



Centaurea baseri (Compositae), a new species from Turkey

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Abstract

Centaurea baseri, a new species from limestone rocks in Emirdağ (Afyon), Central Anatolia, Turkey, is described and illustrated. The new species is compared with the most similar species *C. aphrodisea* and *C. dursunbeyensis* (*C. sect. Phalolepis*), from which it differs in its involucre, basal leaves, achenes, appendages and habit. Diagnostic morphological characters are discussed. Notes are presented on its ecology and conservation status.

Key words: Asteraceae, Cardueae, *Centaurea* sect. *Phalolepis*, new species, taxonomy

Introduction

Centaurea Linnaeus (1753: 909), which is an important genus of Asteraceae (Compositae) family, is distributed with its about 700 species in Asia, North Africa, America and Europe (Brummitt 2004).

Turkey is the main centre of diversity of the genus *Centaurea* (Wagenitz 1986). The genus was previously revised by Wagenitz (1975) for the Flora of Turkey, where it was divided into 34 sections. Subsequently, *Centaurea* was sorted into four genera: *Centaurea*, *Rhaponticoides* Vaillant (1754: 165), *Psephellus* Cassini (1826: 488) and *Cyanus* Miller (1754) (Wagenitz & Hellwig 2000, Greuter 2003). This change notwithstanding, many new species of *Centaurea* were published from Turkey in the latest years (Davis *et al.* 1988, Güner 2000, Duran & Duman 2002, Uzunhisarcıklı *et al.* 2005, Vural *et al.* 2006, Wagenitz *et al.* 2006, Kaya & Vural 2007, Uysal *et al.* 2007, Uysal 2008, Aksoy *et al.* 2008, Daşkın & Yılmaz 2009, Dinç *et al.* 2009, Doğan & Duran 2009, Hamzaoğlu & Budak 2009, Uysal & Köse 2009). Therefore, *Centaurea* and its relatives were handled broadly in respect of taxonomy during the last ten years in Turkey.

The sectional classification of *Centaurea* relies heavily on the morphology of the appendage of phyllaries and the achenes (Garcia-Jacas *et al.* 2001). Species belonging to *C. sect. Phalolepis* (Cassini 1827: 248) Candolle (1838: 568) are perennials, biennials or annuals. They inhabit dry and often rocky places in the Mediterranean and Near East mainly in the mountains (Wagenitz & Hellwig 1996). These species are similar in vegetative characters to *C. sect. Acrolophus* (Cassini 1827: 253) Candolle (1838: 581), but their appendages are orbicular, hyaline with the firmer centre, entire or irregularly lacerate (Wagenitz 1975).

We collected some specimens belonging to *C. sect. Phalolepis* in 2009. The specimens were not referable to any known *Centaurea* species. The comparison of these specimens with specimens in different herbaria in Turkey showed that we are dealing with a species new to science.

Centaurea baseri Köse & Alan, *sp. nov.* (Fig. 1)

Centaurea dursunbeyensis affinis, a qua caulibus procumbentibus (nec erectis vel ascendentibus), appendicibus phyllorum decurrentibus, foliorum basalium segmentis terminalibus 1–2 mm (nec 5–8 mm) latis, involucris 5–10 mm longis et 3–5 mm latis (nec 7–10 mm longis et 5–7 mm latis), acheniis pilosis (nec glabris) differt. A *Centaurea aphrodisea* caulibus procumbentibus (nec erectis), foliis basalibus pinnatisectis (nec pinnatipartitis), involucris 5–10 mm longis et 3–5 mm latis (nec 10–14 mm longis et 5–10 mm latis), acheniis pilosis (nec subglabris) differt.

Type:—TURKEY. Afyon: Emirdağ, Calbalı, Tahtalı, rocky place, 38° 54' 21.1" N, 31° 12' 51.0" E, 1772 m, 4 Jul 2009, YBK 1566 (holotype ESSE).

