or sparsely sericeous subsp. *sosnowskyana*
\+ Primary segments of leaves more numerous (8–12–paired); secondary segments narrowly linear, 0·3–0·5 mm broad, forming 10–20° angles with their rachises; ± densely sericeous . . 3
3 Secondary segments 7–11 on each primary segment, conferted; phyllaries with dark brown margins . . . subsp. *pectinata*
\+ Secondary segments 3–5(–7) on each primary segment, not conferted; phyllaries with pale brown margins subsp. *marschalliana*

subsp. **marschalliana.** Fig. 1A.
Syn.: *A. biebersteiniana* Adam var. *marschalliana* (Willd.) Boiss., Fl. Or. 3:287 (1875).
A. marschalliana Willd. sensu Federov in Fl. URSS 26:30 (1961) pp.
Type: Habitat in Caucasum, *Mussin Puschkin* (B, photo E).

This subspecies has not been collected in Turkey and is evidently confined to the Caucasus.

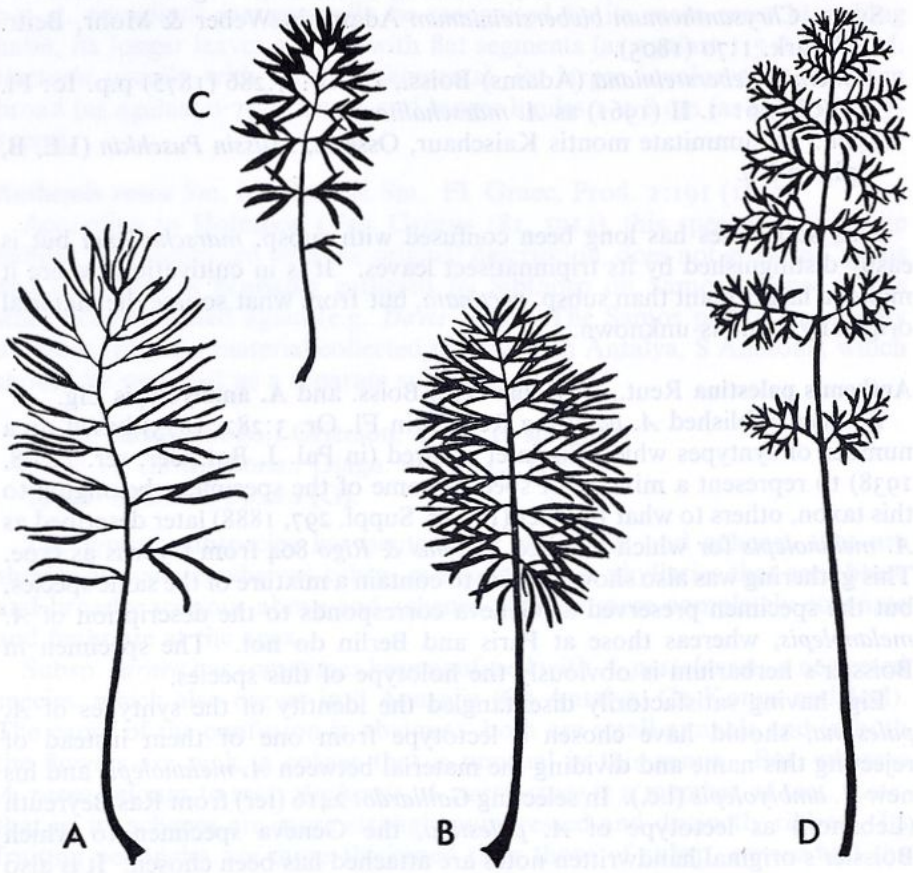

FIG. 1. Silhouettes of leaves of *Anthemis marschalliana*: A, subsp. *marschalliana*; B, subsp. *pectinata*; C, subsp. *sosnowskyana*; D, subsp. *biebersteiniana*.

subsp. **pectinata** (Boiss.) Grierson, **comb. nov.** Fig. 1B.
Syn.: *A. biebersteiniana* var. *pectinata* Boiss., Fl. Or. 3:287 (1875).
Syntypes: in alpibus Guriae, *Szowits*; Ponti Lazici prope Djimil, *Balansa*; ad Tachkopru, *Huet*; Alischeri Khan, *Kotschy* 275.

This subspecies also occurs in the southern Caucasus (Guria) and near Borzhomi. Turkish material of subsp. *pectinata* is in cultivation, some of it derived from *Balls* 539.

subsp. **sosnowskyana** (Fedorov) Grierson, **comb. nov.** Fig. 1C.
Syn.: *Pyrethrum orientale* Willd., Sp. Pl. 3:2159 (1803) non *Anthemis orientalis* (L.) Degen. (1890).
A. rudolphiana Adam in Weber & Mohr, Beitr. Naturk. 1:72 (1805) nom. illeg.
A. marschalliana var. *rudolphiana* DC., Prodr. 6:5 (1838).
A. biebersteiniana var. *rudolphiana* (DC.) Boiss., Fl. Or. 3:287 (1875).
A. sosnowskyana An. A. Fed. in Fl. URSS. 26:31 (1961).
Type: "Habitat in Georgia" *Mussin Puschkin* (B, photo E).

subsp. **biebersteiniana** (Adams) Grierson, **comb. nov.** Fig. 1D.

Syn.: *Chrysanthemum biebersteinianum* Adams in Weber & Mohr, Beitr. Naturk. 1:70 (1805).

Anthemis biebersteiniana (Adams) Boiss., Fl. Or. 3:286 (1875) p.p. Ic: Fl. URSS 26: t. II (1961) as *A. marschalliana.*

Type: in summitate montis Kaischaur, Ossetia, *Mussin Puschkin* (LE, B, photo E.).

This subspecies has long been confused with subsp. *marschalliana* but is easily distinguished by its tripinnatisect leaves. It is in cultivation, where it makes a larger plant than subsp. *pectinata*, but from what source the material originally came is unknown.

Anthemis palestina Reut., **A. melanolepis** Boiss. and **A. amblyolepis** Eig.

Boissier published *A. palestina* Reuter (in Fl. Or. 3:282, 1875) based on a number of syntypes which Eig later showed (in Pal. J. Bot., Jer. ser. 1:208, 1938) to represent a mixture of species, some of the specimens belonging to this taxon, others to what Boissier (Fl. Or. Suppl. 297, 1888) later described as *A. melanolepis* for which he cited *Sintenis & Rigo* 804 from Cyprus as type. This gathering was also shown by Eig to contain a mixture of the same species, but the specimen preserved at Geneva corresponds to the description of *A. melanolepis*, whereas those at Paris and Berlin do not. The specimen in Boissier's herbarium is obviously the holotype of this species.

Eig, having satisfactorily disentangled the identity of the syntypes of *A. palestina*, should have chosen a lectotype from one of them instead of rejecting this name and dividing the material between *A. melanolepis* and his new *A. amblyolepis* (l.c.). In selecting *Gaillardot* 2416 (ter) from Ras Beyreuth (Lebanon) as lectotype of *A. palestina*, the Geneva specimen to which Boissier's original handwritten notes are attached has been chosen. It is also one that has been verified both by Eig and myself.

Anthemis rigescens Willd., Hort. Berol. 1:75 t. 62 (1806), was described from a cultivated plant the origin of which was not known ("Habitat . . . . . "). From the description the stems were 2 feet (60 cm) tall and the illustration shows that it was branched. The rays were white and the inner phyllaries dark-margined. This may be matched with specimens of *A. triumfettii* (L.) All. from Europe (see *Alston & Sandwith* 1551 (K) from S Albania and *Reverchon* from Alpes Maritimes, France).

Willdenow's illustration is the only means of typifying *A. rigescens*, for the specimen in his herbarium bearing this name (No. 16236) has an unbranched stem on which the leaves tend to be basal and the solitary capitulum is borne on a naked peduncle. In appearance and habit this specimen is similar to *A. melanoloma* Trautv. and the diagnostic phrase attached to the sheet is different from that of the original description for it ends "Habitat ad Mare Caspium". Possibly on the basis of this specimen Willdenow later (in Enum. Hort. Berol. 909, 1809) published the Caucasian origin that has generally been associated with the name *A. rigescens.*

There is thus evidence to suggest that *A. rigescens* should be regarded as a synonym of *A. triumfettii* which Linnaeus originally described as a variety of his *A. tinctoria.* These two species seem to be more sharply differentiated in

Europe than in Anatolia, especially in respect to *A. tinctoria* var. *pallida* DC., but *A. triumfettii* can generally be recognised by its more erect branching habit, its longer leaves 3–4 cm with flat segments (as against 1·5–2 cm in *A. tinctoria* usually with inrolled segments), its larger involucre, 1·5–1·8 cm broad (as against 0·75–1·2 cm), and longer ligules 1–1·8 cm (as against 0·75–1 cm).

Anthemis rosea Sm. in Sibth. & Sm., Fl. Graec. Prod. 2:191 (1813).

According to Holmboe (Veg. Cyprus 181, 1914), this species, despite the habitat note published with the original description, does not grow in Cyprus and its type was probably gathered by Sibthorp on Samos whence it has since been collected again (e.g. *Davis* 1667). The Samos plants are slightly different from the material collected mostly from Antalya, S Anatolia, which should be regarded as a separate subspecies.

subsp. **carnea** (Boiss.) Grierson, **comb. et stat. nov.**
Syn.: *A. carnea* Boiss., Diagn. ser. 1, 4:4 (1844).
Type: in Caria, *Pinard* (G).

The typical subspecies has acute inner phyllaries and achenes that are shortly auriculate, whereas subsp. *carnea* has inner phyllaries that are obtuse and broadly scarious above and achenes that are more completely coronate and fimbriate at the apex.

Subsp. *carnea* has sometimes been confused with *A. pestalozzae*, a neglected species, which also occurs in S Anatolia (C3 Antalya, C4 Konya and Içel). The cause of the confusion is obvious: both are small annuals and in both the flowers are pink, a colour that is unusual in this genus. But, whereas *A. rosea* belongs to sect. *Anthemis*, *A. pestalozzae* is a member of sect. *Cota*, that is, its achenes are more strongly compressed and distinctly ribbed. Its fruiting peduncles are more thickened than those of subsp. *carnea* and the receptacle more conical at maturity.

Anthemis sismondeana Clem., Sert. Olymp. 61 (1855).

This species has long been known only from the type gathering (Constantinople, *Clementi*). On examination the latter, which consists of a single specimen, appears to be nothing more than an immature and depauperate plant of *A. auriculata* Boiss., Diagn. ser. 1, 4:5 (1844), close to which Boissier placed it in his Flora (3:310, 1875).

Centaurea

(Beiträge zur Kenntnis der Gattung Centaurea L. 2)

G. WAGENITZ*

In a previous paper (Wagenitz 1972) I dealt with new taxa, new names and new combinations for most of sections *Acrolophus* and *Acrocentron*. In this one, the remaining species of these and other sections are dealt with. The species are arranged according to the system adopted in the Flora; the first part of the paper deals with new taxa, the second with new names and new combinations.

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NEW TAXA

Centaurea zeybekii Wagenitz, **sp. nov.** (Sect. *Acrolophus* [Cass.] DC.)

Affinis *C. cuneifoliae* Sm., sed differt appendicibus triangularibus vel fere lingulatis, minute denticulatis, pappo longiore.

Perennis. *Caulis* erectus, 50–60 cm altus, in parte superiore ramosus ramis strictis ad 18 cm longis monocephalis (rarius iterum ramosis), caulis et rami arachnoideo-tomentosi. *Folia* utrinque pilis brevibus scabridula et glandulis impresse punctata. *Folia basalia* (p.p. florendi tempore emarcida) et inferiora petiolata, pinnatisecta vel sublyrata segmentis utrinque 4–7 (interdum segmentis parvis intermixtis), lanceolatis vel lineari-lanceolatis, pro parte dentatis vel pinnatifidis; segmenta ultima 2–4(5) mm lata, segmentum terminale usque ad 10 mm latum. *Folia media* similia sed sessilia et minora, superiora vel pinnatifida vel integra, suprema integra, lineari-lanceolata. *Involucrum* oblongum (fructiferum fere infundibuliforme), 12–14 mm longum, 6–8 mm latum. *Phylla* multiseriata, media et interna elevatim longitudinaliter striata. *Appendices phyllorum* mediorum triangulares vel fere lingulatae, c. 2·5 mm longae, 2 mm latae, breviter decurrentes, stramineae, in parte inferiore angustissime hyaline marginatae, apicem versus minute denticulatae dentibus utrinque 2–5 vix 0·3 mm longis, mucro terminalis aequilongus. *Flores* rosei, marginales vix radiantes, hermaphroditi c. 20–30. *Achaenia* 3–3·5 mm longa; pappus 2–3 mm longus, scaber.

Turkey. B1 Izmir: Ostseite des Nif Da. oberhalb des Fahrweges zwischen Kurudere und Ovacik köyü, 600 m, lichter, steiniger Kiefernwald am Hang, 28 vi 1973, *F. Holtz* 410, *P. Hänel, T. Kesercioğlu* (holo. GOET; iso. EGE, herb. F. Holtz!)

Although the appendages of this species are only minutely denticulate, their structure clearly indicates its membership of sect. *Acrolophus* (and not sect. *Phalolepis*, where the appendages always have broad hyaline margins). It is named after Prof. Dr N. Zeybek (Izmir), whose valuable assistance was very important for the success of the excursion on which this species and *C. holtzii* were detected.

Centaurea sivasica Wagenitz, **sp. nov.** (Sect. *Acrolophus* [Cass.] DC.)

Affinis *C. calolepidi* Boiss., sed differt statura humiliore, capitulis solitariis, non deciduis, spina terminali longiore; similis quoque *C. diffusae* Lam., a qua differt floribus in capitulo paucis, roseo-purpureis, achaeniis maioribus.

Perennis; caulis 15–25 cm altus, fere a basi copiose ramosus ramis iterum ramosis, planta subglobosa in circumscriptione. *Folia* subtus scabridula, supra glabra vel tenuiter adpresse-tomentosa, utrinque glandulis sedentibus punctata. *Folia inferiora* pinnatisecta, segmentis lateralibus utrinque c. 5 lanceolato-ovatis, integris vel basi lacinulis instructis, 3–4 mm latis, segmentum terminale parum maius; folia media pinnatipartita vel pinnatifida, segmentis lateralibus utrinque 3–4, lineari-lanceolatis, 0·5–2·5 mm latis, inferioribus caulem amplectentibus; folia superiora indivisa linearia vel lineari-lanceolata. *Capitula* in apice ramorum solitaria, persistentia (non decidua). *Involucrum* 9–11 × 2·5 mm, anguste cylindricum, basi angustatum. *Phylla* multiseriata, ab exterioribus triangularibus ad interiora linearia sensim elongata. *Appendices phyllorum* exteriorum breviter triangulares, vix

spinulosae, eae phyllorum mediorum anguste triangulares (ciliis exclusis 5·5–7 mm longae, 1–1·2 mm latae), sensim in spinulam rectam 3–4(5) mm longam angustatae, decurrentes, utrinque ciliis (6)7–8(9) 1–1·5 mm longis ornatae; *appendices mediae* patentes, stramineae, mediae et internae saepe purpureo-maculatae. *Flores* roseo-purpurei, hermaphroditi 5–6, marginales steriles pauci, inconspicui. *Achaenia* c. 3·3 mm longa; pappus nullus.
Turkey. B5 Kayseri: Sarkişla-Kayseri, *Vicia ervilia*-Kulturen 43 km südlich Sarkişla, 1350 m, 5 vii 1953, *Huber-Morath* 11940 (holo. herb. Hub.-Mor.). B6 Sivas: environs of Sivas, steppe on the border of cultivated fields, 1250 m, 2 viii 1962, *M. Zohary* 290 (HUJ); 20 km S of Sivas, state-farm Ulaş, 1275 m, *Artemisia* steppe, 23 viii 1959, *M. & D. Zohary* 3355 (HUJ); Sivas-Tecer, Serpentinhügel 26 km südlich Sivas, 1450-1480 m, 21 vii 1958, *Huber-Morath* 15886 (herb. Hub.-Mor.); 30 km SW Kangal (Gürün), sandiger Steppenhügel E der Straße, 1500 m, 1 viii 1970, *Sorger* 70-32-8 (herb. Sorger).

Centaurea inexpectata Wagenitz, **sp. nov.** (Sect. *Jacea* [Mill.] DC.)
Affinis *Centaureae nigrescenti* Willd., sed differt foliis densis numerosis, basi truncatis vel subhastatis.
Perennis, stolonibus subterraneis instructa. *Caulis* 15–30 (–60) cm altus, erectus, ramosus, ramis ± longis in parte superiore. *Folia* pilis minutis septatis scabrida et sparse arachnoidea; folia basalia lanceolata, petiolata, caulina inferiora florendi tempore emarcida, media et superiora numerosa, densa, internodiis multo longiora, sessilia, media oblonga, 3–4(–9) mm lata, 17–22(–40) mm longa, basi truncata vel subhastata, integra vel dentibus paucis instructa, folia superiora mediis similia, minora. *Involucrum* ovoideum, 13–14(–16) mm longum, 8–9(–11) mm latum, phylla multiseriata, nervosa. *Appendices* phyllorum ungues eorum pro parte maxima obtegentes, brunneae, pars centralis earum anguste triangularis apice phyllorum fere aequilata, 0·8 mm lata, 1·5 mm longa, margine utrinque ciliis 7–8(–13), 1·5–2 mm longis ornata, mucro terminalis ciliis brevior. *Flores* rosei, marginales steriles vix radiantes. *Achaenia* 3(–3·5) mm longa, pappus nullus.
Turkey. A3 Bolu: upland sward above Abant gölü, 7 ix 1940, *B.V.D. Post* 431 (holo. G); Westseite des Abant gölü, 1250 m, Uferweise, 23 viii 1973, *F. Holtz* 1311, *P. Hänel* (B, EGE, GOET, herb. Holtz); Abant-See, feuchte Wiesen, 1400 m, 1 vii 1969, *Sorger* 69-4-23 (herb. Sorger); Abant, 1350 m, 8 viii 1970, *A. & T. Baytop* (ISTE 18448, E). A4 Zonguldak: Keltepe, above Yenice, at Sorgun Yayla, 1300 m, meadow, 4 viii 1962, *Davis & Coode, D.* 38990 (E, GOET, K). A/B2: Brusa [Bursa] to Kutaya [Kütahya], respectively Yanigüil [Inegöl?] to Kutaya, *Mitchell* (K). C2 Muğla: Girdev Da. at Bel yayla, 1900 m, 7 viii 1947, *Davis* 13877 (E, GOET, K).

It was unexpected to find a new species of Sect. *Jacea* (s.str.) in western Turkey, as this section has a more northern distribution and is confined to mountains in the southern Balkans (it is absent in the Aegean area). The known distribution of the species represents a rare example of disjunction between NW and SW Anatolia. The appendages are very similar to those of *C. nigrescens* Willd. (reaching Turkey in the Istranca Da.), but the vegetative characters are distinctive.

Centaurea sect. **Pseudoseridia** Wagenitz, **sect. nov.**

Herbae perennes. *Caules* erecti vel ascendentes, simplices vel parum ramosi. *Folia* lyrata vel integra (lanceolata seu oblonga), caulina interdum anguste decurrentia. *Capitula* media. *Involucrum* subcylindricum vel ovoideum, 10–20 mm latum, e phyllis multiseriatis coriaceis. *Appendices* ± triangulares, ab unguibus bene distinctae, ungues phyllorum non obtegentes, brunneae, spinulosae spinulis palmatim dispositis. *Flores* lutei, marginales steriles inconspicui non radiantes. *Achaenia* subcylindrica hilo parvo. *Pappus* duplex scaber.

Typus: *Centaurea hermannii* F. Hermann (NW Turkey). Further species: *C. drabifolioides* Hub.-Mor. (NE Anatolia); *C. cheirolepidoides* Wagenitz (SW Anatolia); *C. pseudokotschyi* Wagenitz (S Anatolia); *C. hololeuca* Boiss. (Lebanon); *C. lancifolia* Spr. (Crete); *C. cheirolopha* (Fenzl) Wagenitz (S Anatolia, Lebanon); *C. lycopifolia* Boiss. & Kotschy (S Anatolia); *C. stevenii* M. Bieb. (NE Anatolia, Transcaucasia).

