

A new subspecies of *Centaurea cassia* (Asteraceae) from Turkey

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Abstract: A new subspecies in sect. *Jacea* (Mill.) DC., *Centaurea cassia* Boiss. subsp. *dumanii* M. Dinç, A. Duran & B. Bilgili **subsp. nov.**, collected by the authors from South Anatolia, is described and illustrated. The new subspecies is restricted to *Abies cilicica* (Ant. & Kotschy) Carr. subsp. *cilicica* forest above Göller Yaylası (C6 Adana–Kozan). Diagnostic morphological characters from *C. cassia* subsp. *cassia* are discussed. The ecology, biogeography and conservation status of the new taxon are also presented.

Key words: Adana; *Jacea*; *Centaurea*; Compositae; taxonomy; Turkey

Introduction

The fact that Turkey is the main centre of diversity for the genus *Centaurea* is supported by the molecular data and the recently added new species for the science (Garcia-Jacas et al. 2000; Garcia-Jacas et al. 2001; Duran & Duman 2002; Aytaç & Duman 2005; Uzunhisarcıklı et al. 2005; Vural et al. 2006; Wagenitz et al. 2006; Kaya & Vural 2007; Uysal et al. 2007; Uzunhisarcıklı et al. 2007; Uysal 2008). Recently, *Centaurea* has been divided into four genera (Wagenitz & Hellwig 2000; Greuter, 2003a,b). According to the revised system, these genera are *Centaurea*, *Rhaponticoides* Vaill., *Psephellus* Cass. and *Cyanus* Mill. Even excluding the species now placed in these genera, Turkey is among the richest countries in *Centaurea* diversity (Wagenitz 1975; Davis et al. 1988; Güner 2000). A considerable proportion of these taxa are also endemic to the country or localized to a limited area (Yıldırım 1999). The endemism value of *Centaurea* is about 60% in Turkey (Wagenitz 1975; Davis et al. 1988; Güner 2000).

In the Flora of Turkey and the East Aegean Islands, seven taxa from the sect. *Jacea* were presented. In this paper, we present a new subspecies from the same section. The total number of the sect. *Jacea* taxa now known from Turkey has increased to eight. Two of them, *C. inexpectata* Wagenitz and the new subspecies, are endemic for Turkey (Wagenitz 1975).

Material and methods

An average of 15 *Centaurea* specimens was collected from Göller Yaylası in Kozan district of Adana province during

the excursion in summer 2007. After careful examination and comparison of the specimens with the type photo of *Centaurea cassia*, it was realized that the specimens belonged to a new, undescribed subspecies of *C. cassia* from sect. *Jacea* (Mill.) DC. The identification key for the *Centaurea* sect. *Jacea* taxa in Turkish Flora (Wagenitz 1975) were modified in the light of the new data obtained from the present study.

According to the grid system, the partly new species growing in Adana province falls within the C6 square (Davis 1965). Threat category of the new subspecies was evaluated according to IUCN Criteria (IUCN, 2001).

Results

Centaurea cassia subsp. *dumanii* M. Dinç, A. Duran & B. Bilgili, subsp. nov.

Sect. *Jacea* (MILL.) DC. (Figs. 1 A, C)

Type: Turkey. C6 Adana: Kozan, Göller Yaylası, *Abies cilicica* subsp. *cilicica* forest, 1400 m, 16.07.2007, A. Duran 7575, M. Dinç & B. Bilgili (holo. KNYA; iso. GAZI, HUB, Yıldırım 1999 Herb.).

Diagnosis: *Affinis C. cassia* Boiss. subsp. *cassia*, sed *plantis canescenti-tomentosis (non scabridis et araneosis ad glabratis)*, *caulibus 10–20 cm longis vel decumbentibus (non 20–50 cm longis vel erectis)*, *appendicibus mediis solidis cum latis hyalinis margine et 1.5–2.5 mm longis terminalis spinis (non omnio scariousus cum 0.5–0.8 mm longis mucro)*, *floris marginalis valde radiatus (non inconspicuus) differt*.

