

STUDIES IN THE FLORA OF ARABIA VII:

Centaurea in the Arabian peninsula

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ABSTRACT. Two new Arabian taxa of *Centaurea* (Compositae) are described: *C. yemensis* Wagenitz, from the mountains of N Yemen, a perennial species probably allied to sect. *Calcitrata*; *C. pseudosinaica* Czerep. subsp. *niebuhrii* Wagenitz from southern Arabia. A key to the *Centaurea* species of the area is given. Altogether 11 species are recognized as occurring in Arabia. There are comments on some species apparently erroneously recorded. Four species of *Centaurea* were described from 'Arabia' by Velenovský in 1911; of these two can be identified with known species, a third, *C. camelorum* Velen., has been re-found in Jordan, the fourth remains questionable.

INTRODUCTION

Arabia is not an area especially rich in species of *Centaurea*, but the few species present are nevertheless interesting and insufficiently known. The study of material of this genus, for the greater part collected recently and kindly placed at our disposal through the Keepers of the herbaria of the Royal Botanic Gardens at Edinburgh and Kew, the British Museum (Natural History), and the Institut für Allgemeine Botanik in Hamburg, has led to the recognition of one new species and a new subspecies of another. It is useful for further studies to give a provisional list of the species known from the area and a key. The material is still insufficient to give a clear idea of the geographical distribution of the species, especially those of the desert areas.

NEW TAXA

Centaurea yemensis Wagenitz, sp. nov. (Fig. 1)

Planta perennis basi lignosa, ad 30 cm (e collectore usque ad 50 cm) alta, fere a basi ramosa, ramis caulem primarium superantibus. *Folia basalia* florendi tempore sicca vel emarcida, caulina omnia similia, lanceolata, basi in petiolum attenuata vel (superiora) sessilia, indivisa, integra vel minute et remote denticulata, rarius basin versus utrinque 1-2 lobis parvis provisa, superiora minora, involucro circiter aequilonga. *Folia rigida*, glandulis sessilibus dense punctata et pilis brevibus scaberula interdum paulo araneosa. *Capitula* in apice ramorum solitaria. *Involucrum* ovoidem vel cupuliforme, 13-15 mm longum et 9-12 mm latum. *Phylla* pluriseriata, inferiora et media appendice spiniforme provisa, interiora inermia appendice rotundata, scariosa, lacerata. *Appendix* in phyllis mediis 10-18 mm longa, pars basalis 2-3 mm lata, triangularis, utrinque spinulis vel ciliis 1-4(2-4 mm longis) cincta, in spinam validam excurrens. *Flores* roseo-purpurei, marginales pauci, non radiantes, ceteris paulo minores. *Achaenia* ignota. *Pappus* 1.5-2 mm longus, duplex.

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FIG. 1. *Centaurea yemensis* Wagenitz. Part of the holotype (Wood 2600, K); single leaf from Wood 3021 (E).

YEMEN ARAB REPUBLIC: frequent on earth banks around fields on the Dubhan plateau between Turba and Akahila, low much branched annual or weak perennial, flowers mauve, c. 2000 m, 29 x 1978, J. R. I. Wood 2600 (holo. K, iso. E); on earth banks by fields and road between Turba and Rubaisa, (Hoogariah), annual, flowers purple, c. 2000 m, 26 x 1974, J. R. I. Wood 74/134 (K); frequent on stony slopes between Turba & Shergab, annual or short-lived perennial, up to 50 cm, flowers pink-purple, c. 2000 m, 26 x 1979, J. R. I. Wood 3021 (E).

According to the collector, this is an annual or short-lived perennial. Probably it is one of those species, not rare in *Centaurea*, which can flower in the first year but may persist for several years; Wood 74/134 clearly shows several remnants of old flowering-stems and seems to be at least three years old.

The taxonomic position of this species is still uncertain. In the

herbarium at Kew it had been provisionally assigned to sect. *Calcitrata*, and the characters of the involucre certainly point in this direction. But the vegetative characters—perennial habit with undivided leaves—are different. There are some similarities to *C. dhofarica* Baker, but in this species the appendages consist of a spine with 1–2 spinules near the base, while in *C. yemensis* there is a broader basal part with several spinules or cilia on the terminal spine. At the moment, it seems best to treat *C. yemensis* as a 'species incertae sedis' without close relatives.