The Oriental species so far assigned to sect. *Seridia* DC. are rather different from the typical species of the Mediterranean and it is necessary to separate them. The most obvious differences are the yellow flowers with inconspicuous marginal flowers. The structure of the achenes seems to provide a further differentiating character. As described by Dittrich (1968), the achenes of the typical species of sect. *Seridia* are rather uniform: sturdy with a large hilum (about one third the length of the achene) and distinct tooth-like elaiosome. In *C. hermannii*, *C. pseudokotschyi* and *C. lancifolia* of the new section the achenes are slenderer with a small hilum and without a distinct elaiosome. *C. cheirolopha* is intermediate according to the external characters of the achenes, while the achenes of the other species are unknown to me (and indeed not yet collected in most cases). According to the length of the pappus two species-groups can be discerned in sect. *Pseudoseridia* and a subdivision may be necessary in the future. While the pappus is 5–10 mm long in most species, it is very short in *C. cheirolopha*, *C. lycopifolia* and *C. stevenii*. Some of the species are very similar in most characters to species of section *Cheirolepis* (Boiss.) O. Hoffm. as indicated by their names: *C. cheirolepidoides*, *C. drabifolioides* (similar to *C. drabifolia* of sect. *Cheirolepis*) and *C. pseudokotschyi* (imitating *C. kotschyi*). Only by investigation of the pappus is it possible to determine the proper placing of these plants, and *C. isaurica* Hub.-Mor., of which achenes and pappus are still unknown, may belong to sect. *Pseudoseridia* or sect. *Cheirolepis*. Noteworthy is the very restricted area of most species of the new section, three species being so far known only from a single locality.

After this note was written, J. Dostál (1973) described a new genus *Wagenitzia* with *C. lancifolia* as the type-species. From the description, this embraces part of our new sections *Pseudoseridia* and *Pteracantha*, which indeed seem to be related, although the structure of the appendages is rather different.

Centaurea pseudokotschyi Wagenitz, **sp. nov.** (Sect. *Pseudoseridia* Wagenitz).

Affinis *C. drabifolioidi* Hub.-Mor. et *C. cheirolepidoidi* Wagenitz, sed differt caulibus ascendentibus, foliis mediis et superioribus lanceolatis vel oblongis plus minusve semiamplexicaulibus.

Perennis, e basi lignosa multicaulis. *Caules* arcuatim ascendentes, c. 15–27 cm longi, simplices vel circa medium ramibus 1–2 instructi, minute scabri et in parte inferiore sparse araneosi. *Folia* pilis minutis scabridula, vix araneosa, glandulis sedentibus impresse punctata; inferiora florendi tempore iam emarcida, media et superiora lanceolata vel oblonga, sessilia, plus minusve semiamplexicaulia, media c. 5–10 × 35–50 mm, superiora minora. *Involucrum* 22–27 × 11–14 mm, florendi tempore fere cylindricum, postea apicem versus dilatatum. *Phylla* straminea, ab externis triangularibus ad interna fere linearia elongata. *Appendices* phyllorum parvae, phylla non obtegentes et ab iis bene distinctae (non decurrentes), appendices phyllorum mediorum triangulares, brunneae, sparse araneosae, reflexae, digitate spinulosae, spinulis utrinque 5–6, (3–)4–5 mm longis, spinula terminalis vix validior, 4–6 mm longa. *Flores* lutei, marginales non radiantes, laciniis filiformibus. *Achaenia* 5–6 mm longa, 2·3–2·5 mm lata, glabra, lucida, hylo laterali parvo. *Pappus* duplex, externus multiseriatus e setis scabris ab externis albidis brevibus ad internas fuscas, 5·5–6 mm longas sensim elongatis, setae pappi interni 1 mm longae, albidae, conniventes.
Turkey. C4 Antalya: Ak Da. (S of Geyik Da.), rocks, rare, 28 viii 1947, *Davis* 14359 (holo. GOET; iso. K).

At first sight the new species looks very similar to *Centaurea kotschyi* (Boiss. & Heldr.) Hayek and was in fact determined by me as "*C. kotschyi* var. *decumbens*" before the investigation of the pappus. But whereas the pappus of *C. kotschyi* (sect. *Cheirolepis*) is simple, plumose and very long, the pappus of the new species is double (with inner row of short bristles), scabrous and only as long as the achene. A few years ago Huber-Morath (1967) described *C. drabifolioides* Hub.-Mor. (sect. *Pseudoseridia*) "imitating" *C. drabifolia* Sm. of sect. *Cheirolepis*. Now we have a second case of interesting parallelism between the two sections.

Centaurea cheirolepidoides Wagenitz, **sp. nov.** (Sect. *Pseudoseridia* Wagenitz).
Affinis *C. drabifolioidi* Hub.-Mor. et *C. pseudokotschyi* Wagenitz, sed differt foliis tomentosis, inferioribus dentatis, appendicibus minutis breviter ciliatis; affinis quoque *C. hololeucae* Boiss., a qua differt capitulo maiore, appendicibus atrobrunneis, foliis non lobatis.
Perennis. *Caulis* erectus, 38 cm altus, araneoso-tomentosus, in parte superiore ramo unico instructus. *Folia* plus minusve griseo-tomentosa; inferiora lanceolata, petiolata, petiolo incluso 8–13 cm longa, 9–13 mm lata, in parte inferiore laminae utrinque lobulo vel dente unico instructa; folia caulina multo minora, media anguste lanceolata, mucronata, c. 3 cm longa, 3–4 mm lata, anguste et longe decurrentia; superiora bracteiformia, mucrone ad 3 mm longo terminata. *Involucrum* 24 mm longum, 13 mm latum, fere cylindricum (apicem versus parum angustatum). *Phylla* multiseriata, coriacea, straminea, glabra. *Appendices* parvae, atrobrunneae, triangulares (ciliis exclusis 2·5–3 mm latae, 1 mm longae), non decurrentes, patentes vel reflexae, deciduae, ciliatae ciliis utrinque 3–4, 1–1·5 mm longis, mucro terminalis vix validior, 1·5 mm longus. *Flores* lutei, marginales non radiantes laciniis filiformibus. *Achaenia* immatura. *Pappus* duplex, scaber, externus ad 7 mm, internus c. 1·3 mm longus.

Turkey. C2/3 Antalya: Elmali, Keçova, vii 1964, *F. Demirdöğen* ISTO 2579 (holo. E).

Only known to me from a single sheet with one specimen, but apparently quite distinct and perhaps most similar to *C. hololeuca* Boiss. from the Lebanon.

Centaurea sect. **Pteracantha** Wagenitz, **sect. nov.**

Herbae perennes basi lignosae rhizomate valde ramoso ± caespitosae. *Caules* erecti, simplices dense foliati. *Folia* pinnatilobata vel pinnatifida, plerumque tomentosa. *Capitula* media. *Involucrum* subcylindricum, 6–18 mm latum, e phyllis multiseriatis coriaceis margine floccoso-tomentosis. *Phylla involucri* in spinam validam basi parum dilatatam et hic vel fere usque ad mediam spinulis paucis lateralibus ornatam abeuntia. *Flores* lutei, marginales steriles inconspicui non radiantes. *Pappus* duplex, scaber.
Typus: *Centaurea odyssei* Wagenitz (NW Turkey).
Further species: *C. xylobasis* Rech. f. (Samos); *C. speciosa* Boiss. (northern Palestine and Lebanon).

Centaurea speciosa has been placed in sect. *Acrocentron* (Cass.) DC. by Boissier (1875) and the same position has been suggested for the two other species. But the appendages are not decurrent with ciliate margins as in most species of sect. *Acrocentron* and the investigation of the pollen-morphology (Wagenitz, 1955) showed that the pollen of *C. odyssei* belongs to a type (*C. jacea*-type) not found in sect. *Acrocentron*. The spiny appendages are reminiscent of sect. *Mesocentron* (Cass.) DC. but this section consists of annual to biennial species with decurrent leaves. More nearly related are apparently sects. *Pseudoseridia* Wagenitz and *Cheirolepis* (Cass.) O. Hoffm.

Centaurea sericea Wagenitz, **sp. nov.** (Sect. *Cheirolepis* [Boiss.] O. Hoffm.)

Affinis *C. deflexae* Wagenitz, sed differt caule erecto, foliis integerrimis fere sericeis et appendicibus decurrentibus, irregulariter denticulatis.

Perennis. *Caulis* erectus, 20 cm altus, simplex. *Folia* omnia integra, tenuiter sericeo-tomentosa, inferiora anguste lanceolata, ad 9 mm lata, sensim in petiolo angustata, media et superiora lineari-lanceolata, media 45–50 mm longa, 2–3 mm lata. *Involucrum* 23 × 13 mm, fere cylindricum. *Appendices* phyllorum magnae, sed ungues phyllorum non omnino obtegentes, brunneae, marginem versus hyalinae, suborbiculares, paulum decurrentes, margine irregulariter denticulatae ciliis paucis ad 1 mm longis intermixtis, mucrone c. 1 mm longo terminatae. *Flores* et *achaenia* ignota. *Pappus* simplex, 13–14 mm longus, setis plumosis.
Turkey. B2 Balikesir: Dursunbey, 24 v 1947, *Sevim & Mehpave* (holo. E; iso. ISTO?, n.v.).

Only one sheet with a single specimen has been seen, but the species seems quite distinct. It is remarkable that the two related species, *C. deflexa* Wagenitz and *C. nivea* [Bornm.] Wagenitz, are also very rare.

PLATE I. Photograph of the type specimen of *Centaurea longifimbriata* Wagenitz.

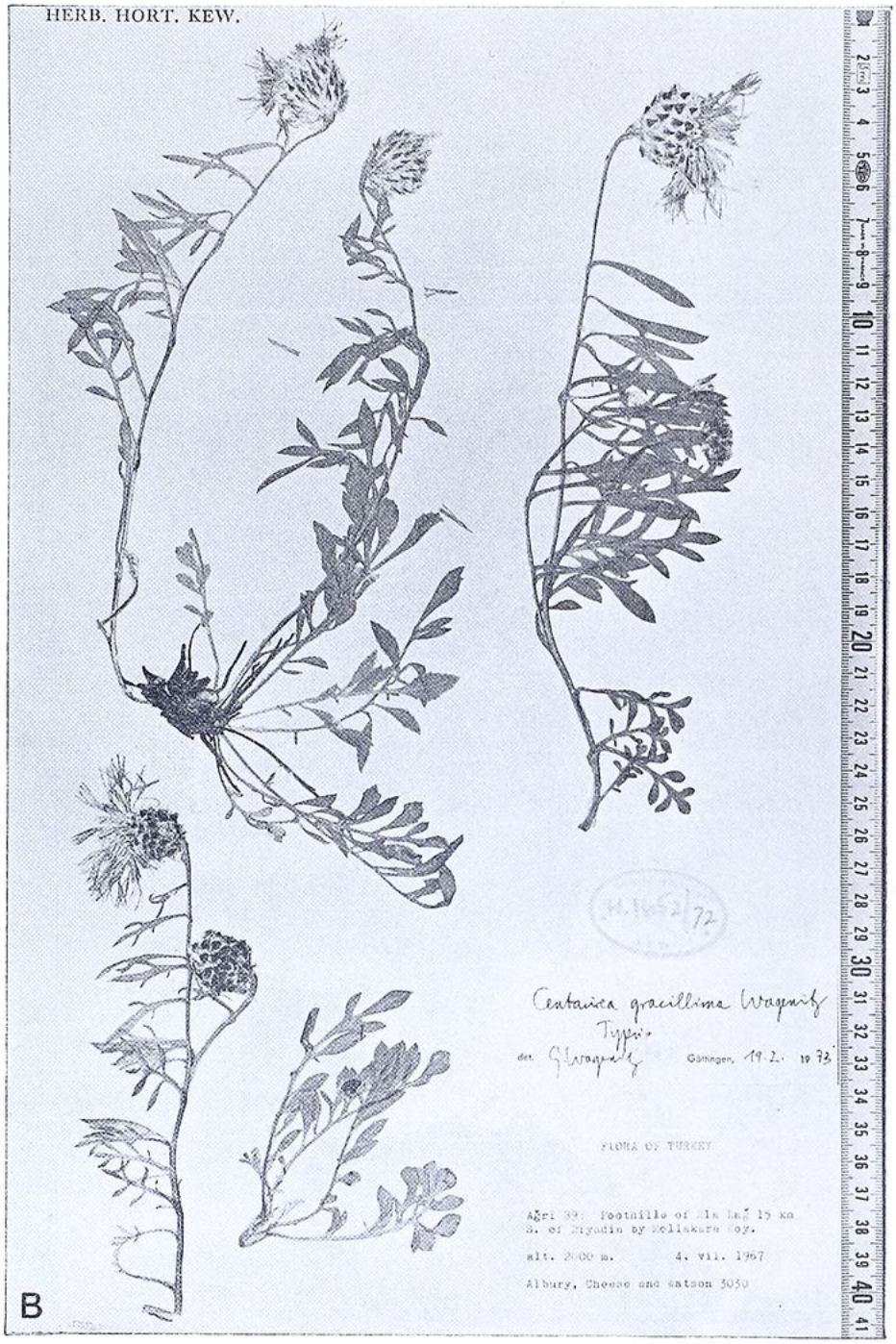

PLATE 2. Photograph of the type specimen of *Centaurea gracillima* Wagenitz.

Centaurea vanensis Wagenitz, **sp. nov.** (Sect. *Rhizocalathium* Tzvelev).

Affinis *C. ustulatae* DC., sed differt caule valde abbreviato (subnullo), involucro ultra 20 mm lato, ciliis appendicum utrinque plerumque 9–11 et pappo 1–2(2·5) mm longo.

Perennis. *Caulis* subnullus vel valde abbreviatus (ad 1–1·5 cm longus), simplex. *Folia* pilis septatis flexuosis ± dense obsita, ambitu late lanceolata, petiolata, interrupte pinnatipartita, laciniis numerosis, majoribus iterum pinnatipartitis vel -lobatis margine crispulis, segmentis c. 2 mm latis. *Capitulum* unicum; involucrum subglobosum, (18–)20–22 mm longum, (20–)24–28 mm latum. *Phylla* multiseriata, viridia. *Appendices* phyllorum mediorum atrobrunneae, ungues phyllorum pro parte obtegentes, triangulares, parum decurrentes, ciliis exclusis (3–)4–5 mm longae, (2·5–)3–4 mm latae, palmatim ciliatae, ciliis utrinque (4–)9–11, (3–)4–5 mm longis, mucro terminalis vix validior, (3–)4–6 mm longus, pilosae (glabrescentes). *Flores* e collectore albidi (eburnei), in sicco flavidi, marginales steriles non radiantes. *Achaenia* typi ignota [*Aucher* 4852: 4–4·5 mm longa, compressiuscula, hylo magno]. *Pappus* duplex setis scabris (1–)1·5–2(–2·5) mm longis, internis brevissimis, 0·5(–1) mm longis.

Turkey. B9 Van: 20 km from Hoşap to Başkale, 2750 m, SW stony slope N of pass, perennial, flowers creamy white, 9 vi 1966, *Davis* 44632 (holo. GOET; iso. E); Van, ad margines agrorum rare, alt. 5500 ped., iv 1849, *Noë* 130 (G); Van, vi 1912, *Kulzer* (WU). B10 Van: 6 km from Özalp to Saray, 2250 m, exposed steppe, 5 vi 1966, *Davis* 44289 (E); Özalp, 2200 m, metamorpher Kalk, 27 v 1966, *Eiselt* (W).

Iran. Prov. Azerbaijan: NW of Khoi, c. 1375 m, on dry stony ground, flower pale yellow, 22 v 1960, *Furse & Synge* 88 (K). Iran (?): in aridis Azerbidjani, *Aucher-Eloy* 4852 (G, K).

Centaurea vanensis is closely related to *C. ustulata* DC. and the two collections known to Boissier (*Noë*, *Aucher* 4852) have been assigned to *C. ustulata* by this author. But although the differential characters given above show some variation and are mostly quantitative, their combination allows a clear distinction in all plants seen. *C. vanensis* has a characteristic habit on account of the combination of the following characters: large capitula sessile and single in the rosette, leaves divided into linear segments, involucre spotted by the contrast of greenish phyllaries and blackish appendages. Specimens with exceptionally large appendages are reminiscent of *C. ispahanica* Boiss. (incl. *C. macrocarpa* Boiss.), but in this species the appendages are brown, the leaves are provided with a larger terminal segment and the pappus is longer.

Centaurea longifimbriata Wagenitz, **sp. nov.** (Sect. *Grossheimia* [Sosn. & Takht.] M. Dittrich.) Plate 1.

Partes subterraneae deficientes, e collectore perennis. *Caulis* erectus, c. 60–70 cm altus, superne ramosus, ramis 15–22 cm longis monocephalis, sub capitulo parum incrassatis. *Caulis* pilis articulatis sparsim hirsutus. *Folia* in sicco papyracea nervis vix prominulis, oculis nudis glabra, sub lente minute asperula pilis articulatis; folia caulina inferiora deficientes, cetera omnia similia oblongo-lanceolata, integerrima, sessilia (fere amplexicaulia), media c. 8–12 × 3–4 cm, summa parum minores capitula plus minusve involucrantia. *Involucrum* fere globosum, 20–25 mm longum latumque. *Phylla*

viridia, glabra, multiseriata. *Appendices* stramineae, magnae, ungues phyllorum fere occultantes, triangulares, ab unguibus phyllorum bene distinctae, non decurrentes, palmatim ciliatae, ciliis utrinque 8–10, 6–7 mm longis (cilium terminale ceteris vix longius vel brevius), in phyllis mediis ciliis exclusis c. 4 mm latae, 4–5 mm longae; in phyllis inferioribus erectae, in superioribus patentes vel reflexae. *Flores* lutei, marginales non radiantes. *Achaenia* immatura. *Pappus* duplex, scaber, externus multiseriatus ad 8 mm longus, internus paleaceus, 3 mm longus.
Turkey. C10 Hakkari: Sat Da., near Varegöz, 1750–1900 m, meadows, perennial, flowers yellow, 30 vi 1966, *Davis* 45742 (holo. E; iso. GOET); Yüksekova, 1820 m, dry grassland, vii 1965, *E. M. Rix* 191 (K).

The section *Grossheimia* was revised (as a separate genus) by Sosnovsky & Takhtajan in 1945. In this revision three species are recognised showing considerable variation in the structure of the appendages. Palmately ciliate appendages can be found in some variants of *C. polyphylla* Ledeb. (*C. ossica* C. Koch), but they are brownish and arachnoid in that species. Moreover, *C. longifimbriata* has more slender stems only slightly dilated below the capitula as compared with those of the other species.

Centaurea hakkariensis Wagenitz, **sp. nov.** (Sect. *Microlophus* [Cass.] DC.)
A speciebus sectionis differt appendicibus pro ratione magnis valde polymorphis, foliis tenuiter papyraceis.
Partes subterraneae deficientes, e collectore perennis. *Caulis* erectus ad 70 cm (e collectore ad 100 cm) altus, ramosus, ramis paucis, sparsim pilosus, in parte inferiore stramineus, in parte superiore viridis. *Folia* in sicco papyracea, nervus medianus solum prominens, facie pilis articulatis sparsis scabriuscula. *Folia inferiora* florendi tempore emarcida, evidenter lyrata et petiolata, media et superiora oblonga vel lanceolato-ovata, sessilia et breviter (vix 1 cm) decurrentia, suprema angustiora. *Involucrum* fere conicum, basi paulum umbilicatum, 23 × 15–17 mm. *Phylla* glabra, coriacea, ab externis triangularibus ad interna lineari-lanceolata sensim elongata. *Appendices phyllorum* deciduae, parvae (ungues phyllorum non obtegentes), exteriores stramineae, lanceolatae, spinulosae, mediae brunneae, late triangulares, cucullatae, palmatim spinulosae, spinulae 5–7, irregulares, terminalis ad 6, ceterae ad 4 mm longae; appendices phyllorum interiorum rotundatae, cucullatae, irregulariter laceratae vel spinulis singulis instructae. *Flores* lutei, marginales non radiantes, ceteris breviores, in lacinias 4–5 filiformes fissi. *Achaenia* immatura. *Pappus* duplex, scaber, externus multiserialis ad 7·5 mm longus, internus 1·5 mm longus.
Turkey. C10 Hakkari: Sat Da., near Varegöz, 1850 m, sloping meadows, perennial, flowers sulphur, 26 vi 1966, *Davis* 45575 (holo. E; iso. GOET, K); 27 km from Yüksekova to Şemdinli, 1850 m, rocky N slope, perennial, up to 1 m, in bud, 15 vi 1966, *Davis* 45065 (E, K).

As compared with the other species of the section the new one has relatively large appendages only approached by *C. polypodiifolia* Boiss. var. *pseudobehen* (Boiss.) Wagenitz. From the polymorphic *C. polypodiifolia*, *C.*

hakkariensis is easily distinguished by the texture of the leaves which are like thin paper (but brittle) when dry, while they are coriaceous with prominent nerves in *C. polypodiifolia*.