Description: Perennial herb with woody rootstock and sometimes sterile leaf-rosettes. Stems decumbent, 10–20 cm tall, densely glandular-punctate, tomentose, rigid,

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branched from near base or in upper part, distinctly angled, up to 3 mm diam. at base. Leaves very densely glandular-punctate, slightly grey-tomentose; basal ones including petiole $3-7 \times 0.8-2.0$ cm with petiole up to 3 cm long, simple or sometimes lyrate with 2–3 pairs of small segments at base, terminal segments largest, about $1/2-2/3$ of the total leaf length, very shallowly and irregularly dentate, lanceolate to oblanceolate, attenuate at base, widely acute, with brownish 0.2–0.4 mm long mucro at apex; cauline ones simple, lanceolate to oblanceolate, or rarely 1–2 pairs of small segments at base, 4–8 mm broad, decreasing in size to capitula. Capitula solitary at end of branches; involucre ovoid to oblong, $13-17 \times 12-16$ mm. Phyllaries imbricate, outer oblong-ovate, $1.8-4 \times 2-2.8$ mm, median lanceolate to oblong-lanceolate, $5-8 \times 2.5-3$ mm, inner linear-lanceolate, $7-12 \times 1.4-1.7$ mm. Appendages large, totally or sometimes partly concealing basal part of phyllaries, minutely scabrous, very shortly decurrent, outer $10-12 \times 5-8$ mm, ovate, totally ciliate or ciliate above lacerate below, median $8-10 \times 7-9$ mm, widely ovate to orbicular, ciliate above lacerate below, inner ovate to obovate, lacerate, $3-5 \times 1.5-3.5$ mm, median and outer with broad hyaline margin and firmer brown central part, 1.0–2.5 mm lateral cilia and 1.5–2.5 mm stronger terminal spinule, innermost completely brown with 0.2–0.5 mm terminal mucro. Flowers rose-purple, marginal distinctly radiant, corolla tube glabrous, 5–7 mm, lobes linear, 4–5 mm. Achenes oblong, $3-3.5 \times 1.6-1.7$ mm, glabrous, compressed, brownish-grey. Pappus 1.0–2.5 mm, brownish below, white above, simple scabrous.

Distribution and ecology: Flowering in June–July, fruiting in August, *C. cassia* subsp. *dumanii* grows in Taurus Mountains in southern Turkey between 1400 and 1450 m elevation, in shady places and deep soil under *Abies cilicica* forest.

Suggested conservation status: Endemic to South Anatolia of East Mediterranean element. The new subspecies is distributed only in a single locality. It appears to be known only from the present locality and its estimated area of occupancy is less than 10 km^2 (criterion B). The population is unhealthy with less than one hundred mature individuals (criterion C). In addition, its extremely restricted area implies a high risk of extinction owing to the subjection to grazing (criterion D). Therefore, it should be classified as “Critically Endangered (CR)” based on the criteria of the IUCN Red List Categories (IUCN, 2001).

Key to *Centaurea* sect. *Jacea* taxa in Turkey

- 1 Appendage $\pm$ orbicular, irregularly lacerate (only outer sometimes ciliate) 2
- Appendage lanceolate or narrowly triangular to subulate, regularly ciliate (innermost excepted) 4
- 2 Pappus absent *C. jacea*
- Pappus 1–2.5 mm 3

- 3 Stem erect, 20–50 cm, basal leaves lyrate *C. cassia* subsp. *cassia*
- Stem decumbent, 10–20 cm, basal leaves simple or sometimes lyrate *C. cassia* subsp. *dumanii*
- 4 Appendage ending in long recurved thread-like pinnate 6–10 mm tip *C. stenolepis*
- Appendage shorter, tip erect or patent 5
- 5 Median leaves up to 10 mm broad, with truncate base; marginal flowers only slightly radiant *C. inexpectata*
- Median leaves broader, narrowed towards base; marginal flowers strongly radiant 6
- 6 Appendage 2–3 mm, ending in tip shorter than triangular basal part *C. nigrescens*
- Appendage 3–5 mm, gradually tapering into tip equalling or longer than lanceolate to narrowly triangular basal part 7
- 7 Appendages very narrow (without cilia 0.5–0.8 mm broad), only partly concealing basal part of phyllaries; involucre 8–10(–12) mm broad *C. salicifolia* subsp. *salicifolia*
- Appendages slightly broader (0.8–1.2 mm), nearly totally concealing basal part of phyllaries; involucre 10–15 mm broad *C. salicifolia* subsp. *abbreviata*

Etymology: We dedicate the new subspecies to Prof. Dr. Hayri Duman, an eminent Turkish taxonomist who described many new species for the science.