Centaurea pseudosinaica Czerepanov in *Not. Syst. (Leningrad)* 20:392 (1960).

This species has only recently been recognized (Czerepanov 1960, Wagenitz 1980). It is only moderately variable in the desert areas of southern Iraq and Iran, but shows considerable variation in the mountains of the Arabian peninsula. In particular the specimens from N Yemen and Dhofar differ in several characters:

1. Perennial habit. This is not apparent in all the specimens and it is very probable that the plants are always capable of flowering in their first year. In some plants the root is distinctly thickened;
2. Leaves sessile or very shortly decurrent. There is much variation in this character. The leaves of the short main-stem are more or less petiolate and hence not decurrent. In the lateral branches, which overtop the primary capitulum, the variation is considerable;
3. Inner row of pappus as long as the penultimate. It may be noted here that this character, which Boissier (1875) thought to be decisive for putting these species into the genus *Phaeopappus*, is variable in several species of *Centaurea*, e.g. *C. aegyptiaca* L. and *C. ispanica* Boiss.

Collections which show only one or two of these characters are known and thus to recognize a separate species seems impossible. I propose the recognition of a new subspecies and name it in honor of Carsten Niebuhr (1733–1815). Niebuhr studied in Göttingen and was the only surviving member of the famous Danish expedition to Arabia (Niebuhr 1816, Hansen 1965, Siebs 1966) which had Prof. Michaelis from Göttingen as its guiding spirit. Although not himself a botanist Niebuhr did much to publish the results of the expedition, especially the '*Flora aegyptiaco-arabica*' of Forsskål, the botanist of the expedition.

Centaurea pseudosinaica Czerep. subsp. **niebuhrii** Wagenitz, subsp. nov.

A subsp. *pseudosinaica* differt foliis ramorum sessilibus vel breviter decurrentibus, serie interna pappi ceteris aequilonga et planta perennante. YEMEN ARAB REPUBLIC: south of Hawari near Mamer (north of San'a), frequent in a rocky volcanic plain, perennial to 1 ft, flowers pale yellow, 2200 m, 18 xii 1874, J. R. I. Wood Y/74/353 (holo, BM).

Other representative specimens: YEMEN ARAB REPUBLIC: Yerim, 14°04' N, 44°18' E, in and around road camp just north of the town, disturbed ground, common along roadsides and waste places, perennial weed spreading laterally under sheep pressure or erect to 30 cm high, 2620 m, 30 x 1975, Hepper 6174 (K); above Haddah, on NE-facing stony slopes, 2800 m, 12 viii 1977, Radcliffe-Smith & Henchie 4591 (K); Jabal Hadhur an Nabi Shwayib, summit and much eroded slopes on various volcanic

rocks of the Trapp series, whole area heavily overgrazed, c. 3300 m, 13 ix 1977, *Lavrano & Newton* 15812 (E); San'a District, nearing El Azraqain, about 7.5 miles from San'a, c. 8000', 31 i 1938, *Scott & Britton* 447 (BM); Juma to Mabar track, 14°49' N, 44°04' E, rocky slopes, 2380 m, 8 v 1979, *D. Wood* Y 1162 (E).

SULTANATE OF OMAN, Dhofar: wadi on north side of Jebel Qara, in steep rocksided wadi with sand and gravel bottom, annual ?, c. 900 m, 9 iii 1979, Whitcombe 511 (E); Ayun cross roads, 600 m, 6 v 1978, Berkeley 13 (E); Jebel Qara, Ayun Road, rocky slopes dominated by *Acacia* sp., c. 800 m, 25 ix 1979, Miller 2210 (E).