Centaurea ptosimopappoides Wagenitz, **sp. nov.** (Sect. *Ptosimopappus* O. Hoffmann).

Affinis *C. ptosimopappae* Hayek, sed differt foliis non coriaceis nervis lateralibus prominulis, pappo 1·5 mm longo persistente et habitu humiliore suffruticoso.

Partes subterraneae deficientes, sed planta evidenter suffruticosa, 35 cm alta (vel altior?). Partes basales lignosae rosulis foliorum et caulibus erectis vel ascendentibus instructae. *Caules* glabrescentes, simplices vel in parte superiore ramosi. *Folia* omnia integra, rigide chartacea, nervis prominulis, lamina glaberrima, marginibus tomentosulis; basalia et inferiora lanceolata, sensim in petiolum angustata, petiolo incluso 10–13 cm longa, 1–2 cm lata, superiora anguste lanceolata, minora, basi angustata sed non distincte petiolata. *Involucrum* 18–22 × 9–11 mm, ovoideum. *Phylla* straminea, coriacea, superficie glabra, apicem et marginem versus tomentosula, ab externis triangularibus ad interna fere linearia elongata, mucrone breve (0·5–1·5 mm longo) terminata. *Flores* lutei, marginales steriles non radiantes laciniis filiformibus. *Achaenia* 5–5·5 mm longa; *pappus* 1·5 mm longus e setis scabris internis non distinctis.

Turkey. C5 Adana: Karsanti, Pos—Sofulu, 13 vii 1972, *E. Yurdakul* 78 (holo. E); Karsanti—Pos ormani Egni Bol, Serpentine, c. 1000 m, 24 vi 1973, *E. Yurdakul* 33 (in herb. Hub.-Mor.).

This is the second species of the hitherto monotypic section *Ptosimopappus*. While the type species *C. ptosimopappa* Hayek is endemic to the Amanus and Cassius mountain-ranges, *C. ptosimopappoides* seems to be confined to the southern slopes of the Anti-Taurus. Although clearly related to C. *ptosimopappa*, the new species is not very different in its characters from sect. *Microlophus*, thus bridging the gap between the two sections.

Centaurea gracillima Wagenitz, **sp. nov.** (Sect. *Psephelloideae* [Boiss.] Sosn.) Plate 2.

Affinis *C. taochiae* Sosn., sed differt foliis pinnatisectis, appendicibus lanceolatis vel ovatis, ciliis 15–20 utrinque ornatis, in parte centrali brunneis.

Perennis, caulibus extrarosularibus decumbentibus, 16–22 cm longis, simplicibus vel ramis 1–2 instructis. *Collum caulis* reliquiis vaginarum foliorum obtectum. *Folia* tenuiter cano-tomentosa, glabrescentia; folia rosularia pinnatisecta, petiolata, 7–10 cm longa, 3–5-juga, segmentis lateralibus oblongis vel lanceolatis, integris vel denticulatis, 3–6 mm latis (rarius p.p. lobatis lobis 1–2); folia caulina inferiora et media pinnatisecta, 1–3-juga (inferiora minora), segmentis late-lanceolatis integris, 1·5–3 mm latis, folia superiora mediis similia vel integra, lineari-lanceolata. *Involucrum* subglobosum, c. 18 mm longum et 15–19 mm latum. *Phylla* multiseriata. *Appendices* phyllorum magnae, ungues phyllorum obtegentes, ab unguibus bene distinctae (non decurrentes), ovatae vel lanceolatae, pars centralis

earum 5 × 4 mm vel 5–6 × 2·5–3 mm, brunneae, cilia utrinque 15–20, albida, 2·5–3 mm longa, mucro terminalis 0·5–1·3 mm. *Flores* roseo-purpurei, marginales valde radiantes, laciniis 5 lineari-lanceolatis, staminodiis in tubo instructis. *Achaenia* immatura. *Pappus* duplex, multiseriatus, scaber, externus ad 3·5 mm, internus 2 mm longus.
Turkey. B9 Ağri: foothills of Ala Dağ, 15 km S of Diyadin by Mollakara Köy, 2000 m, 4 vii 1967, *Albury, Cheese & Watson* 3030 (holo. K).

A very handsome species showing some affinity to *C. taochia* but clearly distinct. There is a remarkable variability of the appendages in the three specimens of the type-sheet, from broadly ovate to lanceolate.

Centaurea holtzii Wagenitz, **sp. nov.** (Sect. *Psephelloideae* [Boiss.] Sosn.)
A speciebus alteris sectionis differt caulibus humilibus dense foliatis, foliis omnibus integris dense flavo-tomentosis.
Perennis, rhizomate lignoso ramoso. *Caules* ascendentes (rarius fere erecti) vel decumbentes, humiles, 7–16 cm longi, simplices, tomentosi, dense foliati. *Folia* dense flavo-tomentosa, inferiora et media late lanceolata vel elliptica (et minute mucronata), superiora lanceolata; inferiora petiolata petiolo 1·5–2 cm longo, lamina ad 2·7 cm lata, 6 cm longa, basalia paulum minora, caulina media et superiora sensim diminuta, subsessilia, suprema sub involucro inserta. *Involucrum* subglobosum vel ovoideum, 20–23 mm longum, 16–22 mm latum. *Phylla* multiseriata, glabra, ab appendicibus omnino tecta. *Appendices phyllorum* magnae, ab unguibus bene distinctae (non decurrentes), stramineae (apicibus ciliorum brunneis), ovatae, pars centralis earum 4–5 mm latae, 6–7 mm longae, cilia utrinque 12–13, 2·5–3·5 mm longa, mucro terminalis aequilongus. *Flores* rosei, marginales radiantes, involucrum c. 15 mm superantes, laciniis 5–7, staminodiis in tubo instructi. *Achaenia* compressa, 7·5–8 mm longa, 4·5 mm lata. *Pappus* duplex, multiseriatus, brunneus; externus e setis scabris ad 6 mm longis, internus e paleolis 4·5 mm longis constans.
Turkey. C6 Maraş: Osthang der Kuyun olugu Da. westlich Tekir an der Straße Maraş—Göksun, 1420 m, sandiger Hang in lichtem *Pinus*-Wald, 16 vii 1973, *F. Holtz* 711, *P. Hänel, Kesercioğlu* (holo. GOET; iso. EGE, herb. F. Holtz).

Although clearly a member of sect. *Psephelloideae* this new species seems to have no close relative. The appendages are rather similar to those of *C. taochia* Sosn., but vegetatively *C. holtzii* is very different from this and in fact all other species of the section on account of the dense foliage of entire broadly lanceolate and yellowish tomentose leaves. A further notable character is the size of the achenes. Apart from the widespread *C. mucronifera* DC. this is the southernmost species of sect. *Psephelloideae*.

Centaurea huber-morathii Wagenitz, **sp. nov.** (Sect. *Psephelloideae* [Boiss.] Sosn.)
A speciebus affinibus sectionis differt characteribus in tabula sequentia indicatis.

	Indumentum foliorum	Folia inferiora	Appendices phyllorum mediorum	Cilia appendicum
C. huber-morathii Wagenitz	tomentosum	pinnati-partita	magnae, sub-orbiculares vix decurr-entes	1-1.5 mm longa
C. pergamacea DC.	laxe pilosum	pinnati-partita	magnae, sub-orbiculares breviter decurrentes	0-0.5 mm
C. schischkinii Tzvelev	laxe pilosum	pinnati-partita (sublyrata)	magnae, sub-orbiculares vix decurr-entes	3-5(-6) mm
C. bornmuelleri Hausskn.	tomentosum	pinnati-partita vel lyrata (vel p.p. integra)	mediae, semi-lunares, breviter decurrentes	2.5-4 mm
C. brevifimbriata Hub.-Mor.	tomentosum	lyrata	parvae, semi-lunares parum decurrentes	0.3-0.5 mm

Perennis. Caulis erectus, 50–60(–65) cm altus, simplex vel ramis duobus longis instructus, tenuiter tomentosus. *Folia* modice dense adpresse floccoso-tomentosa; basalia florendi tempore iam emarcida, inferiora et media pinnatifida: fere usque ad rhachim in segmenta utrinque 6–8(–9) (in foliis inferioribus) ad 3–4 (in foliis mediis) divisa, segmenta lineari-lanceolata [pro parte basi lacinia ornata], secus rhachim anguste decurrentia, c. 30–45 mm longa et 7–11 mm lata, apicem folii versus paulum decrescentia, segmentum terminale segmentis lateralibus simile vel (in foliis mediis) parum major, folia superiora oblanceolata basin versus saepe in latere uno 1–2 laciniis instructa. *Capitula* in apice caulis et ramorum superne nudorum singula, floribus inclusis c. 3·5 (–6) cm lata. *Involucrum* oblongum (vel subglobosum), basi truncatum, 25–(30–33) mm longum, 18–19(–30) mm latum. *Phylla* multi-seriata, glabra, viridia, ab appendicibus omnino tecta. *Appendices* magnae, hyalinae, albidae vel dilute brunneae, in phyllis mediis fere orbiculares, c. 11(–15) mm longae, 10(–13) mm latae, ciliatae ciliis numerosis 1–1·5 mm longis mucro terminalis vix validior, appendices phyllorum internorum minores, albidae, lanceolatae. *Flores* (e collectore) dilute carneo-lilacini, marginales steriles modice radiantes laciniis 6 lanceolatis, staminodiis filiformibus ornati. *Achaenia* immatura. *Pappus* duplex, externus multiseriatus e setis scabris usque ad 11(–13) mm longis, internus 4(–5·5) mm longus, fere squamosus.

Turkey. B7 Erzincan: 30·5 km von Erzincan auf der Straße nach Gümüşane, beim Karayollari ahmediye bakimevi, 2050 m, Wegböschung, 16 vii 1969, *K. P. Buttler* 14094 (holo. GOET; iso. herb. Buttler, n.v.); Erzincan—Kelkit, Sipikör Da., Wiese auf der Paßhöhe, 2000 m, 18 vii 1958, *Huber-Morath* 16036 (herb. Hub.-Mor.)

I am glad to have the opportunity to name this stately species after its discoverer, Dr A. Huber-Morath (Basel), who has done so much for our knowledge of the Turkish flora. Most of the figures given in brackets in the description refer, not to the type collection, but to the Huber-Morath gathering.

Centaurea poluninii Wagenitz, **sp. nov.** (Sect. *Amblyopogon* [DC.] Sosn.)

Affinis *C. karduchorum* Boiss., sed differt caulibus valde abbreviatis, appendicibus late ellipticis, pappo nullo vel brevissimo.

Perennis, rhizomate lignoso crasso, reliquiis brunneis basium petiolorum obtecto, pulvinum formans. *Caulis* nullus vel subnullus. *Folia* adpresse cano-tomentosa, longe petiolata, petiolo incluso 3–4 cm longa, pinnatisecta, 1–3-juga, segmentis oblongis vel fere orbiculatis, 3–7 mm latis, segmentum terminale paulo major, rarius folia indivisa late obovata. *Involucrum* ovatum, c. 17–19 mm longum, 10 mm latum. *Appendices* pro ratione magnae, ungues phyllorum omnino obtegentes, distinctae (non decurrentes), pars centralis earum late elliptica, c. 4–5 mm longa, 3–4 mm lata, hyalina, albida (in phyllis internis brunnescens), circumcirca ciliata, ciliis 20–22, 2–3 mm longis. *Flores* rosei, marginales parum radiantes, laciniis 7–8, tubus florum marginalium staminodiis instructus. *Achaenia* immatura 5–6 mm longa, pappus nullus vel brevissimus (0·2–0·3 mm.).

Turkey. B/C9 Van: distr. Başkale, Ispiriz Da., 3300 m, screes, 31 vii 1954, *Davis & O. Polunin, D.* 23765 (holo. E; iso K).

A very distinct species; the capitula are nearly hidden among the leaves, the branches of the rhizome clothed with the remains of leaf-sheaths and involucres of the previous year.

Named after one of its discoverers, Mr Oleg Polunin, well known as a collector in various areas of Europe and Asia and for his excellently illustrated books on flowers of Europe.

Centaurea tardiflora Wagenitz, **sp. nov.**

Partes subterraneae deficientes, verosimiliter perennis. *Caulis* erectus 38 cm altus, in parte superiore ramo unico instructus. *Folia* margine scabra, facie sparsissime araneosa; basalia et inferiora oblonga, obtusa, petiolata, cetera oblongo-lanceolata vel fere lingulata, sessilia, in alis vix 2-3 mm latis decurrentia (folium medium 8 cm longum, 1·5 cm latum), folia suprema linearilanceolata, 5 mm lata. *Involucrum* 22 mm longum, 14 mm latum, fere cylindricum. *Phylla* straminea (virescentia), c. 5-seriata. *Appendices* minutae, ± rectangulares, 1·5–2 mm latae, 1 mm longae, apicem versus fimbriis minutis ornatae, stramineae. *Flores* lutei, marginales non radiantes, ceteris breviores, laciniis filiformibus. *Achaenia* immatura. *Pappus* duplex e setis barbellatis cito deciduis, externus 9–11 mm, internus 1·5 mm longus.

Turkey. C10 Hakkari: Yüksekova, 1950 m, dry waste ground, yellow flowers, many large and small plants, 5 ix 1967, *Duncan & Tait* 172 (holo. E).

An isolated species which cannot satisfactorily be fitted into any of the existing sections of the genus. It is perhaps closest to Sect. *Chartolepis*, but the very small minutely fimbriate appendages are quite aberrant for this group. So far only one sheet is known. The name alludes to the late flowering-time of the plant.

NEW NAMES AND NEW COMBINATIONS

Centaurea sipylea Wagenitz, **nom. nov.**

Syn.: *Centaurea goniocaula* Boiss., Fl. Or. 3:647 (1875) non *C. goniocaulon* (DC.) Schultz-Bip. in Linnaea 19:325 (1847).

In analogy to the examples cited in Art. 75 of the *International Code of Botanical Nomenclature* the specific epithets "*goniocaula*" and "*goniocaulon*" are to be treated as orthographic variants and hence as homonyms; a new name is therefore necessary.

Centaurea deflexa Wagenitz, **nom. nov.**

Syn.: *Phaeopappus declinatus* Boiss., Fl. Or. 3:395 (1875) non *C. declinata* M. Bieb. 1819.

Cheirolepis declinata (Boiss.) Czerep. in Notul. Syst. (Leningrad) 20: 471 (1960).

Centaurea nivea (Bornm.) Wagenitz var. *declinata* (Boiss.) Wagenitz in Bot. Jahrb. 82:172 (1963).

During the revision of the *Centaurea* species for *Flora of Turkey*, no material has been seen bridging the morphological (and geographical) gap between *C. nivea* var. *nivea* and var. *declinata* as conceived in our earlier revision (Wagenitz, 1963), but a further allied taxon (*C. sericea* Wagenitz, see above) has been found. At the present state of knowledge it seems to me inevitable to treat all of them as separate species, making a new name necessary for var. *declinata* at specific level.

Centaurea polypodiifolia Boiss. var. **szovitsiana** (Boiss.) Wagenitz, **comb. et stat. nov.**

Syn.: *Centaurea szovitsiana* Boiss., Fl. Or. 3:683 (1875).

var. **pseudobehen** (Boiss.) Wagenitz, **comb. et stat. nov.**

Syn.: *C. pseudobehen* Boiss., Diagn. ser. 1, 6:126 (1845).

In view of the considerable variability of *C. polypodiifolia* Boiss. and the occurrence of intermediates between the three species described by Boissier, I found it impossible to maintain these three entities as separate species. The varietal status was chosen because there is no clear geographical or ecological differentiation, although the two new varieties are more restricted in distribution than var. *polypodiifolia.*

Centaurea solstitialis L. subsp. **pyracantha** (Boiss.) Wagenitz, **comb. et stat. nov.**

Syn.: *C. pyracantha* Boiss., Fl. Or. 3:685 (1875).

subsp. **carneola** (Boiss.) Wagenitz, **comb. et stat. nov.**

Syn.: *C. carneola* Boiss., Diagn. ser. 2, 3:83 (1856).

C. pyracantha is distinguished by the shorter and more slender spines with a reddish tinge; intermediates between *C. pyracantha* and *C. solstitialis* s. str. are not uncommon. *C. carneola* is likewise very similar to *C. solstitialis* but has rose-coloured flowers. A recent gathering by Sorger shows a remarkable variation in flower colour, perhaps due to hybridization.

Centaurea calcitrapa L. subsp. **cilicica** (Boiss. & Bal.) Wagenitz, **comb. et stat. nov.**

Syn.: *C. cilicica* Boiss. & Bal. in Boiss., Diagn. ser. 2, 5:113 (1856).

Typical plants of "*C. cilicica*" have a characteristic slender habit with very narrow capitula, but the differences are only quantitative and intermediates occur.

Centaurea aegialophila Wagenitz, **nom. nov.**

Syn.: *Aegialophila cretica* Boiss. & Heldr. in Boiss., Diagn. ser. 1, 10:106 (1849).

Centaurea cretica (Boiss. & Heldr.) Nyman, Syll. Fl. Europ. 34 (1854) nom. illeg. (non *C. cretica* [L.] Sprengel 1826).

A new name is necessary for this species as *C. cretica* is illegitimate, being a later homonym of *C. cretica* (L.) Sprengel. *C. aegialophila* has been used by Boissier as a manuscript-name but was to my knowledge so far only published as a synonym and has to be validated.

C. aegialophila is known in Turkey from a small area on the coast of southern Turkey between Antalya and Alanya. The Turkish populations are more variable than those of Crete and Cyprus and may approach *C. pumilio* L. in some characters. A thorough study of these species may prove that they are only recognizable at subspecific level.

Centaurea hedgei Wagenitz, **nom. nov.**

Syn.: *Psephellus taochius* Sosn. in Grossh., Fl. Kavk. 4:202 (1934).

Centaurea taochia (Sosn.) Sosn. in Fl. URSS 28:435 (1963), nom. illeg. (non *C. taochia* Sosn. 1931).

Named after Mr I. C. Hedge (Edinburgh), the well-known taxonomist and specialist on the family Labiatae, who together with P. H. Davis collected this species for the first time since its discovery in 1903.

Centaurea pulcherrima Willd. var. **freynii** (Sint.) Wagenitz, **comb. et stat. nov.**

Syn.: *Centaurea freynii* Sint. in Freyn in Bull. Herb. Boiss. 3:472 (1895).

Psephellus freynii (Sint.) Bornm. in Feddes Rep. Beih. 89:371 (1944).

C. pulcherrima is a very variable species in Turkey and Caucasia and it is doubtful if the allied "species", mostly described in the genus *Aetheopappus* (Sosnowsky 1953), really merit specific rank. *Centaurea freynii* was described as a member of sect. *Psephelloideae*, but it is clearly the same as this species on account of the characters of the involucre and the pappus (barbellate, inner row not differentiated).

Centaurea cheiranthifolia Willd. var. **purpurascens** (DC.) Wagenitz, **comb. nov.**

Syn.: *Centaurea montana* L. var. *purpurascens* DC., Prodr. 6:579 (1838).

C. fischeri Willd., Enum. Hort. Berol. Suppl. 61 (1813).

This purple-flowering variety tends to have larger capitula and a slightly shorter pappus, but all these characters are very variable.

Centaurea pichleri Boiss. subsp. **extrarosularis** (Hayek & Siehe) Wagenitz, **comb. et stat. nov.**

Syn.: *C. extrarosularis* Hayek & Siehe in Ann. Nat. Hofmus. Wien 28:170 (1914).

C. iconica Hub.-Mor. in Bauhinia 3:317 (1967).

Subsp. *extrarosularis* differs from the type by quantitative characters: smaller involucre (11–15 × 7–9 mm), shorter cilia of the appendages (1–2 mm long) and only slightly radiant marginal flowers. In view of the general variability of these characters and the occurrence of intermediate specimens, I can recognize these plants only as subspecies. No good characters have been found which allow us to distinguish between the high-alpine plants from Ala Da., the type-locality, and the steppe-plants from near Konya from where *C. iconica* has been described, but more material is needed.

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Chondrilla

J. M. Lamond & V. A. Matthews

Chondrilla spinosa Lamond & Matthews, **sp. nov.** Fig. 2.

Species insignis, suffruticoso-spinosa, a speciebus alteris valde distincta; achenia apice haud squamosa, rostro basi denique deciduo.