Description:—Perennial with woody rootstock. Stems procumbent, 14–42 cm tall, branched above. Leaves densely tomentose; basal leaves 1–2-pinnatisect, 3–4.5 cm long, ultimate segments linear to lanceolate, 1–2 mm broad; median leaves 1–2-pinnatisect, with 4–7 lateral lobes, ultimate segments linear; upper leaves linear. Involucres 5–12 × 3–5 mm, ovoid, funnel-shaped in fruiting time. Phyllaries pluriseriate, linear-oblong; outer phyllaries 4–7 mm long, median phyllaries 6.5–10 mm long, inner phyllaries 9–12 mm long (including appendages) (Fig. 2). Appendages large, concealing basal part of phyllaries, rounded, distinctly decurrent, with strawy margin and firmer central part, irregularly lacerate, ending in a 0.5–1.3 mm spinule. Marginal flowers pinkish, radiant, central flowers white. Achenes brown-coloured, 2–4 × 1.5–3 mm, hairy. Pappus double, with scabrid setae, outer series 2.5–5 mm long, inner series ca. 0.5 mm long.

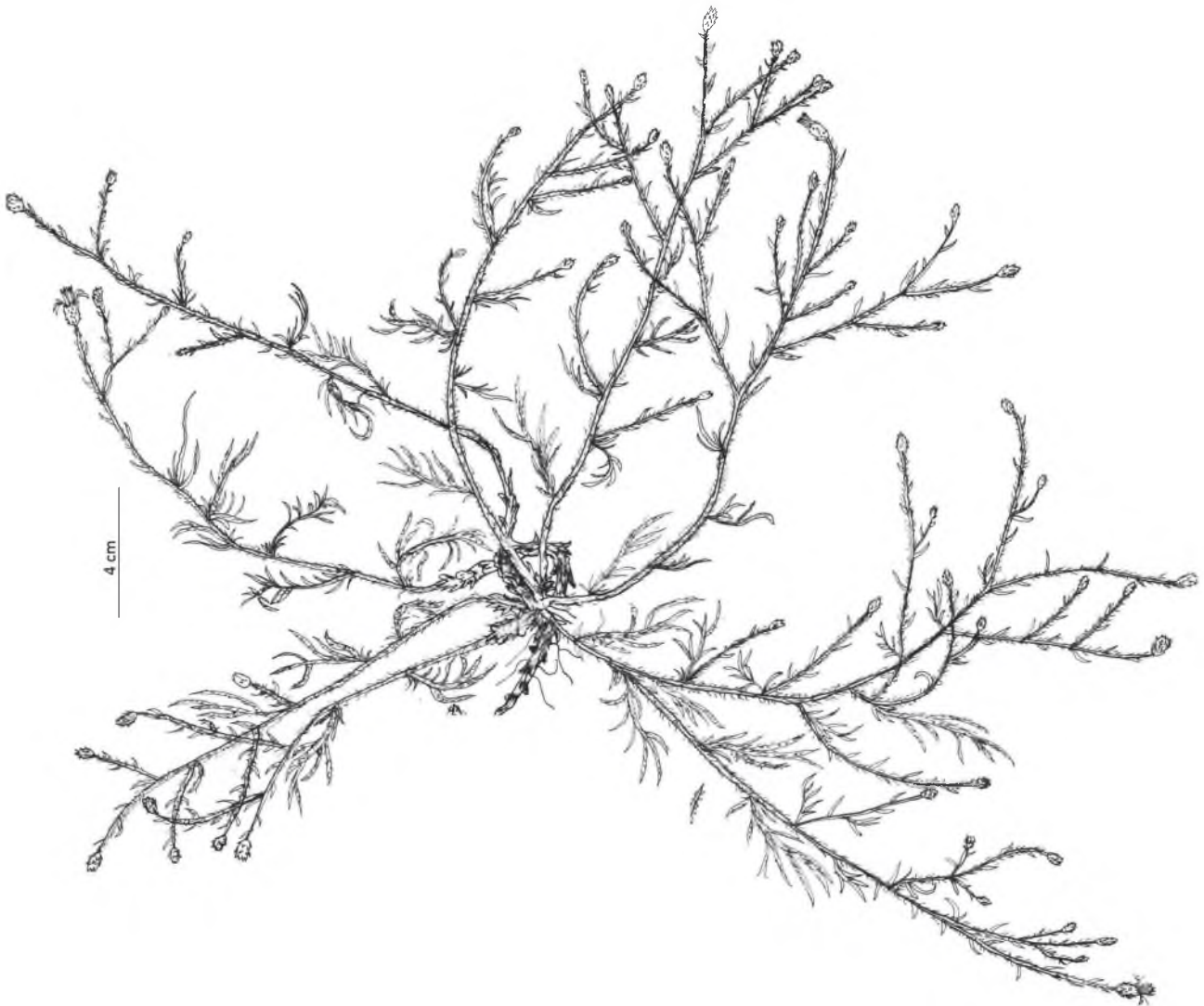


FIGURE 1. Habit of *Centaurea baseri* (from the holotype, YBK 1566).