KEY TO THE SPECIES OF CENTAUREA IN ARABIA

1.	Annuals	2
+	Perennial herbs or subshrubs	6
2.	Outer phyllaries with foliaceous appendage, median with a simple spine	<i>C. bruguierana</i>
+	Appendages of outer phyllaries not foliaceous	3
3.	Appendages triangular, ciliate, ending in a weak spinule	<i>C. ammocyanus</i>
+	Appendages with a robust spine and lateral spinules	4
4.	Phyllaries with a fine adpressed (mealy) tomentum; leaves not decurrent	<i>C. mesopotamica</i>
+	Phyllaries sparsely arachnoid or nearly glabrous; leaves decurrent	5
5.	Stem and leaves villous with long glossy hairs	<i>C. sinica</i>
+	Stem and leaves with very short stiff hairs	<i>C. pseudosinica</i> subsp. <i>pseudosinica</i>
6.	Phyllaries ending in a minute mucro	<i>C. schimperi</i>
+	Phyllaries ending in a spine or spiny appendage	7
7.	Flowers purple	8
+	Flowers yellow	9
8.	Leaves undivided, scabrous with dense short hairs; appendage a spine with few basal spinules, not decurrent	<i>C. yemensis</i>
+	Leaves lyrate with sparse long hairs; appendage a spine ciliate at base and decurrent along the phyllary as a narrow border with numerous long cilia	<i>C. eryngioides</i>
9.	Involucre up to only 8 mm broad; small much-branched shrubs (only young shoots green)	10
+	Involucre broader; perennial herbs, sometimes woody at base	11
10.	Pappus absent; spine of phyllaries at base with a membranous dentate auricle	<i>C. camelorum</i>
+	Pappus present; spine simple or with lateral spinules without auricles at base	<i>C. scoparia</i>
11.	Median leaves nearly linear, entire, c. 10 x longer than broad	<i>C. wendelboi</i>

- + Median leaves lanceolate or linear-lanceolate, mostly lobate or denticulate, scarcely more than 5 x longer than broad 12
- 12. Leaves broadly lanceolate in outline, with flat margins, 2-2.5 cm broad; involucre 16-17 mm long *C. dhofarica*
- + Leaves lanceolate or linear-lanceolate, dentate and crispat-undulate, narrower; involucre 13-15 mm long *C. pseudosinaica* subsp. *niebuhrii*

ANNOTATED CHECK-LIST OF THE SPECIES OF CENTAUREA FROM ARABIA

Arabia is used here as delimited by Wickens (1982). This means that 'Arabia petraea' (\pm = Sinai and Jordan) is excluded. The numbered species are those of which we have seen herbarium material from the area. The names in brackets are synonyms of others or else refer to species indicated from the area but not confirmed, or excluded from the genus.

The abbreviations given after the species names are: SA, Saudi Arabia; NY, North Yemen; O, Oman; UEA, United Arab Emirates; Q, Qatar; K, Kuwait.

(*Centaurea aegyptiaca* L.; the occurrence of this species in the northern part of the area is not improbable, but so far no material has been seen; Boissier (1875) cites *Aucher* 4848 from Muscat under *C. aegyptiaca*, but at least the specimen in the British Museum belongs to *C. pseudosinaica*.)

(*C. albicaulis* (Deflers) O. Schwartz = *Volutaria* sp.)

1. ***C. ammocyanus*** Boiss.—SA.

So far only one Arabian specimen has been seen: Saudi Arabia, Wadi Badanah, *Dickson* 702 (K).

(*C. arabica* Velen.; synonymous with *C. sinaica*, see below.)

2. ***C. bruguierana*** (DC.) Hand.-Mazz.—SA, K.

Known from few collections from Kuwait and northeastern Saudi Arabia. As far as the material allows a exact determination they all belong to subsp. *bruguierana*.

(*C. camelorum* Velen.) See below for a discussion of this species which probably occurs in northern Saudi Arabia and was for this reason included in the key.

3. ***C. dhofarica*** Baker—O.

Besides the type (Dhofar Mountains, Hafa, *Bent* 35, K) only one rather inadequate specimen has been seen which seems to belong to this species: Oman, Arift area, *Jebel Qamar*, *Maconochie* 3631 (E).

4. ***C. eryngioides*** Lam.—SA.

This species, already mentioned for Saudi Arabia by Migahid (1978), has recently been collected by Collenette 'near Shiqri off Tabuk road' in the northwestern part of the country. The typification of the species name, a problem not yet satisfactorily solved, is discussed by Wagenitz (1981).