Suffrutex perennis pulvinum hemisphaericum intricate ramosum c. 30 cm diam., 14–20 cm altum formans. *Caudex* ramoso-lignosus reliquiam petiolorum veterum obtectus. *Caules* erecti aphylli rigentes glabri ± laeves, persistentes. *Folia* omnia basalia 3·5–7·5 cm longa (petiolo incluso), 0·2–0·5 cm lata, glabra glauca anguste oblanceolata irregulariter lobata, aliquot lobis

triangularibus apice acuta, in petiolum angustum attenuata, basi expansum validumque. *Inflorescentia* compluriens late ramosa circa medium caulis, ad furcas bracteata. *Pedunculi* lati patuli usque arcuato-ascendentes (1–)3–4(–7) cm longi, ± glabri rigidi persistentes et spinescentes. *Capitula* solitaria 10–15-flora. *Involucrum* ± anguste campanulatum. *Phyllaria* c. 13–15, 2(–3)-seriata, extus pilis patulis pallide viridibus obsita, interius glabra, apicibus minute albo-pubescentibus; phyllaria externa c. 7, imbricata, 1·5–3 mm longa ± ovato-triangularia; phyllaria interiora 6–8, 7–10 mm longa, 1·25–1·5 mm lata, ± lanceolata atroviridia, ad marginem saepe membranacea. *Receptaculum* ± planum glabrum. *Corollae* 12–16 mm longae luteae glabrae; ligulae 10–12·5 mm longae, 2–2·5 mm latae. *Antherae* c. 4 mm longae, basi ± sagittatae. *Stylus* c. 11 mm longis pubescens (ramis styli luteis 1·5–2 mm longis). *Achenia* 4·5–5·5 mm longa (rostro excluso) glabra teretia straminea vel hinnuleia, 5-costata, costis 3–striatis, apice haud squamosa; rostrum 1·25–1·5 mm longum, pallidum, basi manifeste articulatum, denique deciduum, supra in discum pappi c. 0·5 mm expansa. *Pappus* albus, ± copiosus, pilis 4–5·5 mm longis, minute scabridulis, 1-seriatus.
Turkey. B9 Van: d. Başkale, Ispiriz Da., 3300 m, limestone screes, 31 vii 1954, *Davis & Polunin*, *D.* 23767 (holo. E; iso. K, BM); d. Gevaş, Artos Da., 3505 m, scree, 15 vii 1954, *Davis* 22807.

The new species is a high alpine plant of E Turkey, so far known only from two localities where it forms conspicuous spiny domes on scree. The stems and spinose peduncles which persist for several years are initially glabrous but eventually become covered in often delicate fibrous remains resembling a pilose indumentum. This type of habit is known in several other genera of the Cichorioideae e.g. *Lactuca intricata* Boiss. from S Albania, Greece and W Turkey, the W Mediterranean *Launaea acanthoclada* Maire and *Cichorium spinosum* L. from N Mediterranean coasts and islands, although the fibre remnants are not always evident.

The plant was originally thought to be a *Crepis*. The presence of few-flowered capitula and few-ribbed and distinctly beaked achenes, although unusual in long-lived perennials of that genus, is by no means exclusive and the species of Sect. *Ixeridopsis* Babcock display all these characters. However, in *Crepis* the achene beak is never a separate structure; when present it is always a gradual attenuation of the fertile section of the achene with no truncate or 'shouldered' part and no articulation. In the new species the beak is clearly differentiated from the body of the achene, breaking away from it at the base with great ease and dispersing separately with the pappus. This is not known to occur in over 200 species of *Crepis*, and on this technical character it was decided to exclude the new species from *Crepis*.

At this stage the relationship of the new plant to *Chondrilla* was considered. In most species of this genus the top of the achene bears a corona of short scales which normally hide the base of the beak (if the latter is present). However, these scales are occasionally absent, so the new plant, which lacks scales, cannot be excluded from *Chondrilla* on this character. Mature achenes of *Chondrilla spinosa* examined at a magnification of × 20 show a tendency to produce obscure protuberances near the apex. It is not clear whether these represent the remains of reduced scales (or their initiation?) or whether they are produced by shrinkage of the achene on drying.

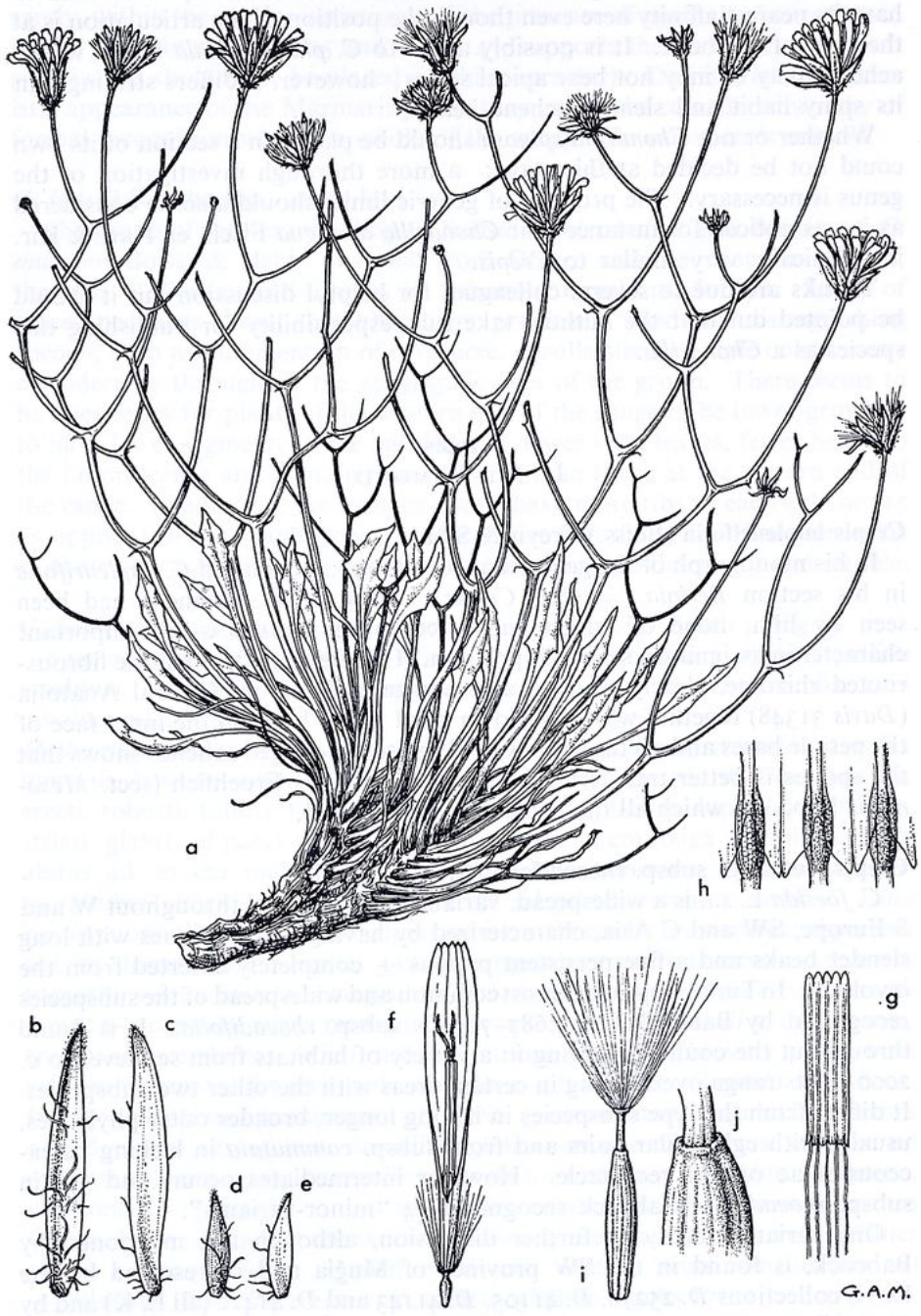

FIG. 2. *Chondrilla spinosa* Lamond & Matthews: a, habit × $\frac{2}{3}$; b-c, inner phyllaries, dorsal and ventral surfaces × $3\frac{1}{3}$; d-e, outer phyllaries, dorsal and ventral surfaces × $3\frac{1}{3}$; f, flower × $3\frac{1}{3}$; g, anther-tube × $4\frac{1}{3}$; h, detail of anther bases × c. 30; i, achene and pappus × 4; j, detail of base of beak of achene × 10.

Sect. *Arthrorynchus* Fisch. & Mey. of *Chondrilla* contains C Asiatic species all of which possess beaks jointed a little above the base; *C. spinosa* seems to have its nearest affinity here even though the position of the articulation is at the base of the beak. It is possibly allied to *C. phaeocephala* Rupr. whose achenes may or may not bear apical scales; however, it differs strikingly in its spiny habit and slender achene beak.

Whether or not *Chondrilla spinosa* should be placed in a section of its own could not be decided at this stage; a more thorough investigation of the genus is necessary. The problem of generic limits should also be considered as it was noticed for instance that *Chondrilla ambigua* Fisch. ex Kar. & Kir. is technically very similar to *Crepis*.

Thanks are due to several colleagues for helpful discussion but it should be pointed out that the authors take full responsibility for publishing this species as a *Chondrilla*.

Crepis

J. M. LAMOND

Crepis bupleurifolia (Boiss.) Freyn & Sint.

In his monograph of the genus, Babcock (1947:451) placed *C. bupleurifolia* in his section *Berinia* (= sect. *Crepis*). Only three specimens had been seen by him, none of which had a complete rootstock—an important character in assigning a sectional position. The presence of a definite fibrous-rooted rhizome, clearly seen on a recent gathering from Central Anatolia (*Davis* 31348) together with the brown wool found both on the inner face of the petiole bases and on the caudex, and the 5(–10)-ribbed achenes shows that the species is better transferred to sect. *Hieracioides* Froehlich (sect. *Mesomeris* Babc.) in which all these characters are found.

Crepis foetida L. subsp. **rhoeadifolia** (M. Bieb.) Čelak.

C. foetida L. *s.l.* is a widespread, variable annual found throughout W and S Europe, SW and C Asia, characterized by having inner achenes with long slender beaks and a fine persistent pappus ± completely exserted from the involucre. In Turkey, by far the most common and widespread of the subspecies recognized by Babcock (1947:687–705) is subsp. *rhoeadifolia*. It is found throughout the country growing in a variety of habitats from sea level to c. 2000 m, its range overlapping in certain areas with the other two subspecies. It differs from the type subspecies in having longer, broader outer phyllaries, usually with eglandular hairs and from subsp. *commutata* in lacking paleaceous setae on the receptacle. However intermediates occur, and within subsp. *rhoeadifolia* Babcock recognized 14 "minor-variants".

One variant worthy of further discussion, although not mentioned by Babcock, is found in the SW province of Muğla and represented by the Davis collections *D.* 25276, *D.* 41105, *D.* 41143 and *D.* 41412 (all E, K) and by *Fitz & Spitzenberger*, 23 iv 1969 s.n. (W). All are from limestone or serpentine habitats on the Marmaris peninsula, growing from 20–100 m above sea level. The plants have comparatively large capitula (involucres c. 10 mm, corollas 14–19 mm) and phyllaries with a dense indumentum of long, shaggy, eglandular hairs. In addition *D.* 41105 p.p., *D.* 41143 p.p. and *D.* 41412 have pale,

unbeaked or more coarsely beaked, spiculate achenes with 5 conspicuous ribs and a minute pappus. (Epappose achenes are already known, though rarely, within the species variation and the presence of normal achenes in two of the gatherings, *D.* 41105 and *D.* 41143, supports the view that too much significance should not be placed on this character). Despite the characteristic appearance of the Marmaris plants they cannot be considered worthy of formal recognition when the whole of the subspecific variation is studied.

C. fraasii Schultz Bip. sensu lato.

The group of species including *C. fraasii*, *C. hierosolymitana* Boiss. and *C. mungieri* Boiss. & Heldr. is found from Greece and the Aegean islands, through W Turkey and Cyprus to Lebanon, Israel and Jordan. Study of these specimens shows that characters previously used for distinguishing species, such as indumentum of involucre, corolla size and style colour, vary considerably throughout the geographic area of the group. There seems to be a tendency for plants at the western end of the range to be lower-growing, to have fewer segments to the basal leaves, fewer stem leaves, fewer heads to the inflorescence and contain fewer flowers than those at the eastern end of the range. In addition, the western plants have more ribs to each achene (15 as opposed to 5–10) and appear to flower later in the year. However, none of these characters is consistent and further study on the group is desirable.

C. hakkarica Lamond, **sp. nov.** (Sect. *Soyeria* (Monn.) Benth.) Fig. 3.

Species affinis *C. conyzifoliae* (Gouan) Dalla Torre sed involucris pallide viridibus, phyllariis externis proprie pectinatis et indumento caulis, folii involucrique differt.

Herba perennis, 55–75 cm alta, ut videtur radice palari ± robusta. *Caudex* lignosus, basibus veteribus petiolorum cauliumque praeditus. *Caules* pauci, erecti, robusti, foliosi, fistulosi, inferne pallidi, ± laeves, superne virides, ± striati, glabri vel parce pilosi. *Folia basalia* ad 33 cm longa (petiolis anguste alatus ad 20 cm inclusis), laminis simplicibus obovatis apicibus obtusis marginibus irregulariter dentatis, glabris vel pilis brevissimis vestitis. *Folia caulina* nonnulla, inferiora basalibus similia sed petiolis brevioribus; superiora sensim decrescentia, sessilia, ovata-triangularia, apicibus acutis, ad bases truncata vel auriculata, marginibus interdum integris. *Inflorescentia* racemosa, 2–5-capitata, supra medium caulis ramificans. *Pedunculi* 5–15 cm longi, erecti vel ascendentes, validi, fistulosi, striati, glabri vel breviter pilosi, cum vel sine paucis validis setis, sub capitulis 1–4 bracteati. *Capitula* c. 85-flora. *Involucrum* late campanulatum; phyllaria ± lanceolata-triangulata, exteriora 5–7, 8·5–15 × 2·5–5 mm, dorsaliter glabra, minute tomentosa vel raro ad medium sparsim setosa, ventraliter minute tomentosa, marginibus pectinatis, interiora 12–15, 15–19 × 3–5 mm, extra tomentosa ad medium interdum setosa, intus ± glabra, nitida, marginibus ± scariosis, glabris vel subtiliter pilosis. *Receptaculum* ± planum alveolis ciliatis, extra tomentosum vel ± villosum. *Corollae* 2·6–2·9 cm, aureae, glabrae, ligulis 17–21 × 2·4–5 mm. *Antherae* 6·5–7·5 mm longae. *Styli* 1·9–2·1 cm, ramis 4·5–5 mm longis flavis inclusis. *Achenia* (vix matura) 9–10 × 1·5–3 mm, superne breviter attenuata, ad bases ± truncata, ferruginea, c. 20-costata, glabra vel superne minute tomentosa. *Pappus* ± copiosus, eburneus, ± persistens?, setis 6–12 mm longis inaequalibus barbellis minutis sub lente vix manifestis instructis.

FIG. 3. *Crepis hakkarica* Lamond; a, habit × $\frac{2}{3}$; b-c, outer phyllaries, dorsal and ventral surfaces × $1\frac{1}{2}$; d-e, inner phyllaries, dorsal and ventral surfaces × $1\frac{1}{2}$; f, flower × $1\frac{1}{2}$; g, anther-tube × 5; h, achene and pappus × $2\frac{1}{2}$.

Turkey C10 Hakkari: Cilo Da. above Diz deresi, 2440 m, rocky slope, few-stemmed perennial, erect, 7 viii 1954, *Davis & O. Polunin, D.* 23949 (holo. E; iso. BM, K); Cilo Da., in gorge between Cilo Ya. and Diz deresi, 2440 m, *Davis* 24255 (E, BM).

C. hakkarica differs from all other species of the genus examined in the distinctive pectinate margins of the outer phyllaries. From *C. conyzifolia* (Gouan) Dalla Torre of C & E Europe, Caucasia and NE Turkey it differs in having pale green involucres without a fuscous indumentum, long-petiolate basal leaves and generally larger capitula. In size of capitula it resembles *C. pontana* (L.) Dalla Torre from the European Alps, generally a single-headed plant. *C. hakkarica* also resembles *C. sibirica* L. in section *Hapalostephium* (D. Don) Froehlich in type of branching and size of involucres, but differs in indumentum and pappus characters and in the absence of a rhizome. At present only known from the two cited gatherings, more material with completely mature achenes is desirable.

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Echinops

I. C. HEDGE

Echinops, in common with many Turkish genera of Compositae, is very inadequately known. Most of its species are well-armed with sturdy spines and prickles, are neither easy nor pleasant to press, and consequently herbarium material is often sparse and far from adequate. The main characters used in the classification of the species are: indumentum, capitulum size, phyllary shape and length, the density and length of the brush (penicillus) and the degree of fusion of the innermost phyllaries. The range of variation of these characters within individual populations of a species is not known but may, judging from herbarium material, be considerable. One almost completely neglected character in the genus is the achene. This might prove to be a more reliable feature in classification than some of the others but mature achenes are hardly ever present on herbarium specimens; by the time mature fruit is developed, the heads have usually disintegrated and fallen to the ground.

Echinops melitenensis Hedge & Huber-Morath, **sp. nov.** (Sect. *Oligolepis* Bge.) Fig. 4.

Herba perennis, 15–30 cm alta. *Caulis* simplex vel pauciramosus, ramis 4–9 cm longis, inferne c. 4–5 mm latus, tota longitudine foliatus, prominenter sulcato-striatus, omnino albo- vel griseo-floccoso-tomentosus, pilis mollibus tenuissimis adpressis et pilis glanduliferis longis patentibus in parte superiore copiose provisus. *Folia* basalia et caulina inferiora desunt. Folia in sicco omnia crasse rigida, discoloria, valde armata, ambitu obtrullata vel triangulari-ovata, nervis subtus valde prominentibus; folia caulina sessilia, semi-amplexicaulia, ad 24 × 10 cm, irregulariter pinnatifida, infra medium

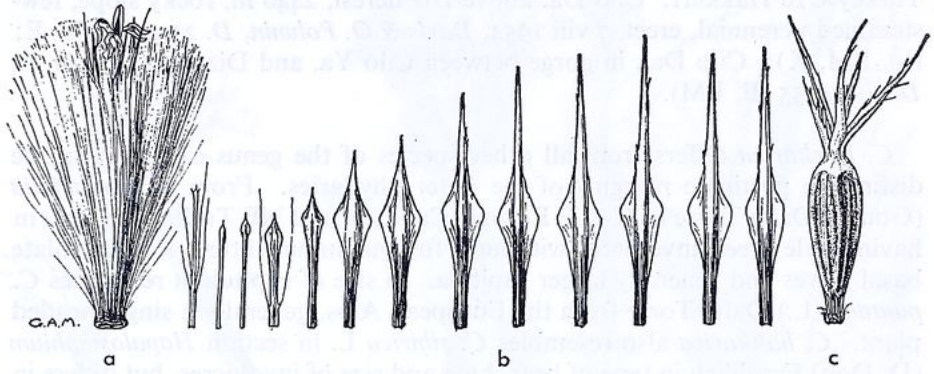

FIG. 4. *Echinops melitenensis* Hedge & Huber-Morath: a, capitulum surrounded by brush; b, outer and median phyllaries; c, innermost phyllaries forming a pentagonous tube around the achene. All × 2.

latissima, lobis maioribus utrinque 3–5, anguste- vel late-triangularibus, in spinas vulnerantes 10–15 mm longas excurrentibus apice longe spinosis, sinubus inter lacinias spinulosis; folia margine saepe revoluta, supra griseo-viridia, pilis adpresse eglandulosis et glandulis ± patentibus dense obsita, subtus adpresse niveo-tomentosa nervis pilis glandulosis crasse prominentibus. *Caput terminale* 4–5 cm diametro, breviter pedunculatum. *Involucrum* tempore florendi c. 2 cm, fusiforme, fructu valde accretum c. 2·8 cm, pentagonum. *Penicillus* eximie multiradiatus, inferne brunnescens superne candidus involucrum aequans vel ¾ involucri longitudinis attingens. *Phylla* c. 17; phylla exteriora 7–8 mm, e basi filiformi superne subito spathulato-dilatata apice minute glandulosa breviter mucronato-attenuata; media linearilanceolata, 10–14 mm, apice longe spinoso-attenuata, rigida, prope basin fusca superne alba vel coerulescenti-suffusa, breviter paucifimbriata; intima 5 in tubum pentagonum atrum concreta apice spinescentia. *Color corollae* ignotus; tubus c. 7 mm longus; lobi c. 10 mm longi, lineares. *Antherae c.* 6·5 mm, sagittatae. *Rami stylorum* 3·5 mm, complanati, pilosi. *Pappus achenii* junioris 2 mm longus, setis ad tertiam partem concretis. *Achaenia* juvenilia dense aureo-sericea.