Distribution and suggested conservational status:—Endemic to Central Anatolia (Afyon province) (Fig. 4). *Centaurea baseri* is a rare and extremely localized species that should be classified as Critically Endangered (CR), according to the IUCN (2001) categories. It has an area of occupancy of less than 10 km² and is known to exist at no more than one location (criterion B2a). Also, the habitat is experiencing a continuing decline owing to grazing (criterion B2b-iii).

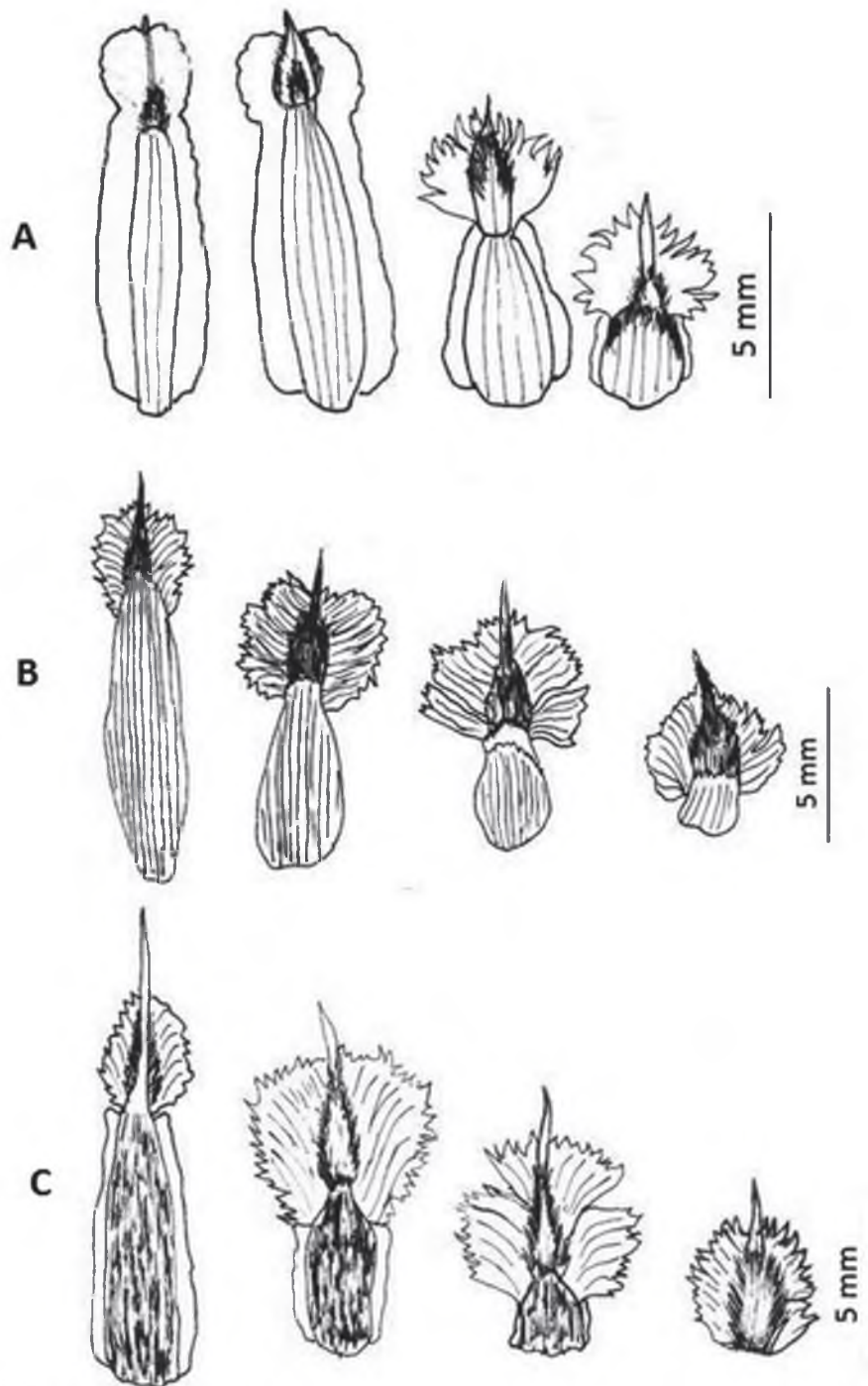


FIGURE 2. Phyllaries of *Centaurea* species. **A.** *Centaurea baseri* (YBK 1566). **B.** *Centaurea aphrodisea* (YBK 1527). **C.** *Centaurea dursunbeyensis* (YBK 1535).