(*C. hochstetteri* Oliv. & Hiern = *Volutaria abyssinica* (Schultz-Bip. ex A. Rich.) C. Jeffrey ex Cufod. Note: The specific identity of the material seen from Arabia with the Ethiopian specimens seems doubtful to me. Further material is needed.)

(*C. lippii* L. = *Volutaria lippii* (L.) Cass. ex Maire; I have not seen an Arabian specimen.)

(*C. maxima* Forssk. = *Centraurothamnus maximus* (Forssk.) Wagenitz & Dittrich; see Wagenitz, Dittrich & Damboldt, 1982.)

(*C. melitensis* L.; recorded by O. Schwartz (1939); the only specimen cited (Wissmann 1407, HBG) is very scrappy and cannot be determined with certainty, but the characters of the achenes exclude it from being *C. melitensis*.)

5. *C. mesopotamica* Bornm.—SA, K.

First indicated from Kuwait by Dickson (1955). A few collections have been seen from Kuwait and northern Saudi Arabia.

(*C. musilii* Velen.; probably synonymous with *C. mesopotamica*, see below.)

(*C. pallescens* Del.) The records of this species are by Deflers (1889), O. Schwartz (1939) and Podlech (1982). The specimens collected by Deflers (at P) have not been seen, the other cited by Schwartz and those of Podlech belong to *C. pseudosinaica*.

(*C. phyllocephala* Boiss. = *C. bruguierana*)

6. *C. pseudosinaica* Czerep.—SA, NY, O, UAE, Q, K.

The most widespread and variable species in Arabia. Most of the earlier records of *C. sinaica* and *C. pallescens* refer to it. It is represented by subsp. *pseudosinaica*, especially in Kuwait and northern Oman, and by subsp. *niebuhrii* in the mountains of southern Arabia (see above for a more detailed discussion).

Mention should be made of two specimens which are similar to *C. pseudosinaica* in several respects but differ considerably. They may represent a new subspecies (or even species), but the material is at the moment insufficient for a description.

SAUDI ARABIA: Al Mujaddah summit, 18°16' N, 42°21' E, c. 9400', 24 x 1969, *Mandaville* 2583 (BM); Asir Province: Abha Region (?), 1977/78, *Nasher* H 4 (E). Prominent features of these plants are the broad wings of the leaves, long and stout spines (25–37 mm long) of the involucre and a very short pappus (c. 1 mm).

(*C. pungens* Pomel; recorded by De Marco & Dinelli (1974) but a misidentification seems probable as the species is so far only known from western North Africa.)

7. *C. schimperi* DC.—SA, NY.

The area of this species described from 'Tayfa' (At Ta'if) extends through the mountains of the Asir to North Yemen. In North Yemen it is so far only known from two collections by Wood near Rada and Shemlaan.

8. *C. scoparia* Sieb. ex Spr.—SA.

Only one collection from northernmost Saudi Arabia (*Collenette* 3456, E) has been seen from the area.

9. *C. sinaica* DC.—SA.

Known from a few collections in the northwestern part of Saudi Arabia (Hijaz) and there replacing *C. pseudosinaica*.

(*C. solstitialis* L.; this species is absent from Egypt and Palestine and from the desert parts of Iraq and its occurrence in Arabia seems improbable; the records are probably due to a confusion with *C. pseudosinaica*.)

(*C. virgata* Lam.; this species was mentioned by Blatter 1921 on the basis of a specimen collected by Forster 'in Arabia' (K); this plant has not been seen and the occurrence of the species is improbable.)

10. *C. wendelboi* Wagenitz—O.

This species was described a few years ago from southern Iran where it occurs north of Bandar Abbas (Wagenitz 1980). In the Kew herbarium a specimen from Arabia was found (with a wrong determination): SULTANATE OF OMAN, Musandam peninsula, Jebel Haryym, 5500 ft., 4 iii 1978, *Munton* 41. This is an interesting disjunction of a rare species across the Strait of Hormuz. *Salvia mirzayanii* Rech. f. & Esfand. provides a similar example (Hedge 1982).