Turkey. B7 Malatya: 18 km N of Malatya, edge of wheat field, 700 m, 22 vi 1949, *Huber-Morath* 10394 (holo. herb. Hub.-Mor.); steppe N of Malatya on road to Arapkir, 22 vi 1949, *Reese* s.n. (herb. Hub.-Mor.). Tunceli: 12 km S of Pülümür, forest remnants, 1400 m, 29 vi 1962, *M. & D. Zohary* 2091, 2092, 2093 (HUJ).

The section *Oligolepis*, characterised by the strongly fused innermost phyllaries, is represented by several species in Central Asia, Afghanistan and Persia; this is its main area of distribution. Two of its species are known to the west of Turkey: *E. graecus* Miller from the Cyclades and *E. fontquerii* Pau from Spain and N Africa. In Turkey, three species of the section are now known: *E. phaeocephalus* Hand.-Mazz., *E. bicolor* Náb. and the newly described *E. melitenensis*. All occur in a limited region of eastern Anatolia. Many of the species in the section are closely related to each other and the three Turkish species are no exception, forming a very natural group. *E.*

melitenensis, named after the classical region of Melitene in eastern Cappadocia, is clearly distinct from the other Turkish and allied Persian species, such as *E. chorassanicus* Bge., on account of the very dense and long brush which equals the length of the capitulum in fruit.

I am grateful to Dr A. Huber-Morath, who first recognized *E. melitenensis* as a new species, for giving me co-authorship of it.

E. pungens Trautv. var. **adenoclados** Hedge, **var. nov.**

A varietatibus caeteribus caulibus ubique pilis glanduiosis non arachnoideis vel lanatis bene differt.

Turkey. B9 Bitlis: Kotum, 1800 m, *Davis & O. Polunin, D.* 24549 (holo. E, iso. K). Van: Başkale, Ispiriz Da., 2700 m, *Davis* 23723. C9 Van: 20 km S of Başkale on road to Hakkari, *Davis* 24517.

E. pungens is a very common species in eastern Anatolia with a wide range of variation. Although a revision of the species throughout its range is much needed—several Caucasian species are obviously very closely allied—the very glandular plants from SE Turkey are worth recognition at least at varietal rank.

Helichrysum

P. H. Davis & F. K. Kupicha

Helichrysum arenarium (L.) Moench, Meth. 575 (1794).

Syn.: *Gnaphalium arenarium* L., Sp. Pl. 854 (1753).

subsp. **rubicundum** (C. Koch) Davis & Kupicha, **comb. nov.**

Syn.: *Antennaria rubicunda* C. Koch in Linnaea 17:49 (1843).
Helichrysum undulatum Ledeb., Fl. Ross. 2:606 (1845).
H. arenarium var. *plinthocalyx* C. Koch in Linnaea 24:348 (1851).
H. arenarium var. *rosea* Trautv. in Acta Horti Petrop. 1:23 (1871).
H. rubicundum (C. Koch) Bornm. in Bull. Herb. Boiss. ser. 2, 7:34 (1907).
H. undulatum Ledeb. subsp. *rubicundum* (C. Koch) Takht. in Takht. & Fedorov, Fl. Erevana 283 (1972).

Subsp. *rubicundum* is distinguished from the European subsp. *arenarium* by having sterile shoots with prominently swollen leaf-bases, leaves usually with undulate margins, and phyllaries which are cucullate and often apricot or straw-coloured rather than yellow.

E Anatolia, Caucasia, NW Iran.

subsp. **aucheri** (Boiss.) Davis & Kupicha **comb. et stat. nov.**

Syn.: *H. aucheri* Boiss., Diagn. ser. 1, 11:28 (1849).

Subsp. *aucheri* is distinguished from subsp. *arenarium* by having sterile shoots with prominently swollen leaf bases; it differs from subsp. *rubicundum* in having non-undulate leaves and flat, rather than cucullate, phyllaries; the involucre is always yellow.

Endemic to Turkey—mainly Inner & adjacent N Anatolia.

subsp. **erzincanicum** Davis & Kupicha, **subsp. nov.**

Planta humilis, caulibus 10–19 cm altis. *Folia basalia* 7–20 mm longa, 1·5–4 mm lata, pulvinum densum formantia. A subsp. *arenario* foliis angustis undulatis, surculis sterilibus foliorum basibus tumidis differt; a subsp. *rubicundo* phyllariis citrinis planis, caulibus brevioribus recedit; a subsp. *aucheri* foliis undulatis minoribus divergit.

Turkey. B7 Erzincan: Ak Da., 1150 m, *E. K. Balls* 1515 (holo. E; iso. BM); c. 10 km N of Erzincan, 1520 m, *M. & D. Zohary* 31714 (and many other gatherings from the same province) B9 Ağri: Ağri to Doğubayazit, 1670 m, *M. Zohary & Plitmann* 2261–47 Endemic to E Anatolia.

Helichrysum artvinense Davis & Kupicha, **sp. nov.**

Planta perennis, cinereo-alba, villosa-lanata, caespitosa. *Caules floriferi* 20–22 cm alti, simplices, erecti, a caudicibus brevibus lignosis ramosis exorientes. *Surculi* steriles basi ovoidei tumidi. *Folia basalia* spathulata, 11–13 mm longa, 4–5 mm lata; folia caulina minora, linearia, patentia, subobtusa, apiculata. *Capitula* late turbinata circa 5 mm longa, 6(–7) mm lata, 5–16 in corymbo denso subgloboso 17–25 mm lato portata. *Phyllaria* 40–50, regulariter imbricata, oblongo-obovata, plana, adpressa, fulvo-aurea. *Flores* omnes hermaphroditi, tubulares, 3 mm longi inferne pilosuli, dentibus limbi late ovatis brevissimis, involucro paulo breviores. *Fl.* 7–8.

Turkey. A9 Çoruh (Artvin): Trockenzone bei Ardanuç, 15 viii 1962, *Leisler* (holo. W).

A species of somewhat doubtful relationship. It resembles *H. compactum* Boiss. (endemic to SW Anatolia, c. 1400 km away) in its neat subglobose corymbs, but the base of the plant is less conferted, the indumentum sparser and the phyllaries darker yellow (tawny gold instead of pale lemon). Only a few of the flowers are left in the capitula. The plant has evidently been growing on eroded marly (calcareous!) slopes in the rain-shadow zone of the Çoruh valley, and is only known from the type collection; several other endemics are confined to the same area.

Helichrysum plicatum DC., Prodr. 6:183 (1838).

This very variable species, distinguished from *H. graveolens* (Bieb.) Sweet on habit and indumentum, is represented by three inter-grading subspecies in Turkey.

1 Cauline leaves 40–70 × 5–20 mm, yellowish-green; plants subglabrous . . . . . subsp. *polyphyllum*

\+ Cauline leaves 15–40 × 2–5 mm, whitish or greyish-green; plants subglabrous to densely lanate-tomentose 2

2 Capitula bright yellow . . . . . subsp. *plicatum*

\+ Capitula cream-coloured . . . . subsp. *pseudoplicatum*

subsp. **plicatum**

Syn.: *H. anatolicum* Boiss., Diagn. ser. 1, 4:11 (1844).

Widespread in Anatolia, except in the west; Balkans, N Iraq, Lebanon, Caucasia.

subsp. **polyphyllum** (Ledeb.) Davis & Kupicha, **comb. et stat. nov.**
Syn.: *H. polyphyllum* Ledeb., Fl. Ross. 2:605 (1845).
Mainly S & E Anatolia; Caucasia, Iran.

A much broader circumscription is accepted of this taxon than that adopted in Fl. URSS (as *H. polyphyllum*).

subsp. **pseudoplicatum** (Náb.) Davis & Kupicha, **comb. et stat. nov.**
Syn.: *H. plicatum* DC. var. *lacteum* Boiss., Fl. Or. 3:231 (1875).
H. pseudoplicatum Náb. in Publ. Fac. Sci. Univ. Masaryk Brno 52:9 t. 1 f. 4 (1925).
SE Anatolia, N Iraq, Iran, Transcaucasia.

Less variable than the other two races, subsp. *pseudoplicatum* is generally subglabrous, with straight slender stems, narrowly linear leaves and smaller capitula only 4–6 mm long. A few specimens from the Anti-Taurus etc. approach the SE Anatolian material in these characters, but have the yellow phyllaries of subsp. *plicatum*.

Hieracium

P. D. Sell* & C. West*

There are two main schools of thought on the classification of the genus *Hieracium* L. sensu lato. In the one held by A. Jordan and by C. J. M. Arvet-Touvet in southwest Europe and by M. W. W. Brenner, J. P. Norrlin, K. Johansson, H. Lindberg and H. Dahlstedt in Scandinavia, the majority of the taxa were given binomials and placed in various groups, many of which had no valid taxonomic status. This method has been carried on by S. O. F. Omang in Norway, K. Wiinstedt in Denmark, H. W. Pugsley in the British Isles and A. Y. Juxip in his large and important work on the *Hieracium* flora of the URSS.

In the other, started by C. Naegeli and A. Peter and greatly expanded by K. H. Zahn in his monumental monograph and other publications, numerous subspecies were included under large 'major' species. These 'major' species were placed in Sections (there often being only one per Section), and between the Sections they put many other 'major' species also with numerous subspecies, which Zahn termed *Species intermediae collectivae*. These intermediate taxa number nearly as many as those within Sections, and they are not included in the keys. In fact, unless you have an idea as to what the parents are, there are sometimes no means of identifying them. This classification has been followed in papers by J. L. van Soest, B. de Retz and others, and by F. Markgraf in Hayek's *Prodromus Florae Peninsulae Balcanicae* and by E. I. Nyárády in Săvulescu's *Flora Republicii Populare Române* where many of the subspecies are reduced in rank to variety.

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In most arrangements of the genus with the exceptions of those of C. H. & F. W. Schultz (and to a certain extent those of Arvet-Touvet and of Norrlin) the species are placed in two subgenera, *Hieracium* sensu stricto and *Pilosella*. While most authors admit that intermediates occur between most taxa within each subgenus, nobody has found intermediates between species occurring in different subgenera. For this reason we believe that the two subgenera are best recognised as genera (in accordance with the views of the Schultz brothers), and distinguished on achene characters, the presence or absence of stolons and the general facies. We do not hold the view of some botanists that the South American species of *Hieracium* are intermediate between *Pilosella* and *Hieracium*. When considering the South American species the differences between *Hieracium* and *Crepis* need to be taken into account. If the generic descriptions of *Hieracium* in Zahn's monograph and of *Crepis* in E. B. Babcock's monograph are compared it will be seen that no concrete differences are shown. In European plants we consider the character which will distinguish all species is the arrangement of the involucral bracts, *Hieracium* (and *Pilosella*) having several series of imbricate bracts, and *Crepis* having an inner and outer series, the outer usually being much shorter. This character goes hand in hand with a characteristic facies, so that even from a moving car the genera can be recognised. When we first saw the American species of *Hieracium* of the Subgenus *Stenotheca* (on herbarium sheets) we immediately thought that they looked like *Crepis*. This opinion was confirmed by the fact that they have an inner and an outer row of involucral bracts. Some species also have the achenes narrowed at the apex as in *Crepis*.

For the account in the *Flora of Turkey* we are recognising *Pilosella* Hill and *Hieracium* L. as distinct genera. The treatment of taxa within the genera is as follows.

PILOSELLA Hill

In this genus our field experience suggests that hybrid swarms occur in nature. The available information on the species cytologically and experimentally supports this view, the plants being sexual with abundant, well-developed pollen, and hybrids having been synthesised in cultivation. No cases have been recorded where pairing does not take place at meiosis, and in the triploids there is a lesser development of pollen such as one would expect in hybrids. Most of the cytological work has been done in northwest Europe, but we have no reason to suspect that a different situation exists elsewhere. In this genus we have followed the broad outlines of classification of Naegeli & Peter and of Zahn, but have only recognised a few of the subspecies of their main species, and none of the subspecies under the hybrids which, if accepted, should be more correctly termed nothomorphs. We have as far as possible given the hybrids binomials, so that anyone wishing to treat them as species can do so.

HIERACIUM L.

In contrast to *Pilosella*, we have never seen any situation in the field which suggested that hybridisation was taking place, except perhaps between the segregates of the *H. sabaudum* group. When meiosis has been examined in

plants with $2n = 27$ and $2n = 36$, no pairing of chromosomes has been found. Such plants have little or no pollen, but produce an abundance of good seed. We therefore consider it reasonable to regard them as being agamospermic. *H. umbellatum* L. has both agamospermic ($2n = 27$) and sexual ($2n = 18$) variants, and a plant of *H. vagum* Jordan (*Sabauda*) from Czechoslovakia has $2n = 18$ and is presumably sexual. The intermediates between species of the *H. sabaudum* group examined cytologically proved to be agamospermic. Over the last 20 years we have grown over 300 clones of *Hieracium*, mainly in close proximity, and some of them for long periods. Many seeds have blown onto adjacent areas and germinated, but we have never found among the resulting plants an intermediate or 'species' we could not account for. Naegeli & Peter, however, recorded a number of plants they considered to be intermediates, which appeared among plants they cultivated. *Pilosella* species grown under similar conditions produced intermediates of which we did not know the origin. One species from the north of Scotland, *H. fulvocaesium* Pugsley, has abundant pollen, but proved to be agamospermic as regards meiosis and production of good seed, showing that the production of abundant pollen does not necessarily mean that the plant is reproducing sexually. In the great bulk of the plants we have examined, pollen is poor or absent.

Although it is likely that more sexual species will be discovered, especially in central and east Europe, we consider the most reasonable treatment is to give all the taxa binomials and treat them as apomicts as in the case of *Alchemilla*, *Sorbus* and *Rubus*. To treat them as subspecies of large group-species as Zahn has done, is a most hazardous nomenclatural undertaking which we are not prepared to make. *H. lachenalii* C. C. Gmelin, for example, is an older name for *H. vulgatum* Fries (sensu Zahn), which would require a minimum of 150 new combinations. *H. hypochaeroides* Gibson for *H. wiesbaurianum* Uechtr. would supply another 60. Should a yet older name be found, the whole procedure would have to be repeated. Species could have originated in one or more of at least three ways. First, they could have originated in the past, when more of the species were sexual, the variants resulting from hybridisation reproducing apomicticly, thus creating new stable species. In this way very diverse species could be created at the same time. However, we find it difficult to distinguish the supposed hybrids or intermediates of Zahn from the good species, as some at least of the 'good species' are triploids and are also likely to be of hybrid origin. Secondly, if a sexual species which was once widespread, died out in some areas and left a disjunct distribution, geographical isolation of populations might lead by selection to modification of its characters which could be perpetuated by an apomictic mode of reproduction. Thirdly, every so often the offspring of an agamospermic plant includes an individual which is aberrant in a few minor details. Once again the mode of reproduction might allow a new 'species' to be formed.

With reference to intergeneric categories for classifying *Hieracium* apomicts we regard J. E. Dandy's statement appended to our checklist of British *Hieracia* to be relevant, i.e. "For convenience sectional headings are inserted in parentheses, but it must be stressed that the "sections" are groupings of microspecies and do not correspond to sections as generally understood in other genera". We believe the most suitable rank for them to be Series, which

is the lowest possible infrageneric grouping and has the great advantage of never having been validly used before, so that well-known epithets can be taken up without regard to priority. If intermediates are placed between Series the convenience of having the taxa grouped is lost. We have therefore either put them into existing Series for which we have epithets or created new ones for them.

In preparing the accounts of *Pilosella* and *Hieracium* for the *Flora of Turkey* we have had to rely entirely on the specimens and descriptions of other botanists, because neither of us has visited that country. Dr P. H. Davis has made available to us the Edinburgh collection and several loans from other herbaria, particularly the Sintenis herbarium from Lund (LD) and the B.V.D. Post collection from Geneva (G), which, together with the very fine personal collection kindly loaned to us by Dr A. Huber-Morath, Basel, form the basis of the account.

Hieracium huber-morathii P.D. Sell & C. West, **sp. nov.**

Caulis 25–50 cm altus, ubique pilis stellatis sparsis et pilis simplicibus eglanduliferis numerosis, superne pilis glanduliferis paucis vestitus. *Folia* ubique pilis simplicibus eglanduliferis longis numerosis vel in pagina superiore sparsis vestita; basalia 40–110 × 20–40 mm, plerumque ovata vel elliptica, exteriora interdum obovata, obtusa vel acuta, integra vel dentata, dentes interdum anguste mammiformes, basi cuneata vel breve attenuata, petiolis brevibus alatis; caulina 1–2, basalibus similia sed sessilia semiamplexicauliaque. *Capitula* 3–9; pedunculi ad 4 cm longi, pilis stellatis numerosis, pilis simplicibus eglanduliferis numerosis, pilis glanduliferis brevibus numerosis obsiti. *Involucrum* 10–12 mm longum; squamae lineari-lanceolatae, plus minusve acutae, pilis stellatis sparsis, pilis simplicibus eglanduliferis numerosis, pilis glanduliferis brevioribus numerosis vestitae. *Ligulae* glabrae. *Styli* flavi. *Cypselae* circa 3·5 mm longae, brunneo-purpureae.
Turkey. C4 Konya: 44 km east of Beyşehir, 1280 m, 4 vii 1948, *Huber-Morath* 16426 (holo. herb. Hub.-Mor.).

This species, known only from the type gathering, belongs to Zahn's group-species *H. pallidum* Biv. (Series *Pallida* (Fries) P. D. Sell & C. West).

Hieracium marmoricola P. D. Sell & C. West, **sp. nov.**

Caulis 30–40 cm altus, pilis stellatis sparsis, pilis simplicibus eglanduliferis paucis, interdum superne pilis glanduliferis paucis vestitus. *Folia* leviter glauca, pilis simplicibus eglanduliferis plus minusve rigidis in superficiebus ambabus sparsis in marginibus et costis inferioribus numerosis, pilis stellatis minimum in pagina inferiore caulinorum vestita; basalia 40–90 × 20–35 mm, plerumque elliptica, interdum lanceolata, obtusa vel acuta, denticulata vel dentibus mammiformibus parvis, basi attenuata, petioli longiusculi; caulina 1–2, basalibus similes vel bracteiformia. *Capitula* 4–10; pedunculi ad 30 mm longi, pilis stellatis densis, pilis glanduliferis inaequalibus numerosis, pilis simplicibus eglanduliferis longioribus paucis vel numerosis obsiti. *Involucrum* 10–13 mm longum; squamae lineari-lanceolatae, subobtusae vel acutae, pilis stellatis numerosis, pilis glanduliferis inaequalibus numerosis, pilis

simplicibus eglanduliferis paucioribus vestitae. *Ligulae* glabrae. *Styli* flavi. *Cypselae* 4–4·5 mm longae, obscurae.
Turkey. A1(A) Balikesir: Kapu-Dagh, 21 vi 1883, *Sintenis* 687 (holo. LD).

Uechtritz originally labelled this plant *H. sintenisii*, but never validly published it. Freyn in Öst. Bot. Zeitschr. 42:269 (1892) published the name *H. sintenisii* for a completely different taxon, placed by us in the genus *Pilosella*. Zahn in Engler, Pflanzenreich 79(IV.280):1043 (1922) then published *H. erythrocarpus* subsp. *sintenisii* as "Uechtr. in Sint., It. Trojan. (1883) n. 687", which is *H. marmoricola*, followed by the reference "Freyn in Ö.B.Z. (1892) 269", which refers to the plant now placed in *Pilosella*. The description is referable to *H. marmoricola*. To avoid being involved in this confusion, we have described the plant as new and have designated Sintenis no. 687 as the holotype. Should anyone suggest that all we have done is to give the plant a new name, the only change necessary would be to call the holotype a lectotype.

Zahn considered this plant to be intermediate between his group-species *H. sparsum* Friv. and *H. murorum* L., but its habit, rigid hairs of the leaf margin, inflorescence and yellow styles made us decide to place it in his group-species *H. pallidum* Biv. (Series *Pallida* Pugsley ex P. D. Sell & C. West). We have so named it because it grows on marble limestone.

The following five taxa are published by Dr A. Huber-Morath.