Ecology:—*Centaurea baseri* occurs in limestone rock crevices and on rocky slopes. It is an endemic to Central Anatolia, an Irano-Turanian element. This species grows together with *Chamaecytisus hirsutus* (L.) Link, *Astragalus andrachneifolius* Fenzl, *Phlomis armeniaca* Willd., and *Marrubium astracanicum* Jacq. subsp. *astracanicum*, at altitudes of 1500–2000 m above sea level. Flowering time—June. Chamaephyte.

Etymology:—The species is named in honour of Prof. Dr. Kemal Hüsnü Can Başer who is one of the editors of The Flora of Turkey and East Aegean Islands, vol. 11.

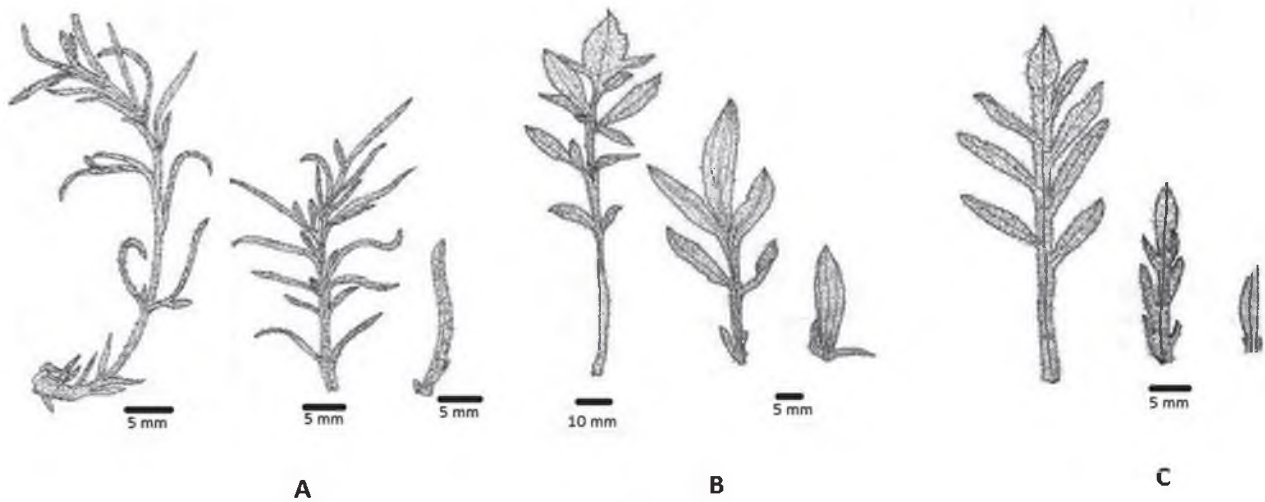


FIGURE 3. Basal, median and upper leaves of *Centaurea* species. **A.** *Centaurea baseri* (YBK 1566). **B.** *Centaurea dursunbeyensis* (YBK 1535). **C.** *Centaurea aphrodisea* (YBK 1527).