11. *C. yemensis* Wagenitz—NY.

See above for a discussion of this new species endemic to N Yemen.

THE CENTAUREA SPECIES FROM 'ARABIA' COLLECTED BY MUSIL

In 1911 Velenovský described four new species of *Centaurea* collected by A. Musil in the 'middle and northern part of Arabia'. The exact localities of these species are unknown and their identities have been very uncertain. From the published itinerary of Musil (Peucker 1910, Musil 1927), it is clear that in 1908–09 he travelled in areas which now belong to Syria, Jordan and Saudi Arabia. Velenovský gives only a broadly delimited area as 'In distr. Hamad' or 'As Sowwan' and the Arabic name of the plant. It looks as if Velenovský thought these names were place-names! The Arabian names are cited by Musil in 1927 but in slightly altered orthography and with some corrections. They can be a help in finding the locality, but the evidence is not unequivocal as the same Arabian name may be used for more than one species.

The types of these species had seemed to be lost as Rechinger failed to get them on loan together with other material (Rechinger 1962). But fortunately three of these have been found and kindly sent on loan by the herbarium of the Botanical Institute of the Charles University at Praha. This allows a clear answer about the identity of these species.

C. arabica Velen. Investigation of the type shows this to be the yellow-flowering variant of *C. sinaica* DC. The area or place 'El Marsad' has not been found. The Arabic name is given as 'Mrara' by Velenovský and 'Mrâr' by Musil (1927). The same name is used for other yellow-flowering annual *Centaurea*-species with spiny involucre such as *C. musili* Velen.

(Musil 1927), *C. alexandrina* Del. and *C. pallescens* Del. (Schweinfurth 1912).

C. camelorum Velen. This is a species which should be maintained. The type material was collected at 'As Sowwan' with the Arabian name 'Brukau' cited by Velenovský, which is an error for 'Brukān' (Musil 1927). The same Arabian word is given as 'Burkān' for *C. scoparia* by Schweinfurth (1912) and as 'Berkan' by Schimper and Kaiser in the 'schedae' of their collections of the same species. 'As Sowwan' is an area west of the Wadi Sirhan in Jordan. Musil 1927 mentions 'Brukān' several times; probably he collected it in the area near al-Hadita. Besides the type we have seen two other collections of this neglected species:

JORDAN: Māan (Arabia), in deserto, 20 vi 1909, Nábēlek 3692 (SAV, sub *Phaeopappo scopario*); Azraq Druze, basalt edge, 15 ix 1965, J. Hemsley (K).

C. camelorum has the general habit of *C. scoparia* making the application of the same Arabic name to both species easy to understand. But the differences are clear: the involucre is shorter than in *C. scoparia* and has a woolly indumentum, and on both sides of the spine there is a membranous dentate auricle and the pappus is lacking. It is probable that this species is also present in adjacent parts of Saudi Arabia.

C. epapposa Velen. (1911, non *C. epapposa* Velen. 1903). This species is said to occur in 'distr. Hamad' and its Arabic name is 'Harsaf' in Velenovský (1911), but 'Srēra' in Musil (1927). Plants with the name 'Srēra' are mentioned by Musil west of Al-Mijadin at the Euphrates, in Syria and near the ruins of al-Hadita near the Jordanian-Saudi Arabian border. Both places are not in the area known as 'el Hamad'! Thus there is considerable confusion. I cannot identify *C. epapposa* with any of the known species of the region on the basis of the description and regrettably no type material is available of this species.

C. musili Velen. ('*C. Musili*'). This is the only species already mentioned in the literature. Handel-Mazzetti (1913) puts it with a question-mark in the synonymy of *C. mesopotamica* Bornm. This identification is confirmed by the study of the type material in PRC. There are two sheets of this species. One, which is chosen here as the lectotype, has the original diagnosis pasted on the sheet. It is from 'el Lobbo', an area southeast of Sakakah in Saudi Arabia. The second is from Wadi Sirhān in Saudi Arabia near the border to Jordan. The Arabic name is given as 'Amrār' on the first and 'Mrār' on the second sheet, a name which—as mentioned above—is also used for *C. arabica*.