Pilosella hoppeana (Schultes) C. H. & F. W. Schultz subsp. **isaurica** Huber-Morath, **subsp. nov.**

Folia oblanceolata, spathulata vel anguste elliptica, plus minusve obtusa, integra, in superficiebus ambabus pilis stellatis densis et pilis simplicibus eglanduliferis longis subrigidis numerosis vestita. *Caulis* 7–15 cm altus, ubique pilis stellatis densis et pilis simplicibus eglanduliferis paucis vel numerosis, superne pilis glanduliferis parvis numerosis vestitus. *Involucrum* 9–11 mm; squamae ovatae vel lanceolatae, obtusae vel subacutae, pilis stellatis densis, pilis simplicibus eglanduliferis longis pallidis densis, pilis glanduliferis paucis vestitae.
Turkey. B4 Ankara: Ankara to Beynam Orman, 8 vi 1969, *Akman* 321 (herb. Hub.-Mor.). B5 Nevşehir: Nevşehir to Ürgüp, *Davis* 191421 (E). C4 Konya: steppige Trift 59 km östlich Beyşehir, Beyşehir-Konya, 1460 m, 5 vii 1948, *Huber-Morath* 17655 (holo. herb. Hub.-Mor.).

This subspecies has both surfaces of the leaves with dense stellate hairs as in subsp. *cilicica* (Naegeli & Peter) P. D. Sell & C. West, but is distinguished by the involucre having dense simple eglandular, not glandular hairs.

Hieracium giresunense Huber-Morath, **sp. nov.**

Caulis 12–30 cm altus, pilis stellatis paucis interdum pilis simplicibus eglanduliferis raris vestitus. *Folia* glauca, pilis simplicibus eglanduliferis longis rigidis praecipue in marginibus vestita; basalia 30–70 × 10–20 mm, lanceolata, obtuso-mucronata, denticulata vel leviter dentata, basi angustata, subsessilia; caulina 2–3, linearia integraque vel bracteiformia. *Capitula* 2–7;

pedunculi ad 25 mm longi, pilis stellatis numerosis vel densis obsiti. *Involucrum* 11–14 mm longum; squamae lineari-lanceolatae, basi latae, angustatae ad apicem obtusae, pilis stellatis numerosis vel densis, pilis simplicibus eglanduliferis longis raris vestitae. *Ligulae* glabrae. *Styli* obscuri. *Cypselae* 3·5-4 mm longae, obscurae.
Turkey. A7 Giresun; Şebin Karahisar—Tamdere, 9–11 km north of Şebin Karahisar, 1300–1330 m, 1 vii 1955, *Huber-Morath* 16401 (holo. herb. Hub.-Mor.).

This plant is known only from the type gathering. It has the leaf clothing and general appearance of Zahn's group-species *H. pallidum* Biv. (Series *Pallida* Pugsley ex P. D. Sell & C. West) but the involucre and style colour of group-species *H. sparsum* Friv. (Series *Glauca* (Griseb.) P. D. Sell & C. West). It possibly originated from a cross between species of the two groups.

Hieracium pseudodontotrichum Huber-Morath, **sp. nov.**

Caulis 14–25 cm altus, ubique pilis stellatis sparsis et pilis simplicibus eglanduliferis paucis vel numerosis superne pilis glanduliferis paucis vestitus. *Folia* glauca, maculata, pilis simplicibus eglanduliferis in pagina inferiore et in marginibus numerosis, in pagina superiore paucioribus subrigidis, pilis stellatis paucis vel numerosis, praecipue in pagina inferiore vestita; basalia 15–45 × 7–15 mm, ovata, lanceolata, elliptica vel oblanceolata, plerumque obtuso-mucronata, denticulata vel dentata, dentibus apiculatis, basi angustata, petiolis brevibus; caulina 1–2, basalibus similia vel bracteiformia. *Capitula* 1–2; pedunculi ad 4·5 cm longi, pilis stellatis numerosis, pilis glanduliferis parvis numerosis, interdumque pilis simplicibus eglanduliferis raris obsiti. *Involucrum* 10–12 mm longum; squamae lanceolatae, obtusae vel acutae, pilis stellatis densis, pilis glanduliferis parvis numerosis, pilis simplicibus eglanduliferis paucis vestitae. *Ligulae* glabrae. *Styli* flavi. *Cypselae* circa 4 mm longae, obscure brunneo-purpureae.
Turkey. C3 Eskişehir: 18 km from Eskişehir towards Kütahya, 880 m, 13 vi 1954, *Huber-Morath* 16389 (holo. herb. Hub.-Mor.). C3 Isparta: Dedegöldağ, c. 1900 m, 1 vii 1965, *Sorger* 65–42–21 (herb. Sorger, Linz).

The habit, rigid hairs of the margin of the glaucous leaves and yellow styles clearly place this species in Zahn's group *H. pallidum* Biv. (Series *Pallida* Pugsl. ex P. D. Sell & C. West).

Hieracium tamderense Huber-Morath, **sp. nov.**

Caulis 25–40 cm altus, ubique pilis simplicibus eglanduliferis paucis, superne pilis stellatis paucis et pilis glanduliferis parvis paucis vestitus. *Folia* 30–90 × 10–30 mm, pilis simplicibus eglanduliferis numerosis; basalia pauca, anguste elliptica, plus minusve acuta, denticulata, basi angustata; caulina 5–8, late elliptica vel panduriformia, rare ovata, acuta vel acuminata, denticulata vel breviter dentata, sessilia, semiamplexicaulia. *Capitula* 8–10; pedunculi ad 10 mm longi, pilis stellatis densis, pilis glanduliferis inaequalibus obscuris densis obsiti. *Involucrum* 7–8·5 mm longum; squamae lineari-lanceolatae, obtusae vel subacutae, pilis stellatis numerosis, pilis glanduli-

feris inaequalibus obscuris numerosis, interdum pilis simplicibus eglanduliferis raris vestitae. *Ligulae* flavae, apice et in marginibus pilis simplicibus eglanduliferis brevibus obsiti. *Styli* obscuri. *Cypselae* non visae.
Turkey. A7 Giresun: Alpwiesen E ob Tamdere, 1620–1700 m, 7 vii 1958, *Huber-Morath* 16017 (holo. herb. Hub.-Mor.).

This species, known only from the type gathering, belongs to Zahn's group-species *H. juranum* Fries (Series *Prenanthoidea* (Fries) P. D. Sell & C. West).

Hieracium tmoleum Huber-Morath, **sp. nov.**

Caulis 6–15 cm altus, pilis stellatis sparsis, pilis plus minusve plumosis paucis vel numerosis vestitus. *Folia* omnia basalia, 20–70 × 5–20 mm, oblanceolata vel anguste elliptica, plus minusve obtusa, integra vel subdentata, basi angustata, pilis plus minusve plumosis numerosis praecipue in pagina inferiore et in marginibus vestita, petiolis brevibus alatis. *Capitula* 1–2; pedunculi ad 8 cm longi, pilis stellatis densis, pilis simplicibus eglanduliferis vel subplumosis paucis vel numerosis, pilis glanduliferis brevibus paucis vel numerosis obsiti. *Involucrum* 10–12 mm longum; squamae lineari-lanceolatae, plus minusve acutae, pilis simplicibus eglanduliferis vel subplumosis numerosis, pilis glanduliferis parvis paucis vestitae. *Ligulae* saepe tubuliformes, apice pilis simplicibus brevibus obsiti. *Styli* obscuri. *Cypselae* circa 3·5 mm longae, obscure brunneo-purpureae.
Turkey. B2 Izmir: Boz Dağ, 1300 m, 5 vii 1968, *Sorger* 68–16–36 (holo. herb. Hub.-Mor.; iso. herb. Sorger).

This species, known only from the type gathering, probably originated from hybridisation in the past between a species of Zahn's group-species *H. pannosum* Boiss. and a species of one of Zahn's other groups.

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Inula

A. J. C. Grierson

Inula helenium L.

In Europe *I. helenium* is a relatively stable species but in Turkey it is polymorphic and may be divided into four subspecies. This variation may be summarised as follows:

1, the number of capitula on each plant may be few (c. 5) as in subsp. *helenium* or numerous (c. 25) as in subsp. *vanensis*;

2, the arrangement of capitula, while always basically racemiform, can vary from the typical corymbose condition in which all are borne at approximately the same level, or may be narrowly racemiform in which the capitula are borne on short stalks along the length of an otherwise unbranched stem (as in subsp. *turcoracemosa*);

3, the size of the involucre can vary from 1·5 cm broad in the subspecies that bear numerous capitula (subsp. *vanensis* and *pseudohelenium*) to 5 cm broad in those in which they are fewer (e.g. subsp. *orgyalis*);

4, the outer phyllaries are often somewhat foliaceous in subsp. *helenium*, but in subsp. *orgyalis* they become larger and appear like a whorl of upper leaves which form an extra involucre around the shorter true one;

5, the ray flowers vary in number from few (c. 15) in subsp. *vanensis* to numerous (c. 100) in subsp. *orgyalis*. Their ligules also vary in size from 3–6 mm in subsp. *vanensis* to 30 mm in subsp. *orgyalis*.

The subspecies as represented in Europe and Turkey may be divided as follows (lacking comparative material the Caucasian *I. magnifica* Lipsky which belongs to the "*I. helenium* complex" has not been critically considered but it is probably closest to subsp. *orgyalis* with larger involucres 4·5–6·5 cm broad, long foliaceous outer phyllaries and ligules 3·8–5·3 cm long).

1 Inflorescence of 10–20 capitula in narrowly racemose or spicate form; ligules 1–1·5 cm long . . . . . subsp. *turcoracemosa*

\+ Inflorescence ± corymbose 2

2 Outer phyllaries longer than inner ones, foliaceous; ligules 2·5–3 cm long . . . . . subsp. *orgyalis*

\+ Outer phyllaries shorter or only as long as inner ones; ligules (of Turkish plants) up to 2 cm long 3

3 Involucres 3–4 cm broad; ligules up to 3 cm long subsp. *helenium*
+ Involucres 1·5–3 cm broad; ligules less than 1·5 cm long . 4
4 Ligules 3–6 mm long, scarcely longer than involucre . subsp. *vanensis*
+ Ligules 10–15 mm, obviously longer than involucre subsp. *pseudohelenium*

subsp. **helenium**

Apparently not found in Turkey; probably native in SE Europe (Albania, Bulgaria, Greece, Yugoslavia, Romania), formerly cultivated for the medicinal properties of its roots and now widely naturalized in Europe. Introduced in N America and Japan.

subsp. **turcoracemosa** Grierson, **subsp. nov.** a subspecie typica capitulis 10–20 inflorescente anguste racemiforme dispositis differt.

Turkey. A4 Kastamonu: Karasudere, *Sintenis* 1892:4982. A7 Trabzon: mouth of Dermendere R. (ad ostium Dermendere), *Sintenis* 1889:1441. A8 Erzurum: Tortum Göl, 1250 m, *Stainton & Henderson* 6129 (holo. E); 5 km N of Tortum Göl, 1000 m, *Davis* 47646. Also in Caucasia.

Resembles *I. racemosa* Hook. f. from W Himalaya in which, however, the outer and median phyllaries are acute and strongly reflexed and the inner ones are distinctly purplish.

subsp. **orgyalis** (Boiss.) Grierson, **comb. et stat. nov.**

Syn.: *I. orgyalis* Boiss., Fl. Or. Suppl. 291 (1888).

Turkey. A4 Zonguldak: Kel Tepe above Yenice, 1350 m, *Davis* 37799. A4 Kastamonu: Daday to Eflani, 1000–2000 m, *Davis* 38636. A9 Çoruh: Yalnizçam Da. below Kutul, 1900 m, *Davis* 32462. B9 Van(?): "Semina misit cl. Kotschy unde plantam in horto Valeyres cultam descripsi" (holo. G, photo E.). N & NE Anatolia. Endemic?

As all the above wild-collected material comes from N and NE Anatolia, it seems reasonable to doubt the source of the original seed as Boissier reported it.

subsp. **pseudohelenium** Grierson, **subsp. nov.** a subspecie typica capitulis minoribus, involucris 1·5–2·5 cm latis, ligulis 1-1·5 cm longis differt.

Turkey. A9 Kars: mountains E of Kağizman, 7 km from Kağizman to Cumaçay, 1600 m, *Davis* 46812 (holo. E). B9 Muş: 8 km N of Varto, 1820, *Buttler* 16032. Endemic?

Resembles the typical subspecies in having a corymbose inflorescence but the capitula are consistently smaller and with shorter ligules.

subsp. **vanensis** Grierson, **subsp. nov.** a subspecie typica capitulis minoribus, involucris 1·5–2·5 cm latis, ligulis paucioribus et inconspicuis 3–6 mm longis differt.

Turkey. B9 Van: 5 km N of Satak, *Davis* 23177 (holo. E); Hakkari: Koçanis, 2560 m, *Davis* 24310. B10 Van: Zap Gorge, 20 miles S of Başkale, *Davis* 23805. Endemic?

Like subsp. *pseudohelenium* in having smaller capitula but distinct in having few (c. 15) inconspicuous ligules that are scarcely as long as the involucre.

THE REDUCTION OF CODONOCEPHALUM FENZL TO INULA L. The reasons that Fenzl (in Flora 26, 1:297–298, 1843) gave for differentiating *Codonocephalum* from *Inula* were principally four: 1, that the capitula are discoid; 2, that the anther tails are "multisetose", i.e. fimbriate into a number of hairs; 3, that the achenes are 4–5-angular and multistriate; and 4, that the pappus hairs are subplumose ("dense barbellatis, fere plumosis") and connate at the base into a cupule.

If one studies the species of *Inula*, especially those of sect. *Corvisartia*, to which Fenzl himself related his *C. inuloides*, then none of these reasons appears sound enough to maintain *Codonocephalum* as a separate genus. Also it may be noted that Korovin has already transferred *C. peacockianum* to *Inula* (see below).

There are already two species of *Inula* in Turkey which completely lack female flowers: *I. discoidea* Boiss. and *I. fragilis* Boiss. & Hausskn., and, in several others, they are much reduced, e.g. *I. sarana* Boiss. and *I. heterolepis* Boiss.

The anther tails of most *Inula* species are to some extent fimbriate—possibly this is connected with the fact that the tails of adjacent anthers are coherent. In some species it is difficult to see the lateral hairs except under a microscope, but in *I. helenium* L. and *I. grandis* Schrenk they are obvious when viewed through a binocular dissector. It is interesting to note that the anther tails of *C. serratuloides* Gilli are scarcely fimbriate. Though less strongly marked than those of *C. inuloides*, the achenes of *I. helenium* and of other species of Sect. *Corvisartia* are angular and finely costate.

Possibly *C. inuloides* and *C. serratuloides* Gilli (which the author notes as having a plumose pappus) mark the ultimate in the development of the side bristles of the pappus setae. That of *C. peacockianum* Aitch. & Hemsl. can only be described as barbellate and certainly no Orient species of *Inula* has a plumose pappus. The fusion of the pappus setae into a basal cupule is known in a number of *Inula* species and that of *I. helenium* is identical with the pappus of *Codonocephalum* species.

The species of *Codonocephalum* should be transferred to *Inula* and should be placed in or near Sect. *Corvisartia*. Two new combinations are necessary.

Inula inuloides (Fenzl) Grierson, **comb. nov.**
Syn.: *Codonocephalum inuloides* Fenzl in Flora 26, 1:397 (1843).

Inula peacockiana (Aitch. & Hemsl.) Korovin in Rastit. Srednei Azii i Yuzhn. Kazakhst. 2:511 (1962).
Syn.: *Codonocephalum peacockianum* Aitch. & Hemsl. in Trans. Linn. Soc. ser. 2, 3:75 t. 31 & 32 (1886).

Inula serratuloides (Gilli) Grierson, **comb. nov.**
Syn.: *Codonocephalum serratuloides* Gilli in Öst. Bot. Zeitschr. 104:311 (1957).

Inula macrocephala Boiss. x **I. inuloides** (Fenzl) Grierson.

The specimen (Van: vallis fluv. Bochtan (Botan) prope Sattak, c. 1000 m, 13 vii 1910, *Nábělek* 3607) which Nábělek identified as *I. macrocephala* is intermediate between this species and *I. inuloides* as the following table shows:

	I. macrocephala	*I. macrocephala* x *I. inuloides*	*I. inuloides*
habit	robust, ± unbranched	slender	slender, branched
leaf	± elliptic, dentate	ovate-lanceolate, entire	ovate-lanceolate, entire
indumentum	pilose & stipitate-glandular	pilose & stipitate-glandular	villous & sessile-glandular
capitula	solitary (rarely 2), terminal, radiate	4, racemose, radiate	3–6, racemose, discoid
involucre	3–5 cm broad	4 cm broad	1·5–2 cm broad
phyllaries	ovate, 20–30 × 7·5–15 mm	ovate-lanceolate, 20 × 3–4 mm	ovate, 15–20 × 3–5 mm
ligules	12 mm	8–9 mm	0
disc corollas	12 mm	11 mm	8–9 mm
achenes	5 mm	5 mm	4–5 mm
pappus	brownish, 13 mm, ± barbellate	brownish, 10 mm, barbellate	white, 5–9 mm, subplumose

An examination of the pollen of *Nábělek* 3607 indicated 50% viability, half the grains being of small size and not becoming stained with aceto-carmine. This hybrid is a further indication that *Codonocephalum* and *Inula* are congeneric.

Lamyropsis

F. K. Kupicha

Lamyropsis lycia Kupicha, **sp. nov.**

Affinis *L. microcephalae* (Moris) Dittrich & Greuter sed capitulis majoribus, parte patenti phyllariorum longiore, floribus malvinis differt.

Planta perennis? *Caules* 40 cm excedentes, parce ramificantes, albo-arachnoidei. Folia ambitu late lanceolata, 7–9 × 5–6 cm, supra cinereo-viridia costis albis, infra dense albo-lanata, pinnatisecta, segmentis profunde bifidis vel interdum trifidis, omnibus lobis spinis validis flavescentibus 1·5–2·5 cm longis a rachide extensis. *Capitula* subsessilia in ramulos foliaceos 3–7 cm longos laxe racemosa. *Involucrum* parce arachnoideum, subglobosum, 1·5–2·5 cm diametro phyllariis patentibus exclusis, imbricatum; phyllaria parte infera ovata adpressa et parte supera spinoso-subulata patenti, 2–3·5 cm longa, costa prominenti abaxiali; phyllaria intima breviora erecta. *Corollae* malvinae, c. 25 mm longae (lobis equalibus 7 mm longis inclusis), phyllariis mediis breviores. *Filamenta* in parte distali dense papillosa. *Achenium*

oblongum-obovoideum, laeve, subcompressum, c. 6 × 1·5 mm, apice mamilla centrali manifesta provisum; cicatrix basalis. *Pappus* c. 20 mm longus, setis plumosis. *Fl.* 7–8.
Turkey. C3 Antalya: d. Kemer, Tahtali Da., 2100 m [on limestone], perennial?, flowers mauve, 16 viii 1947, *Davis* 14194 (holo. E).

This new species was collected in the same area of SW Anatolia as the white-flowered *Ptilostemon afer* (Jacq.) Greuter subsp. *eburneus* Greuter (in Boissiera 22:97, 1973), to which it has a superficial resemblance in leaf shape and inflorescence. The ripe achenes, however, clearly demonstrate that our plant must be referred to *Lamyropsis* (Charadze) Dittrich (Candollea 26:97–102, 1971). It is evidently allied to *L. microcephala* (Moris) Dittrich & Greuter, endemic to Sardinia and recently investigated in depth by Greuter & Dittrich in Ann. Mus. Goulandris 1:85–98 (1973). The only other Turkish species of *Lamyropsis* is *L. cynaroides* (Lam.) Dittrich; it differs markedly from *L. lycia* in leaf shape and general inflorescence.

Matricaria

A. J. C. Grierson

Matricaria chamomilla L.

The name *Matricaria recutita* L. (Sp. Pl. 891, 1753) has been given preference over *M. chamomilla* L. (Sp. Pl. 891, 1753) in, for example, Clapham, Tutin & Warburg, *Flora of the British Isles* Ed. 2:854 (1962) and *Flora URSS* 26:148 (1961) on the grounds that the diagnostic phrase of the latter name was later used by Linnaeus for *M. inodora* (Fl. Suec. ed. 2:296, 1755) and *Chrysanthemum inodorum* (Sp. Pl. ed. 2:1253, 1763) which is the basionym for *Tripleurospermum maritimum* (L.) Koch var. *inodorum* (L.) Hyl. ex Vaarama.

The situation was reviewed by Hylander (Uppsala Univ. Arskr. 7:317, 1945) in which he argued that the name *M. chamomilla* could be retained though its description should be excluded. It was better, he suggested, to uphold a much used and established name than to take up one, i.e. *recutita*, that had never been used. Toman & Stary (Taxon 14:224–228, 1965) make the same plea, directing attention to the wide use of *M. chamomilla* in pharmacology.