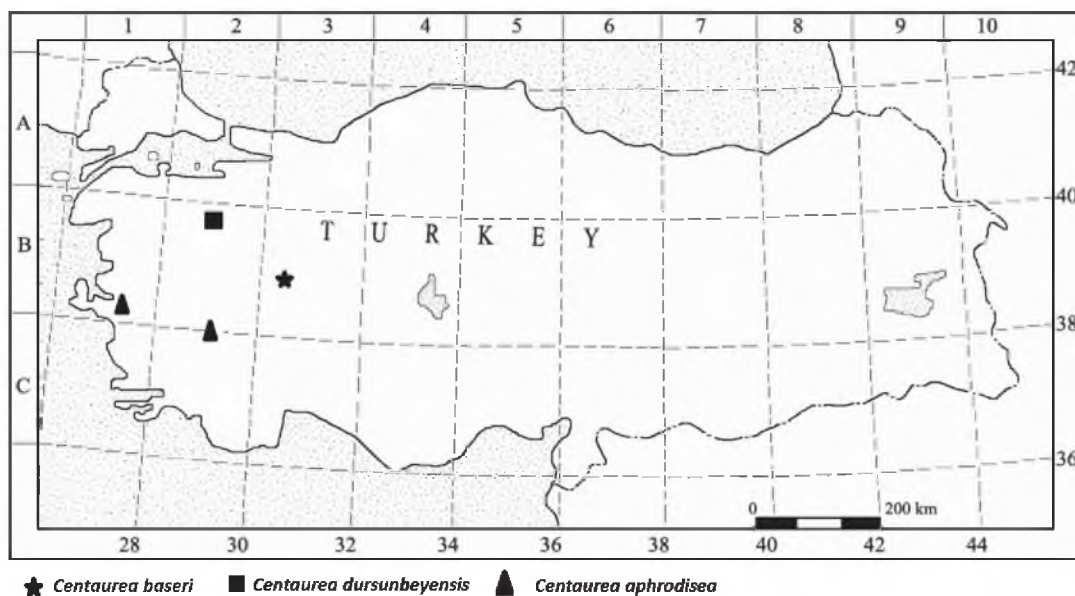


FIGURE 4. Distribution areas of *Centaurea baseri*, *C. dursunbeyensis* and *C. aphrodisea*.

Identification key

Group D of the Flora of Turkey (Wagenitz 1975)

1. Mucro 0.5–1.5 mm long
 2. Basal and lower cauline leaves entire or lyrate.....31. *C. lycia*
 2. Basal and lower cauline leaves pinnatipartite or pinnatisect
 3. Basal and lower leaves pinnatipartite29. *C. aphrodisea*
 3. Basal and lower leaves pinnatisect
 4. Appendages not decurrent, ultimate segments of basal leaves 5–8 mm broad, stem erect to ascending
.....29a. *C. dursunbeyensis*
 4. Appendages decurrent, ultimate segments of basal leaves 1–2 mm broad, stem procumbent
.....29b. *C. baseri*
1. Mucro 1.5–4 mm long [...]

Discussion

The new species *Centaurea baseri* is included in *C. sect. Phalolepis*, which comprises 11 species in Turkey, all of which are endemic to the country.