Discussion

Sect. *Jacea* species in Turkey are mainly distributed in North Anatolia. *C. cassia* is a rather isolated species at the southern limit of distribution of sect. *Jacea*, and only distantly related to *C. jacea* in this section. The new subspecies *C. cassia* subsp. *dumanii* is the second southern representative of the section. It is only related to *C. cassia* subsp. *cassia*, and differs from it by slightly grey-tomentose indumentum (not slightly scabrous and arachnoid to glabrate), 10–20 cm long and decumbent stem (not 20–50 cm long and erect), firm appendages with a broad hyaline margin, mostly well differentiated cilia and 1.5–2.5 mm long terminal spinule (not brown and scarious with very short 0.5–0.8 mm mucro and basally confluent cilia or lacerate margin) (Fig. 1, Table 1).

Centaurea cassia subsp. *dumanii* and *C. cassia* subsp. *cassia* are rather differentiated taxa in sect. *Jacea*. Glandular punctate indumentum is only seen in these two taxa in the section (Wagenitz 1975). This feature is rare in the sections related to sect. *Jacea* and also seen in *C. antalyense* Duman & Duran which belongs between sect. *Jacea* and sect. *Phalolepis* (Cass.) DC. (Duran & Duman 2002). In addition, the three taxa are similar in terms of some other vegetative characters such as habitus and leaf shapes. Therefore, although *C. antalyense* was previously presented in sect. *Phalolepis* (Duran & Duman 2002, Wagenitz et al. 2006), these three species may occur in the same section – sect. *Jacea*.