None of these later authors concerned themselves with typifying the species but, despite the fact that Linnaeus transferred his original diagnosis of *M. chamomilla* to other species in his later works, the synonym derived from the *Hortus Cliffortianus* (p. 415—Matricaria foliis supra decompositis setaceis, pedunculis solitariis) remained constantly with the name *Matricaria chamomilla* in all of them. It seems reasonable, therefore, to regard the specimen in the Clifford Herbarium (415/1, BM) as the lectotype of this species.*

*It might be objected: (1) that Linnaeus's diagnoses must be regarded as having paramount importance in deciding the typification of his species (but "all the constituent elements in Linnaeus's protologue must be taken into consideration"—see Stearn, 1957, Introduction to Linnaeus's Species Plantarum Facsimile Edition p. 125); (2) that having

There are three varieties of *M. chamomilla* based on achenial characters: the widespread one in which all the achenes are naked or ecoronate; a second which occurs in Turkey particularly in the south in which the achenes of the ray have auriculate coronas (the achenes of the disc are naked) and the third variety (var. *pappulosa*), for which there is only one Turkish record, from Muğla, in which all of the achenes have coronas.

It has generally been assumed that the variety with naked achenes was the typical one but, when one examines the lectotype, it clearly has coronate ray achenes (so also has the specimen labelled "*chamomilla*" in the Linnean collection, 1013/4). In neither of these herbaria is there a specimen labelled or relating to *M. recutita*, nor in Burser's herbarium, nor did Linnaeus cite an illustration of it, but his meaning is clear both from the description ("seminibus nudis") and from the botanically unusual epithet that he employed (dict.: *recutitus*, *-a-um* adj., circumcised).

The varieties may be keyed as follows:

1	Achenes, at least some of them, coronate	2
+	Achenes all naked, ecoronate	var. *recutita*
2	Marginal achenes only with coronas	var. *chamomilla*
+	Marginal and disc achenes with coronas	var. *pappulosa*

var. **chamomilla**

Syn.: *M. chamomilla* var. *kochiana* (Sch.-Bip.) Fiori & Paol., Fl. Anal. Ital. 3:226 (1903).
M. kochiana Sch.-Bip., Tanacet. 26 (1844); Briquet in Burnat, Fl. Alp. Marit. 6:137 (1916).

var. **recutita** (L.) Grierson, **comb. et stat. nov.**

Syn.: *M. recutita* L., Sp. Pl. 891 (1753).
M. chamomilla var. *chamomilla* auct. plur. non L.

var. **pappulosa** Margot & Reuter, Fl. Zante 96 (1841).

Syn.: *M. coronata* Gay apud W. Koch, Syn. Fl. Germ. ed. 2,416 (1843).
M. pusilla Willd., Enum. Hort. Berol. 907 (1809).
M. courrantiana DC., Prodr. 6:52 (1837); Sch.–Bip., Tanacet. 26 (1844).
M. pyrethroides DC., Prodr. 6:52 (1837).
M. meridionalis C. Koch in Linnaea 17:45 (1843).
Courrantia chamomelloides Sch.–Bip. in Webb & Berth., Phyt. Canar. 2:276, t. 48 (1844).
M. chamomilla var. *coronata* (Gay) Boiss., Voy. Esp. 2:316 (1839–45).
M. chamomilla var. *courrantiana* (DC.) Fiori & Paol., Fl. Anal. Ital. 3:236 (1903).

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realised that he had diagnosis and plant wrongly associated, *M. chamomilla* was only correctly defined by Linnaeus in 1775 which is invalidated by *M. chamomilla* 1753. Nevertheless, the fact that Linnaeus always associated the Hort. Cliff. phrase name with *M. chamomilla* provides strong, if not overwhelming, evidence that he wished the specimen in the Clifford herbarium to be known by this name and he must have been of the same opinion in 1753. Hylander was correct: the 1753 diagnosis must be excluded because Linnaeus himself later transferred it to another plant and, in doing so, effectively chose the Hort. Cliff. element of the protologue as the lectotype of M. *chamomilla*.

The varieties *pappulosa* and *coronata* appeared at just about the same time, but there is considerable doubt about the publication dates of Boissier's work (see Stafleu, Taxonomic Literature p. 42, 1967) and there are indications that suggest that the text did not appear till after 1843. There appears no reason to doubt that Margot & Reuter's *Flora of Zante* was published in 1841.

Onopordum

A. Danin*

Onopordum turcicum Danin, **sp. nov.**

Affinis *O. polycephalo* Boiss. sed involucris majoribus, phyllis exterioribus et medianis latioribus (3–3.5 mm latis), pedunculis longioribus recedit. Ab *O. leptolepide* DC. capitulis pluribus pedunculis brevioribus insidentibus, involucri phyllariis haud purpureis, setis pappi barbellatis pilis lateralibus brevioribus facile distinguitur.

Herba biennis, 50–200 cm alta, tota adpresse-arachnoidea, griseo-viridis. *Caulis* superne breviter paniculatus, longitudine 2–4-alatus, alis 2–10 mm latis, sparse sinuatis et spinosis, lobis triangularibus versus apicem nervo conspicuo in spinam 2–10 mm longam excurrente. *Folia radicalia* elliptica, pinnatiloba, lobis triangularibus spinis 2–5 mm longis provisis; folia caulina angustiora, oblongo-lanceolata et decurrentia, in lobos anguste triangulares profundius divisa (saepe pinnatifida). *Capitula* 1–7(–10), subcorymbosa (capitula lateralia saepe solitaria), pedunculis 2–7(–10) cm longis insidentia. *Pedunculi* alis 2–4 mm latis provisi, superne foliis minoribus lineari-subulatis integris vel lateraliter spinulosis capitulum breviter involucrantibus. *Involucrum* subglobosum, 2·5–3 × 3–4 cm, basi planum; phyllaria erecta, arachnoidea ad glabriuscula, lanceolata, 15–28 × 2–3·5 mm, sensim in spinam 3–5 mm longam attenuata, interiora floribus paulo breviora. *Flores* 25–30 mm longi; corolla limbo obliquo, lobis quatuor aequalibus quam lobo quinto 2 mm brevioribus. *Setae* pappi barbellatae, pilis lateralibus latitudine rachidis 1–2-plo longioribus. *Fl.* 7–8.

Turkey. A4 Ankara: mts N of Guetcheren (Keçiören), viii 1906, *Frères E.C.* A6/B6 Sivas/Tokat; Çamlibel Da., between Artova and Yildizeli, *Davis* 24867. A8 Erzurum: 27 km from Erzurum to Torum, 1950 m, *Davis* 27531. Gümüsane: Baiburt, *Bourgeau* (*O. lanigerum* Boiss. mss.). B3 Eskişehir: Beylikahir to Mihaliççik, 850 m, *Davis* 37196. B4 Ankara: Ankara, *Davis* 13224. B5 Kirşehir: nr Kirşehir, 1120 m, *M. Zohary* 611. B6 Sivas: 60 km SW of Sivas, 1620 m, *M. & D. Zohary* 209/3. Maraş: Göksun to Göksu, *B. Post* 155. B7 Tunceli: Pülümür to Selepur, 1700 m, roadside at edge of oak scrub, 23 vii 1957, *Davis & Hedge, D.* 31606 (holo. E). Erzincan: nr Refahiye, 1570 m, *Hub.-Mor.* 12864. B8 Erzurum: Kandili, 40 km W of Erzurum, *Rech.* 32880. B9 Ağri: Doğubayazit to Ağri, c. 53 km E from Ağri, 1900 m, *Lamond* 5029. Erzurum: Tahir to Horasan, 26 km SE of Horasan, 1900 m, *Lamond* 5040.

This widespread, mainly Inner Anatolian species (which extends into S Transcaucasia) is closest to *O. polycephalum* Boiss. but has sometimes been confused with the Caucasian *O. heteracanthum* C. A. Meyer and even with the Persian-Afghan *O. leptolepis* DC. It grows in a variety of habitats—steppe, chalky slopes, river banks, fallow fields and roadsides—from 800 to 2150 m.

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Pilosella

P. D. Sell & C. West

For a discussion of the limits of this genus and the description of a new subspecies see under *Hieracium* above (pp. 242, 245).

Pulicaria

A. J. C. Grierson

Pulicaria odora (L.) Reichb., Fl. Germ. Excurs. 239 (1831).
Syn.: *Inula odora* L., Sp. Pl. 881 (1753).

The specimen in the Linnean Herbarium numbered 999·3, labelled "*odora*" is not a *Pulicaria* but an *Inula*, probably *I. montana* L., and the next specimen, 999·4, labelled "*odorata*" appears to belong to the same species. (Linnaeus did not publish an *Inula odorata*.) Linnaeus cited two illustrations with his description:
Asteris altera species apula. Col. ecphr. 1. p. 251 t. 253.
Conyza altera apula. Moris. hist. 3. p. 113 & 7 t. 21 f. 6.
The first of these (Colonna, Minus cognitarum rariorumque nostra coelo orientium stirpium ecphratis, 1616) shows the plant that Reichenbach transferred and figured (Ic. Fl. Germ. 16: t. 932, 1853) which is a *Pulicaria*. Morison's illustration is a copy of Colonna's as may be seen by the detail of the roots. *Pulicaria odora* can thus only be typified by these two illustrations. It is also interesting to note that there is no specimen in the Linnean herbarium labelled "*Inula montana*".

Scorzonera

D. F. Chamberlain

Scorzonera lasiocarpa Chamberlain, **sp. nov.**
S. pygmaei Sibth. & Sm. primo aspectu simile sed acheniis lanatis. *Herba* nana rosulata perennis plus minusve scaposa. *Caudex* crassus, cylindricus. *Folia* integra, linearia, 5–9 cm longa, 2–3 mm lata, versus basem sparse lanata. *Scapa* circa 10 cm longa, capitulo solitario. *Phyllaria exteriora* 2–4 mm longa, ovato-lanceolata, lanata. *Phyllaria interiora* circa 12 mm longa, glabrata. *Flores* lutei, in sicco purpureo-fasciati, c. 10 mm longi. *Achenia* circa 4 mm longa, 1 mm lata, sessilia obovoidea, sulcata, dense lanata. *Setae pappi* erubescentes, plumosae, ad apicem barbellatae. *Fl.* 4–5. Turkey. C5 Hatay: Antakya, d. Samandağ, nr. Çevlik, 100 m, limestone cliff overlooking the sea, 8 v 1965, *Coode & Jones* 641 (holo. E).

If the lanate achenes are an indication of affinity, then *S. lasiocarpa* is close to the Caucasian *S. filifolia* Boiss. However, superficially at least, *S. lasiocarpa* appears to be much more closely allied to the glabrous-fruited *S. pygmaea* Sibth. & Sm. from N Anatolia.

Scorzonera violacea Chamberlain, **sp. nov.**

S. lacerae Boiss. affinis sed caulibus brevioribus, foliis coriaceis, phyllariis obtusisque differt.

Herba perennis procumbens subscaposa vel caulescentia. *Caudex* crassus, cylindricus. *Caules* 15–20 cm longa. *Folia basalia* dentata vel irregulariter pinnatisecta, 5–10 cm longa, 2–3 cm lata, coriacea, sparse pubescentia, petiolo 1–2 cm longo. *Phyllaria exteriora* 4–10 mm longa, ovata, apice obtuso. *Phyllaria interiora* 20–30 mm longa plus minusve glabra. *Flores* violacei vel purpurei, 3–4 cm longi. *Achenia* sessilia, c. 10 mm longa, sulcata costis undulatis. *Setae pappi* plumosae vel barbellatae. *Fl.* 6.

Turkey. C5 Niğde: Berglehmen bei Bereketli Maden, 1600 m, vi 1906, *Siehe* 325 (holo. E; iso. BM). C2 Antalya: Akdağ, calcareous hills, c. 1400 m, *Sorger* 65–28–9 (hb. Sorger). C3 Burdur: 4 km from Burdur to Bucak, 950 m, *Huber–Morath* 9467 (hb. Hub.–Mor.). C3 Burdur: 3 km S of Burdur, 950 m, *Huber–Morath* 17329 (hb. Hub.–Mor.). C4 Konya: Oyuklu Da,. 2000 m, *Quézel et al.* C4 Konya: above Gevne, nr. Taşkent, 1800 m, *Renz* (herb. Hub.–Mor.). C5 Konya: Koraş, 1600 m, *Siehe* 1912: 556.

The S Anatolian *S. violacea* has in the past been included under *S. incisa* DC. by several authors including Lipschitz (cf. Fragm. Monogr. Scorzonera 1: t.36, 36a, 1935). *S. incisa*, which is however separable on its greater size and yellow florets with purple tubes, has a more easterly distribution. *S. violacea* may be more readily confused with the purely purple-flowered *S. lacera* Boiss., also from S Anatolia. The latter differs in its herbaceous leaves and acute phyllaries.

Senecio

V. A. Matthews

Senecio davisii Matthews, **sp. nov.**

S. taraxacifolio (Bieb.) DC. affinis sed habitu elato, sparsim puberulo (non glanduloso-hirto), foliis profundius divisis, lobo terminali parviore, capitulis numerosioribus et pappo albo differt.

Herba perennis erecta caulibus porcatis sparsim puberulis c. 1 m altis. *Folia basalia* saltem 45 cm longa petiolata pinnatisecta, lobis lateralibus ovatis irregulariter dentatis c. 8–jugis, lobo terminali lobis lateralibus paı viore. *Folia caulina* versus apicem caulis sessiles, auriculata pinnatisecta. *Pedunculi* (3–)6–12 cm longi. *Capitula* 7–9 in corymbum laxum, 11–14 cm latum disposita, radiata, 3–4 cm diam. (ligulis inclusis). *Phyllaria* 10–13 mm longa, 1·5–2·5 mm lata, lanceolata puberula, margine scarioso. *Bracteae* calyculi paucae (5–6), 6–8 mm longae, lanceolatae. *Ligulae* 10–13, 14–17 mm longae, flavae. *Flores* disci 4–lobati. *Achenia* 6–7 mm longa, costata, glabra. *Pappus* albus, 7–9 mm longus.

Turkey. C10 Hakkari: Sat Da. between Yüksekova and Varegöz, 2000 m, shaly rocky slope, 30 vi 1966, *Davis* 45832 (holo. E).

Endemic and only known from the type. Most closely related to *S. taraxacifolius* and differing in the characters enumerated above. In *Flora Orientalis* 3, Boissier described group § *Quadridentati* with one species (*S.*

taraxacifolius) which possessed 4–lobed disc flowers. Examination of other Turkish *Senecio* species has shown that this character is present elsewhere i.e. in most of his group § *Velutini* and at least one species of § *Reniformes* (*S. farfarifolius*). It seems odd that Boissier failed to notice this when he was compiling his Flora. The neglected character of 4–lobed disc flowers is certainly useful at the species level and below, but its value at sectional level will need to be carefully assessed.

Senecio integrifolius (L.) Clairv. subsp. **karsianus** Matthews, **subsp. nov.**

A subsp. *integrifolio* foliis basalibus subter sparsim araneosis supra glabrescentes (non pariter utrinque araneosis) subito vel gradatim in petiolum attenuatis, phyllariis viridibus vel purpureis, et ligulis numerosioribus (17–20) differt.

Turkey. A9 Kars: Haçuvan between Kars and Ardahan, 1900 m, edge of water meadow, 30 vi 1957, *Davis & Hedge, D.* 30474 (holo. E); 7 km from Sarikamiş to Karaurgan, 2200 m, water meadow, 15 vii 1966, *Davis* 46617; Kisir Da. above Susuz, 2000 m, stream side, 3 vii 1957, *Davis* 30522.

Subsp. *karsianus* differs from the C & E European subsp. *integrifolius* in the characters given above, and from the other Turkish taxa (subsp. *aurantiacus* (Hoppe ex Willd.) Briq. & Cavalier var. *leiocarpus* Boiss. and subsp. *aucheri* (DC.) Matthews) in its less densely arachnoid stems, pubescent achenes and slightly longer ligules.

Senecio platyphyllus DC. var. **glandulosus** Matthews, **var. nov.**

A var. *platyphyllo* caulibus ramis inflorescentias et foliis subtus glanduloso–araneosis divergit.

Turkey. A6 Ordu: below Çambasi, 1900 m, *Tobey* 1281. A7 Giresun: below Tamdere, 1600 m, 9 viii 1952, *Davis, Dodds & Çetik, D.* 20629 (holo. E); 10 km N of Tamdere, 1400 m, *Hub.–Mor.* 15834; Şebin Karahisar to Giresun, 1480 m, *Hub.-Mor.* 12858. A7 Trabzon: Sumila, *Sintenis* 1889:1494.

Differs from the type variety in its glandular-arachnoid indumentum. Var. *platyphyllus* grows in NE Anatolia and in Caucasia.

Senecio taraxacifolius (Bieb.) DC. var. **discoideus** Matthews, **var. nov.**

A var. *taraxacifolio* capitulis discoideis floribus plerumque 5–lobatis differt.

Turkey. Armenia, *Calvert & Zohrab* 566 p.p. Lazistan, *Aucher* 3431. B8 Erzurum: Palandöken Da., 2700–3000 m, *Buttler* 16065. Bingöl: Bingöl Da., *Kotschy* 498. B9 Bitlis: Süphan Da. above Adilcevaz, 3350–3660 m, *Davis & Polunin, D.* 24645 (holo. E).

Differs from the type variety in the absence of ligules and in the 5–lobed disc flowers. Var. *taraxacifolius* occurs in E and NE Anatolia, N Iran and Caucasia; var. *discoideus* appears to be endemic to Turkey. For a discussion of the number of lobes of the disc flowers, see note above under *S. davisii*.

Senecio tauricolus Matthews, **sp. nov.**

Affinis *S. cilicio* Boiss. sed indumento foliorum sparso, pappo longiore (7–10 mm haud 5·5–7 mm) differt.

Herba perennis erecta rhizomate brevi, caulibus sparsim floccosis 40–70 cm altis. *Folia* sparsim arachnoideo-floccosa vel glabrescens; folia basalia 11–16(–20) cm (cum petiolo), elliptica usque anguste ovata, sinuato-dentata vel integra; folia caulina versus apicem caulis decrescentia, denticulata vel integra semi-amplexicaulia. *Petioli* 2–10 cm longi. *Capitula* (2–)4–9 in corymbo plerumque laxo, radiata, 2–4 cm diam. (ligulis inclusis). *Phyllaria* 8–10 mm longa, c. 1·5 mm lata, lanceolata, dense floccosa. *Bracteae* calyculi 8–10(–12), 4–8 mm longae, lineares. *Ligulae* plerumque 13, 12–18 mm longae, flavae. *Flores* disci 5-lobati. *Achenia* 2–4 mm longa, sparsim puberula praesertim versus apicem. *Pappus* albus, 7–10 mm longus.

Turkey. C4 Konya: d. Ermenek, Ermenek-Karaman, Kalkfelsen, 13 km nördlich ob Ermenek, 1640 m, 7 vii 1964, *A. Huber-Morath* 17303 (holo. herb. Hub.-Mor.); Korasch, 1600 m, steppe, vi 1912, *Siehe* 553 (as *S. castagneanus* DC.); Bozkir to Küçüksu menkıı, 1700 m, juniper scrub, 13 vi 1968, *Çetik* 289; Hadim to Taschkent, Quercetum by Kongul, 1480–1500 m, 16 vi 1948, *Hub.-Mor.* 8544; N of Oyuklu Da., 1900 m, 1970, *Quézel et al.*; Kuyu, 2000 m, rocks, 1970, *Quézel et al.* C5 Niğde: Ala Da. by Arpalik cave, 2000–2190 m, rocky slopes, 28 vi 1963, *Parry* 184 Ala Da., 1820–2500 m, rocky and grassy slopes, 5 vii 1963, *Parry* 213. Adana: d. Karaisali, Asmancik Y., NW of Pozanti, 1450–1500 m, mixed woodland, 28 vi 1959, *Hub.-Mor.* 15841.

Related to the endemic *S. cilicius* Boiss., but differing in having a less dense leaf indumentum and achenes with a longeı pappus. *S. cilicius* and *S. tauricolus* aıe the only Turkish members of Boissier's group § *Velutini* which have 5-lobed disc floweıs. They also differ from other species of the group in having 8–10(–14) calyculus bracts; the other *Velutini* possess 4–7. In this calyculus character *S. cilicius* and *S. tauricolus* approach group § *Crociserides* as circumscribed by Boissier in which there is a larger number of calyculus bracts; in this group *S. castagneanus* shows the neaıest affinity to *S. tauricolus*.

Sonchus

V. A. Matthews

Sonchus erzincanicus Matthews, **sp. nov.**

A *S. palustre* L. et *S. maritimo* L. affinis sed characteribus in tabula indicatis differt.