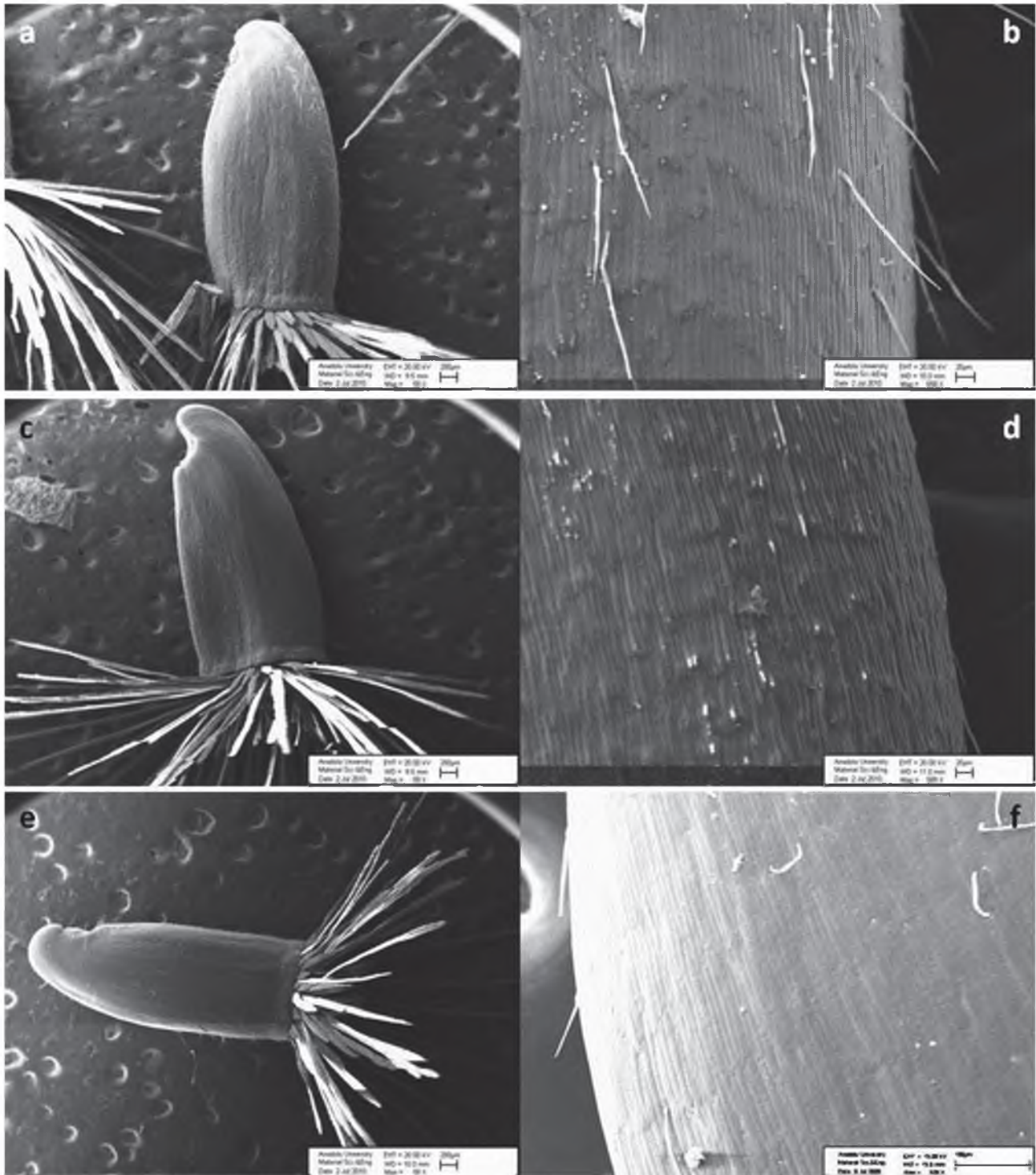


FIGURE 5. Scanning electron micrographs of achenes of *Centaurea* species. A–B. *Centaurea baseri* (YBK 1566). C–D. *Centaurea dursunbeyensis* (YBK 1535). E–F. *Centaurea aphrodisaea* (YBK 1527).

Centaurea baseri is closely related to *C. dursunbeyensis*. The main differences between *C. baseri* and *C. dursunbeyensis* are found in the habit, involucre, basal leaves, achenes and appendages. *Centaurea baseri* is procumbent, growing up to 40 cm (not erect to ascending). The ultimate segments of basal leaves of *C. baseri*

are narrower than in *C. dursunbeyensis*, 1–2 mm (vs. 5–8 mm) wide (Fig. 3). Involucres of the *C. baseri* are smaller than in related species, 5–10 × 3–5 mm (vs. 7–10 × 5–7 mm). Appendages of *C. baseri* are decurrent, whereas in *C. dursunbeyensis* they are not decurrent. Achenes of *C. baseri* are pilose, whereas in *C. dursunbeyensis* they are glabrous, hairy at the apex (Table 1, Fig. 5).

Centaurea baseri is also similar to *C. aphrodisea* but differs from the latter in its procumbent (vs. erect) stem. Whereas the basal leaves of *C. baseri* are 1–2-pinnatisect, those of *C. aphrodisea* are pinnatipartite. The involucre is smaller, 5–10 × 3–5 mm (vs. 10–14 × 5–10 mm), the appendages are decurrent (vs. shortly decurrent). In addition, achenes are pilose (vs. subglabrous) (Table 1, Fig. 5).