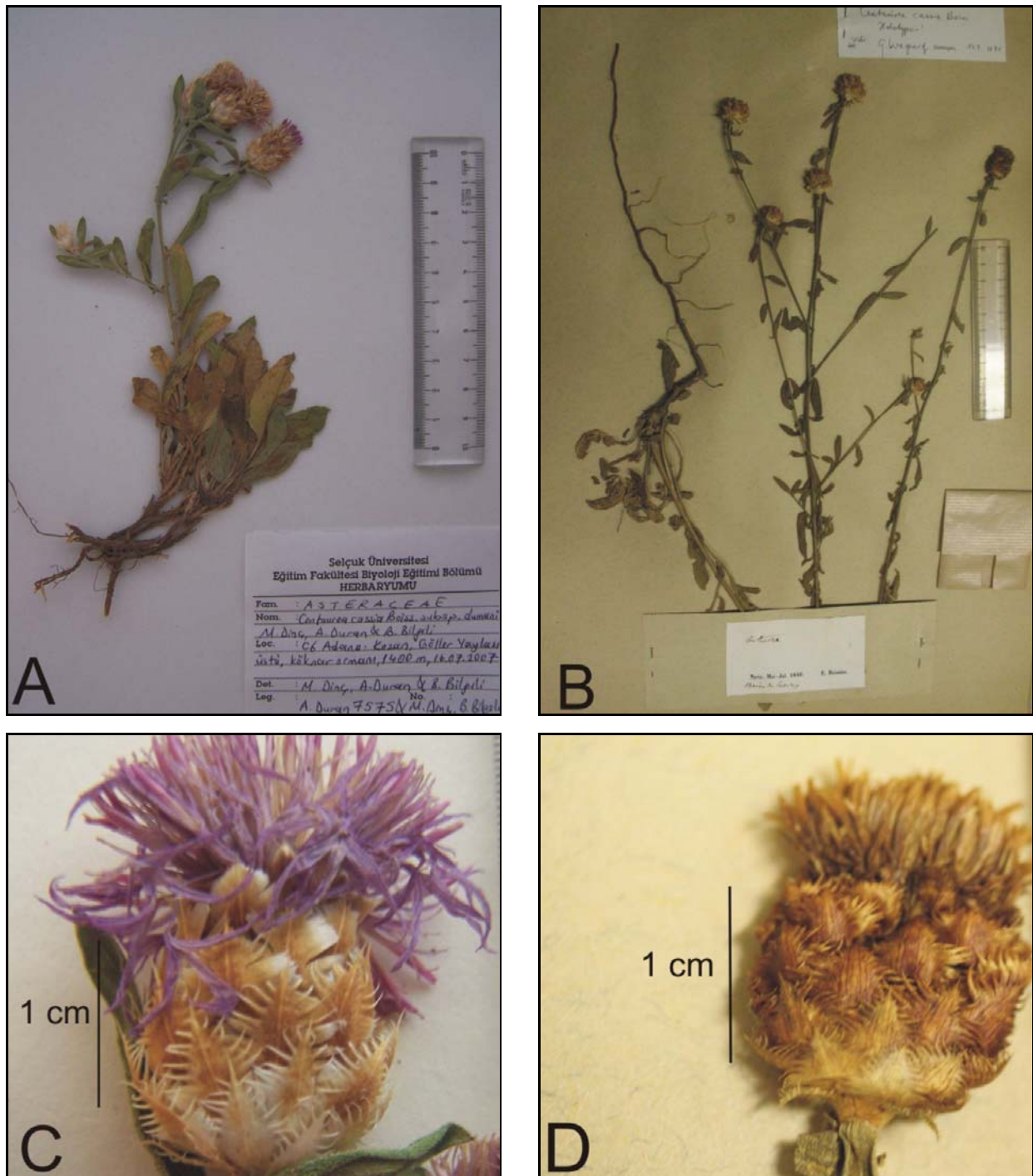


Fig. 1. The types of the two subspecies of *Centaurea cassia*. A – Holotype of *C. cassia* ssp. *dumanii*, B – Holotype of *C. cassia* ssp. *cassia* (in regione inferiori sylvatica montis Cassii Syriae borealis, vi 1846, Boissier sine numero, G), C – Capitulum of *C. cassia* ssp. *dumanii*, D – Capitulum of *C. cassia* ssp. *cassia*.

Amanus (Amanos Dağları) and Cilician Taurus are the two branches of Anatolian Diagonal, which is an oblique belt running from the north-east, south of the Anti-Taurus (Davis 1971). The Diagonal is the main diversity centre of several genera in Turkey and very rich in phytodiversity. The present richness and neo-endemism related to the Diagonal (Ekim & Güner 1986) support the occurrence of the two subspecies of *C. cassia* in the two branches, subsp. *cassia* on Amanus and

its surroundings and subsp. *dumanii* on Cilician Taurus.

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Table 1. A comparison of the two subspecies of *Centaurea cassia*.

Character	<i>C. cassia</i> subsp. <i>dumanii</i>	<i>C. cassia</i> subsp. <i>cassia</i>
Stem	decumbent, 10–20 cm	erect, 20–50 cm
Basal leaves	simple or sometimes lyrate with a very large, 8–20 mm broad, lanceolate to oblanceolate terminal segment, about 2/3 of the total leaf length	lyrate with 5–15 mm broad lanceolate terminal segment, about 1/3–1/4 of the total leaf length
Indumentum	slightly grey-tomentose	slightly scabrous and arachnoid to glabrate
Involucre	oblong to ovate, 13–17 × 12–16 mm	Ovoid to subglobose, 10–15 × 7–15 mm
Middle appendages	lanceolate to widely ovate, firm with brown central part and broad hyaline margin, very shortly decurrent, totally ciliate or with 3–5 pairs 1.0–2.5 mm long cilia (basal not confluent) above, lacerate below, with 1.5–2.5 mm long and stronger terminal spinule	ovate to orbicular, scarious, brown, very shortly decurrent with 10–15 cilia 1–2 mm (basal confluent) ending in a very short 0.5–0.8 mm mucro
Marginal flowers	distinctly radiant	scarcely radiant
Pappus	1.0–2.5 mm long	1.0–1.5 mm long

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