Herba perennis erecta gracilis caule glabro c. 80 cm alto, basi 4 mm lato, superne sparsim glanduloso-hirto, pilis c. 0·2 mm longis. *Folia basalia* rosulata 10–18 cm longa, oblongo-elliptica, ad $\frac{1}{5}$–$\frac{1}{6}$ pinnatifida, lobis oblongis, margine denticulata; folia caulina pauca linearia ± integra semi-amplexicaulia exauriculata, ea inflorescentiae diminuta subulata, 5–10 mm longa. *Capitula* 1·5–2 cm diam., in cymoso-paniculata laxe oblongam c. 28 cm longam, 8 cm latam disposita, capitulis lateralibus ramorum brevi-pedunculatis vel subsessilibus. *Pedunculi* sparsim glanduloso-hirti. *Recepta-*

culum nudum. *Involucrum* cylindraceum. *Phyllaria* multiserialia, sparsim glanduloso-hirta, externa anguste ovata, 3–5 mm longa, interiora lanceolata, 8–12 mm longa. *Ligulae* aureae, c. 10 mm longae. *Achenia* 3–4 mm longa, glabra pallide brunnea, leviter compressa, in quoque facie 1–2–costata, laevia inter costas, erostrata. *Pili* pappi 2-seriales, 7–8 mm longi, albi. Turkey. B7 Erzincan: plain E of Erzincan, 1250 m, slightly saline marsh, 30 viii 1957, *Davis & Hedge*, *D.* 31847 (holo. E).

This specimen was at first determined by L. Boulos as a hybrid between *S. palustris* L. and *S. maritimus* L. The geographical distributions of the putative parents suggest that this is unlikely. *S. palustris* is uncommon in Turkey and occurs only in grid squares A7, A9 and C9; it has not been recorded from B7 (Erzincan). *S. maritimus* is only recorded from Turkey (Fl. URSS 29 notes that it is found—as *S. transcaspicus* Nevski—in "Armenia-Kurdistan") but no material has been seen. No records of hybrids between these species have been found from areas where they overlap.

	palustris	*erzincanicus*	*maritimus*
Folia	auriculata, 25–50 cm longa	exauriculata, 10–18 cm longa	auriculata, 4–15 cm longa
Pedunculi	dense glanduloso-hirti pilis 0·5–1 mm longis	sparsim glanduloso-hirti, pilis 0·2 mm longis	glabri
Diam. capituli	3–4 cm	1·5–2 cm	2–2·5 cm
Achenia	rugosa, in quoque facie 4–5–costata	laevia, in quoque facie 1–2–costata	laevia, in quoque facie, 3–costata

It can be seen from the table that in certain characters (leaf length, peduncle indumentum) the Turkish plant is intermediate between *S. maritimus* and *S. palustris*, but in other characters (e.g. in number of achene ribs) it is not so. The capitula produce a full complement of apparently fertile achenes and a pollen count has shown the percentage of fertile grains to be 98%. The evidence suggests that *S. erzincanicus* is not a hybrid but is a species in its own right.

Tanacetum

A. J. C. Grierson

Tanacetum albipannosum Huber-Morath & Grierson, **sp. nov.**

T. aucherano (DC.) Sch.-Bip. affinis a qua imprimis differt phyllariis non hyalino-marginatis, foliis densius albo-tomentosis et lobis minoribus.

Herba perennis, griseo vel albo-tomentosa, basi lignescens. *Caules* erecti, 20–40 cm alti, foliati, supra ramosi rarius simplices, albo-pubescentes. *Folia* basalia bi-vel tripinnatisecta, ambitu oblanceolata, 7–15 cm longa (petiolis inclusis usque 6 cm longis), segmentis primariis 12–16–jugis, 0·5–2 cm longis, lobis (segmentis ordinis secundariis) obovato oblongis, 8–10–jugis, 1–4 mm

longis, obtusis, simplicibus vel interdum pinnatipartitis; folia mediana similia, plerumque sessilia; folia superiora simpliciter pinnatisecta, 1–2 cm longa. *Capitula* radiata, solitaria vel pluria usque 5, laxe corymbosa. *Involucra* griseo-pubescentia, 0·75–1·25 cm lata; phyllaria ovato oblonga, 4–6 mm longa, subcartilaginea, acuta, anguste fuscescenti-marginata. *Flores radii* 20–35, ligulis albidis vel dilute sulphureo-luteis, 5–8 mm longis, 2·5–4 mm latis, apice obscure tridentatis. *Flores disci* lutei, 2–2·5 mm longi. *Achenia* oblonga, 2–2·5 mm longa, 5–6-costata; corona crenulata, 0·1–0·2 mm longa.

Turkey. A7 Erzincan: Şuşehri to Refahiye, Kalkfelsen 55 km östlich Şuşehri, 1550 m, 1 vii 1953, *Huber-Morath* 13004 (holo. herb. Hub.-Mor.; iso. E); ibidem, 1645 m, 24 vi 1934, *Balls* 1486 (E). Giresun: 22 km N of Şebin Karahisar, 1700 m, *Sorger* 69–29–11 (herb. Sorger); Eribel Pass above Tamdere, 2120–2350 m, 7 vii 1958, *Huber-Morath* 15814 (herb. Hub.-Mor.); ibidem, 2400 m, 7 vii 1958, *Markgraf* 10794 (ZU). B7 Erzincan: 80 km W of Erzincan, 1700 m, *Anderson & Petersen* 28 (E); Şebin Karahisar-Giresun, Yedigözü Yaylari, 1760 m, 1 vii 1955, *Huber-Morath* 12996 (herb. Hub.-Mor.).

Tanacetum mucroniferum Huber-Morath & Grierson, **sp. nov.**

Syn.: *Pyrethrum aucherianum* DC. var. *glabrescens* Boiss., Fl. Or. 3:341 (1875).

Species inter *T. oxylepidem* (Bordz.) Grierson* et *T. aucheranum* (DC.) Sch.-Bip. ponenda. Indumentum parce vel moderate albo-pubescente sed absque pilis sericeis fulvescentibus. Folia illa *T. aucherani* similia sed lobis mucronatis. Capitula solitaria vel pauca. Phyllaria illa *T. oxylepidis* similia, ovato-lanceolata, fusco-marginata, acuminata apice scariosa.

Turkey. B7 Erzincan: Refahiye-Erzincan, Kalkfelsen 23 km E von Refahiye, 1830 m, *Huber-Morath* 13002 (holo. herb. Hub.-Mor.); Keşiş Da. above Cimin, 2800–2900 m, *Davis* 31785 (E). Tunceli: Munzur Da. above Ovacik, 2600 m, *Davis* 31141 (E). B8 Muş: Bıngöl Da. nr. Varto, 1830–2135 m, *Kotschy* 365 (K—iso. of *P. aucheranum* var. *glabrescens*). B9 Ağri: d. Suluçem, S end of Balik Gölü, 2300 m, *Davis* 47266 (E).

Both of these new species belong to a group of related species which also includes *T. sericeum* (Adam) Sch.-Bip., *T. aucheranum* (DC.) Sch.-Bip. and *T. oxylepis* (Bordz) Grierson*, none of them sufficiently close for any one to be considered (as Boissier did in the case of *T. mucroniferum*) an infraspecific taxon of another. All are similar in habit, being erect, medium-sized herbs with bi- or tripinnatisect leaves. *T. sericeum* and *T. oxylepis* are closely related because of their acute leaf lobes and their indumentum which, in part at least, consists of a characteristic brown sericeous hair. In that they have a whitish indumentum, *T. albipannosum* and *T. mucroniferum* are more closely related to *T. aucheranum*. *T. albipannosum* and *T. aucheranum* also agree in having rounded leaf lobes, whereas *T. mucroniferum* is closer to *T. sericeum* because its lobes are acute. The phyllaries of *T. aucheranum* are distinctive and unique in this group in being obtuse and scarious-tipped; those of the

* **Tanacetum oxylepis** (Bordz.) **Grierson, comb. nov.**
Syn.: *Chrysanthemum oxylepis* Bordz. in Mem. Soc. Nat. Kiev 25:122 (1915).
C. sipikorense Bornm. in Feddes Rep. Beih. 89:339 (1944).

other species are acute and only slightly scarious. *T. mucroniferum* further resembles *T. oxylepis* in its capitula which are larger than those of *T. sericeum*. The dense indumentum serves to distinguish *T. albipannosum* as also does the presence, usually, of several capitula which have ligules that tend to be yellowish.

Tanacetum cadmeum (Boiss.) Heywood subsp. **orientale** Grierson, **subsp. nov.**
A subspecie typica caulibus 18–25 cm (non 10–20 cm) altis, corymbis 25–36 (non 7–20) capitulis compositis differt.
Turkey. B6 Adana: Saimbeyli, Bozoğlan Da. above Obruk Yayla, 2000 m, *Davis* 19781 (holo. E).

The type subspecies was described from SW Anatolia—C2 Denizli—and is also recorded from B3 Afyon, C2 Antalya, C3 Isparta and C5 Adana.

Other specimens of subsp. *orientale* have been collected from Central & E Anatolia: A7 Gümüşane, *Balls* 1789. B5 Kayseri, *Davis* 19373. B6 Adana, *Davis* 19409. B7 Erzincan, *Sintenis* 1890: 2579; Malatya, *Huber-Morath* 9019. B9 Ağri, *Davis* 44100. C7 Diyarbakir, *Kotschy*. C10 Hakkari, *Duncan & Tait* 222.

Tanacetum densum (Labill.) Sch.-Bip. subsp. **sivasicum** Huber-Morath & Grierson **subsp. nov.** a subspecie typica capitulo solitario, ligulis 1·5–3 mm longis, foliis basalibus minoribus laminis 10–15 (–20) mm longis 5–7 mm latis differt.
Turkey. B6 Sivas: Gürün-Sivas, Kalkfelsen, 34 km nordlich Gürün bei Böğrüdelik, 1750 m, *Huber-Morath* 13230 (holo. herb. Hub.-Mor.; iso. E). B6 Malatya: Darende to Akçadağ, 1525 m, *Davis* 21904 (E). Sivas: Gök Pinar, 1800 m, *Sorger* 71–50–5 (herb. Sorger).

Single-headed specimens of *T. densum* turn up among Syrian gatherings of the type subspecies which is not indigenous in Turkey. Even in Syria, however, it is unusual to find all the stems monocephalous. It is further separated from subsp. *amani*, which is common in S Turkey, by its smaller leaves, thinner stems and rootstocks, and by its prominently scarious inner phyllaries.

Tanacetum densum (Labill.) Sch.-Bip. subsp. **laxum** Grierson, **subsp. nov.** a subspecie typica segmentis primariis foliorum (juvenilibus exceptis) distantibus (fere ut in *T. chiliophyllo*), capitulis 3–7 laxe corymbosis, ligulis (an semper?) 4 mm longis differt.
Turkey. B6 Sivas: Gök Pinar, 1800 m, *Sorger* 71–50–4 (holo. herb. Sorger).

T. densum and *T. cadmeum* are generally separated by the closely conferted leaf segments of the former as against the more open arrangement of segments in the latter. The shape of the ultimate segments also differs: oblanceolate and obtuse in *T. densum*, linear and acute in *T. cadmeum*. The ligules in *T. cadmeum* are inconspicuous, generally about 1·5 mm long, but they are

usually 2–2·5 in *T. densum*. Those of subsp. *laxum* therefore, although known only from a single gathering, are the longest recorded.

T. chiliophyllum (Fisch. & Mey.) Sch.-Bip., a taller species from E Anatolia, usually has neatly pectinate leaf segments.

Tanacetum coccineum (Willd.) Grierson, **comb. nov.**

Syn.: *Chrysanthemum coccineum* Willd., Sp. Pl. 3:2144 (1803).

This species has to some extent been misinterpreted and requires elucidation. Willdenow described the leaves as "folia pinnata glabra, pinnis pinnatifidis, laciniis linearibus acutis", and there are three sheets in his herbarium (No. 16173) under the name *C. coccineum*:

1, has pinnatisect leaves with segments that are serrately toothed and bears a separate label inscribed "*Pyrethrum carneum* MB."

2, has bipinnatisect leaves and bears a ticket reading "*C. roseum* M. (Adam)."

3, is leafless and bears the remains of a capitulum: it is unannotated.

It would seem from his description that Willdenow regarded only the specimen with bipinnatisect leaves as *C. coccineum* and thus there is some justification for Bieberstein renaming the pinnatisect specimen as *P. carneum*, but none for Adams' *C. roseum* (a photograph at E of his type specimen in Leningrad "in summitate montis Kaischaur" is identical with Willdenow's second specimen). It may also be noticed that Bieberstein (in Fl. Taur.-Cauc. 2:324, 1808) treated *coccineum* and *roseum* as synonyms but regarded *P. roseum* as the correct name. But Tzvelev (Fl. URSS 26:218, 1961) separates *P. roseum* with pinnately divided leaves from *P. coccineum* with bipinnatisect leaves which is contrary to Adam's original intention.

From his herbarium, it would appear that Willdenow regarded both leaf forms as belonging to the same species and probably any distinction between them should be at subspecific level. Thus:

subsp. **coccineum** with bipinnatisect leaves, syn.: *P. roseum* Adams in M. Bieb., Fl. Taur.-Cauc. 2:324 (1808), is native to Transcaucasia.

subsp. **carneum** (M.B.) Grierson, **comb. et stat. nov.,** syn.: *Pyrethrum carneum* M. Bieb., Fl. Taur.-Cauc. 2:325 (1808), with pinnatisect leaves is apparently confined to the Caucasus and Azerbaijan.

In both of these subspecies the primary leaf segments are ovate or elliptic in outline but in NE Turkey and Georgia the leaves are deeply bi-or tripinnatisectly divided into narrowly linear carrot-like segments. This may be recognised as a distinct subspecies.:

subsp. **chamaemelifolium** (Somm. & Lev.) Grierson, **comb. et stat. nov.**

Syn.: *Pyrethrum roseum* Adam var. *chamaemelifolium* Somm. & Lev. in Acta Hort. Petrop. 16:235 (1900).

This was originally described as having white ligules but in view of the variability of colour among garden Pyrethrums (which were developed from *T. coccineum*), it is reasonable to assume that several colour forms exist in nature.

Taraxacum

J. L. van Soest*

Taraxacum buttleri van Soest, **sp. nov.** (Sect. *Erythrosperma* Dahlst.).

Planta parva, 3–6 cm alta, basi araneosa fragmentis foliorum veteriorum incrassata. *Folia* numerosa, decumbentia, subprasino-viridia, subglabra, lobata, petiolis angustis roseis. *Folia exteriora* obovata, breviter lobata (lobi utrinque 1–2) vel subintegra, interiores utrinque 2–4-loba, lobi laterales late triangulares, usque ad 6 mm longi, subretroversi, subacuti, dorso minute dentato vel denticulato, margine inferiore interdum plicato; interlobia brevissima, plicatula; lobus terminalis hastatus, 6–10 mm longus obtusus, interdum denticulatus. *Scapi* parce araneosi, floriferi foliis breviores. *Involucrum* canescenti-viride, 9–11 mm longum, turbinatum. *Squamae* exteriores laxe adpressae vel apice recurvae, ovatae, 3–4 mm longae, 1·5–2·5 mm latae, ovatae, inconspicue viridi-marginatae, omnes laeves. *Calathium* luteum. *Ligulae* marginales extus stria atro-violacea notatae. *Antherae* polliniferae; stylus et stigmata obscure fuscescentia, siccitate nigra. *Achenium* badio-rubrum, pyramide inclusa 5 mm longum, spinulosum ceterum rugosum basi laeve, in pyramidem cylindricam 1·3 mm longam subabrupte abiens. *Rostrum* 7 mm longum. *Pappus* albus, 5 mm longus. *Floret* majo.

Turkey. C2 Antalya: Elmali Da., Südhang oberhalb Kişla köyü, Aufstieg nach Aksivu, 1880 m, 17 v 1969, *K. P. Buttler & A. Uzunoğlu* 13069 (holo. herb. Buttler).

This species is related to *T. hepaticolor* van Soest. The latter has pale fulvous achenes which are slightly smaller; the leaf form of well developed plants is also different—those of *T. hepaticolor* being more hairy; the outer phyllaries are smaller in *T. buttleri*; in the latter the phyllaries have no gibbosity whereas in *T. hepaticolor* a gibbosity is present. It is probable that all plants from Turkey previously identified as *T. hepaticolor* f. *erythrocarpum* van Soest belong to *T. buttleri*; *T. hepaticolor* is restricted to Iran.

Taraxacum microcephaloides van Soest, **sp. nov.** (Sect. *Rhodotricha* Hand.-Mazz.).

Planta humilis, raro ad 15 cm alta, basi interdum arachnoideo-pilosa, ceterum glabra. *Folia* canescenti-viridia, lobata, petiolis, pallide viridis; lobi laterales triangulares vel late lingulati, subacuti, ± integri; interlobia sat longa, angusta; lobus terminalis elongato-sagittatus, subobtusus. *Scapi* cupreo-vel roseo-colorati, teneri. *Involucrum* angustum, 8–9 mm latum, c. 12 mm longum. *Squamae* exteriores anguste triangulares, pallide virides, inconspicue marginatae, apice recurvatae, omnes laeves. *Calathium* planum, radians, ad 2 cm diametro, pallide luteum. *Ligulae* marginales extus stria canoviolacea notatae. *Antherae* polliniferae. *Stylus* sordide luteus, stigmata nigrescentia, siccitate nigra. *Achenium* stramineum, pyramide inclusa c. 4 mm longum, superne breviter spinulosum ceterum laeve, in pyramidem conicam, c. 0·8 mm longam subabrupte abiens; rostrum c. 5 mm longum; pappus perpallide brunnescens, 3–4 mm longus.

* van Soutelandelaan 35, Den Haag, Netherlands.

Turkey. C7 Adiyaman: Taurus Cataonicus, in monte Nimrud Dagh pr. vicum Kjachta, pr. Tschirik Jailassi, in cespite humido ad fontem, substr. calcareo, 1950 m, 12 vii 1910, *Handel-Mazzetti* 2158 (holo. WU).

T. microcephaloides is characterized by blackish stigmas, in which it differs, amongst other characters, from *T. assemanii* and from *T. stenocephalum* = *T. bessarabicum*; *T. kotschyi* has distinct horns on the phyllaries, whereas *T. microcephaloides* lacks these. Handel-Mazzetti has already pointed out the great variability of his "*T. microcephalum*".

Taraxacum uzunoglui van Soest, **sp. nov.** (Sect. *Scariosa* Hand.-Mazz. emend. Dahlst.).

Planta tenera, 8–10 cm alta, basi subglabra fragmentis foliorum veteriorum incrassata. *Folia* numerosa, laete gramineo-viridia, tenera, lobata, in nervo dorsali parce araneosa ceterum glabra, petiolis angustis, pallidis vel parce roseolis. *Folia exteriora* anguste oblongata, dentata, subobtusa, interiora utrinque c. 5-loba; lobi laterales deltoidei, usque ad 5 mm longi, acuti interdum dorso denticulato; interlobia brevia, lata; lobus terminalis hastatus vel deltoideus, ad 15 mm longus, subobtusus. *Scapi* tenera, parce araneosi. *Involucrum* 10–11 mm longum, c. 8 mm latum, basi rotundatum, fusco-viride. *Squamae* exteriores erecto-patentes, ovatae usque ad 2·5 mm latae, 6 mm longae, acuminatae, ± tota pallide virides vel latissime albo-vel viridi-marginatae, parte mediano, 0·1–1 mm lato, obscure viridi, apicibus obscuribus, omnes laeves. *Calathium* luteum. *Ligulae* marginales planae, extus stria atroviolacea notatae. *Antherae* polliniferae; stylus et stigmata fusco-virescentia. *Floret* majo. *Achenium* aurantiacum, pyramide inclusa 5 mm longum, superne argute spinulosum ceterum rugosum, in pyramidem cylindricam, 1·3 mm longam (spinulis praeditam) sensim abiens. *Rostrum* 5 mm longum; pappus sericeus, 5–6 mm longus.

Turkey. C2 Antalya: Elmali Da., Südhang oberhalb Kişla köyü, Aufstieg nach Aksivu, 1880 m, 17 v 1969, *K. P. Buttler & A. Uzunoğlu* 13071 (holo. herb. Buttler).

T. uzunoglui is reminiscent of *T. hyberniforme* van Soest, which is known from the region of Istanbul. It differs from it especially in the characters of the achene, which is bigger in *T. uzunoglui*; the cone is much longer, only 0·5 mm in *T. hyberniforme*; the spinules in the latter species are coarse and not thin as in the first. Moreover, the number of lateral lobes is greater in *T. uzunoglui*; in *T. hyberniforme* the involucre is dark green and the phyllaries, partly, are corniculate.