TABLE 1. Diagnostic characters of *Centaurea baseri* (YBK 1566) and its related species *C. aphrodisea* (YBK 1527) and *C. dursunbeyensis* (YBK 1535)

Species▶ Character▼	<i>C. baseri</i>	<i>C. dursunbeyensis</i>	<i>C. aphrodisea</i>
Stem	14–40 cm, several procumbent stems, with (5–)10–20 capitula	20–40 cm, several lateral erect to ascending stems, dichasially branched from the base to top, with (5–)10–20 capitula	28–71 cm, erect, branched in the upper part, with (2–)5–15 capitula
Basal leaves	1–2-pinnatisect, ultimate segments 1–2 mm broad; terminal segment linear	1–2-pinnatisect, ultimate segments 5–8 mm broad, oblong-lanceolate, acute; terminal segment smaller or larger	1-pinnatipartite, ultimate segments 1.4–5 mm broad, linear-lanceolate; all equal
Stem leaves	median leaves pinnatisect, upper leaves simple	median leaves pinnatisect, upper leaves with 1–2 lateral lobes at base	median leaves pinnatipartite, upper leaves simple
Involucre	5–10 × 3–5 mm, ovoid	7–10 × 5–7 mm, ovoid-oblong	10–14 × 5–10 mm, ovoid to cup-shaped
Appendages	simple, decurrent, hyaline with a brown or black colour at the central part; margins slightly lacerate; terminal mucro up to 0.5–1.3 mm long	simple, hyaline with a straw-yellow colour; margins slightly lacerate, cream-colored; terminal mucro up to 0.5 mm long	shortly decurrent, hyaline with a firmer straw-yellow or light-brown colour at the central part; margins irregularly denticulate; terminal mucro 0.8–1.2 mm long
Achenes	obovoid, brown, 2–4 × 1.5–3 mm, pilose	obovoid, creamish-brown, with striations 3–4 × 2–2.5 mm, glabrous	linear-lanceolate, 2.9–3.9 × 1.2–1.9 mm, subglabrous
Pappus	outer series 2.5–5 mm long, inner series ca. 0.5 mm long	outer series 3–4 mm long, inner series ca. 0.5 mm long	outer series 1.4–3.7 mm long, inner series 0.2–1.3 mm long

References

- Aksoy, N., Duman, H. & Efe, A. (2008) *Centaurea yaltirikii* sp. nov. (Asteraceae, Sect. *Pseudoseridia*) from Turkey. *Nordic Journal of Botany* 26(1–2): 53–56.
<http://dx.doi.org/10.1111/j.1756-1051.2008.00255.x>
- Brummitt, R.K. (2004) *Vascular Plant Families and Genera*. Royal Botanic Gardens Kew, 820 pp.
- Candolle, A.P. de (1838) *Prodromus systematis naturalis regni vegetabilis* 6. Treuttel & Würtz, Paris, 687 pp.
- Cassini, A.H.G. de (1826) Pséphelle, *Psephellus*. In: Cuvier, G. (ed.) *Dictionnaire des sciences naturelles* 43. Levrault, Strasbourg & Paris, Le Normant, Paris, pp. 488–490.
- Cassini, A.H.G. de (1827) Spilacre, *Spilacron*. In: Cuvier, G. (ed.) *Dictionnaire des sciences naturelles* 50. Levrault, Strasbourg & Paris, Le Normant, Paris, pp. 238–257.
- Daskin, R. & Yilmaz, Ö. (2009) *Centaurea kaynakiae* (Asteraceae), a new species from Turkey. *Annales Botanici Fennici* 46: 474–478.
<http://dx.doi.org/10.5735/085.046.0519>