Of the four species described by Velenovský, *C. camelorum* stands as a good species allied to *C. scoparia* (sect. *Corethropsis* DC.). *C. arabica* and *C. musili* are synonyms of older species names, and only the identity of *C. epapposa* is still unsolved. However, the latter name cannot be used as it is a younger homonym of another *C. epapposa* described by the same author from Bulgaria.

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REFERENCES

BLATTER, E. (1921). Flora arabica. Part II. *Records Bot. Surv. India* 8: 123-282.

BOISSIER, E. (1875). *Flora orientalis*. Vol. 3. Basel & Genf.

CZEREPANOV, S. (1960). Generis *Centaurea* L. s.str. species novae. *Notul. Syst. Herb. Inst. Bot. Acad. Sci. URSS* 20:392-398.

DE MARCO, G. & DINELLI, A. (1974). First contribution to the floristic knowledge of Saudi Arabia. *Ann. Bot. (Rome)* 33:209-236.

DEFLERS, A. (1889). *Voyage au Yemen. Journal d'une excursion botanique faite en 1887 dans les montagnes de l'Arabie Heureuse*. Paris.

DICKSON, V. (1955). *The Wild Flowers of Kuwait and Bahrain*. London.

HANDEL-MAZZETTI, H. v. (1913). Pteridophyta und Anthophyta aus Mesopotamien und Kurdistan sowie Syrien und Prinkipo. III. *Ann. Naturhist. Hofmus. Wien* 27:391-459.

HANSEN, TH. (1965). *Reise nach Arabien. Die Geschichte der Königlich Dänischen Jemen-Expedition 1761-1767*. Hamburg. [Also in an English version].

HEDGE, I. C. (1982). Studies in the flora of Arabia II: some new and interesting species of Labiateae. *Notes RBG Edinb.* 40:63-73.

MIGAHID, A. M. (1978). *Flora of Saudi Arabia*. Ed. 2, 2 Vols. Riyadh.

MUSIL, A. (1927). *Arabia Deserta. A Topographical Itinerary* (Amer. Geogr. Soc.: Oriental Explorations and Studies Vol. 2). New York.

NIEBUHR, B. G. (1816). Carsten Niebuhr's Leben. *Kieler Blätter* 3:1-86.

PEUCKER, A. (1910). Musil's explorations in northern Arabia. *Geogr. Journ.* 35:579-581.

PODLECH, D. (1982). Beiträge zur Kenntnis der Flora des Jemen (Y.A.R.). *Mitt. Bot. Staatss. München* 18:401-442.

RECHINGER, K. H. (1962). Revision einiger Typen von Velenovsky's *Plantae Arabicae Musiliana*. *Bot. Not.* 115:35-48.

SCHWARTZ, O. (1939). Flora des tropischen Arabien. *Mitt. Inst. Allg. Bot. Hamburg* 10:1-393.

SCHWEINFURTH, G. (1912). *Arabische Pflanzennamen aus Aegypten, Algerien und Jemen*. Berlin.

SIEBS, B. E. (1966). *Lebensbilder von der Elb- und Wesermündung*. Bremerhaven.

VELENOVSKÝ, J. (1911). *Plantae arabicae Musiliana*. *Sitzungsber. Königl. Böhm. Ges. Wiss., Math.-Nat. Cl.* 11:1-17.

WAGENITZ, G. (1980). *Centaurea* L., in Rechinger, K. H. (Ed.), *Flora Iranica*. Lief. 139 b: 313-420. Graz.

— (1981). Drei neue Arten der Gattung *Centaurea* (Compositae-Cardueae) aus der Flora von Libanon und Syrien. *Candollea* 36:365-373.

—, DITTRICH, M. & DAMBOLDT, J. (1982). *Centaurothamnus*, eine neue Gattung der Compositae-Cardueae aus Arabien. *Candollea* 37:101-115.

WICKENS, G. E. (1982). Studies in the flora of Arabia III: a biographical index of plant collectors in the Arabian peninsula (including Socotra). *Notes RBG Edinb.* 40:301-330.