- Davis, P.H., Mill, R.R. & Tan, K. (1988) *Centaurea* L. In: Davis, P.H., Mill, R.R. & Tan, K. (eds.) *Flora of Turkey and the East Aegean Islands* 10 (Suppl. 1). Edinburgh University Press, Edinburgh, pp. 166–169.
- Dinç, M., Duran, A. & Bilgili, B. (2009) A new subspecies of *Centaurea cassia* (Asteraceae) from Turkey. *Biologia* 64(5): 898–901.
<http://dx.doi.org/10.2478/s11756-009-0172-x>
- Doğan, B. & Duran, A. (2009) *Centaurea serpentinica* sp. nov. (Asteraceae) from the central and south Anatolia transition zone, Turkey. *Nordic Journal of Botany* 27: 319–323.
<http://dx.doi.org/10.1111/j.1756-1051.2009.00471.x>
- Duran, A. & Duman, H. (2002). Two new species of *Centaurea* (Asteraceae) from Turkey. *Annales Botanici Fennici* 39: 43–48.
- Garcia-Jacas, N., Susanna, A., Garnatje, T. & Vilatersana, R. (2001) A generic delimitation and phylogeny of the subtribe Centaureinae (Compositae): a combined nuclear and chloroplast DNA analysis. *Annales Botanici Fennici* 87: 503–515.
<http://dx.doi.org/10.1006/anbo.2000.1364>
- Greuter, W. (2003) The Euro+Med treatment of Cardueae (Compositae) – generic concepts and required new names. *Willdenowia* 33: 49–61.
- Güner, A. (2000) *Centaurea* L. In: Güner, A., Özhatay, N., Ekim, T. & Baser, K.H.C. (eds.) *Flora of Turkey and the East Aegean Islands* 11 (Suppl. 2). Edinburgh University Press, Edinburgh, pp. 163–164.
- Hamzaoğlu, E. & Budak, Ü. (2009) *Centaurea aksoyi* sp. nov. (Asteraceae: Cardueae) from Turkey and a contribution to the sectional taxonomy. *Nordic Journal of Botany* 27: 16–20.
- IUCN Species Survival Commission (2001). *IUCN Red list categories*. Version 3.1. IUCN, Gland, Switzerland and Cambridge, UK.
- Kaya, Z. & Vural, M. (2007) A new species of *Centaurea* sect. *Acrocentron* (Asteraceae) from Turkey. *Novon* 17: 198–201.
[http://dx.doi.org/10.3417/1055-3177\(2007\)17\[198:ANSOCS\]2.0.CO;2](http://dx.doi.org/10.3417/1055-3177(2007)17[198:ANSOCS]2.0.CO;2)
- Linnaeus, C. (1753) *Species plantarum*. L. Salvius, Stockholm, 1200 pp.
- Miller, P. (1754) *The Gardeners Dictionary*. Abridged from the last folio edition. Edition 4, London.
- Uysal, T. (2008) *Centaurea ertugruliana* (Asteraceae), a new species from Turkey. *Annales Botanici Fennici* 45: 137–140.
<http://dx.doi.org/10.5735/085.045.0208>
- Uysal, T., Demirelma, H., Ertugrul, K., Garcia-Jacas, N. & Susanna, A. (2007) *Centaurea glabro-auriculata* (Asteraceae), a new species from Turkey. *Annales Botanici Fennici* 44: 219–222.
- Uysal, T. & Köse, Y.B. (2009) A new *Centaurea* (Asteraceae) species from Turkey. *Turkish Journal of Botany* 33: 41–46.
- Uzunhisarcıklı, M.E., Tekşen, M. & Doğan, E. (2005) *Centaurea marashica* (Asteraceae), a new species from Turkey. *Annales Botanici Fennici* 42: 309–312.
- Vaillant, S. (1754) Neue Kennzeichen dreier Classen von Pflanzen mit zusammengesetzten Blumen, nämlich: der Cynarocephalarum, derer mit Artischockenhäuptern. Corymbiferarum, die zusammengesetzte, scheibenförmige Blumen tragen. Cichoracearum, weg-wartartiger. *Der Königl. Akademie der Wissenschaften in Paris. Physische Abhandlungen* 5: 143–194, 333–377.
- Vural, M., Duman, H., Aytac, Z. & Adıgüzel, N. (2006) *Saponaria karapinarensis*, *Senecio salsuginea* and *Centaurea tuzgoluensis*, three new species from Central Anatolia, Turkey. *Belgian Journal of Botany* 139(2): 252–260.
- Wagenitz, G. (1975) *Centaurea* L. In: Davis, P.H. (ed.) *Flora of Turkey and the East Aegean Islands* 5. Edinburgh University Press, pp. 465–585.
- Wagenitz, G. (1986) *Centaurea* in South-West Asia: Patterns of distribution and diversity. *Proceedings of the Royal Society of Edinburgh* 89B: 11–21.
- Wagenitz, G. & Hellwig, F.H. (2000) The genus *Psephellus* Cass. (Compositae, Cardueae) revisited with a broadened concept. *Willdenowia* 30: 29–44.
- Wagenitz, G., Hellwig, F.H., Parolly, G. & Martins, L. (2006) Two new species of *Centaurea* (Compositae, Cardueae) from Turkey. *Willdenowia* 36: 423–435.
<http://dx.doi.org/10.3372/wi.36.36139>