

## Five new records of the genus *Echinops* (Asteraceae) from Turkey

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**Abstract:** *Echinops ritrodes* Bunge, *E. gaillardotii* Boiss., *E. adenocaulos* Boiss., *E. chardinii* Boiss. & Buhse, and *E. tenuisectus* Rech.f. were recorded for the first time in Turkey. The taxa are described and illustrated. Geographical distributions of the taxa are also mapped, and IUCN threat categories of the populations are discussed.

**Key words:** *Echinops*, Compositae, new record, taxonomy, Turkey

### Türkiye için *Echinops* (Asteraceae) cinsinin beş yeni kaydı

**Özet:** *Echinops ritrodes* Bunge, *E. gaillardotii* Boiss., *E. adenocaulos* Boiss., *E. chardinii* Boiss. & Buhse ve *E. tenuisectus* Rech.f. Türkiye'den ilk kez kaydedilmiştir. Taksonların tanımları ve şekilleri verilmiştir. Ayrıca bu taksonların coğrafik dağılımları da haritalanmıştır. Populasyonların, IUCN tehlike kategorileri tartışılmıştır.

**Anahtar sözcükler:** *Echinops*, Compositae, yeni kayıt, taksonomi, Türkiye

### Introduction

The genus *Echinops* L. (Asteraceae) consists of approximately 120 species (Bobrov, 1997; Susanna & Garcia-Jacas, 2007), distributed in Africa and the Mediterranean basin (Jäger, 1987; Garnatje et al., 2004). In Turkey, the genus comprises 19 species, including 2 subspecies and 3 varieties (Hedge, 1975; Gemici & Leblebici, 1992; Garnatje et al., 2005; Özhatay et al., 2009; Vural et al., 2010).

During 2007-2008, some unusual specimens of *Echinops* were collected from different regions in

Turkey. At first these specimens appeared to be very similar to some Turkish species of *Echinops*. After comprehensive examination and revision of various relevant literature (Rechinger, 1964, 1979; Feinbrun, 1977; Bobrov, 1997), it was considered that these 5 species were new records for Turkey, namely *Echinops ritrodes* Bunge, *E. gaillardotii* Boiss., *E. adenocaulos* Boiss., *E. chardinii* Boiss. & Buhse, and *E. tenuisectus* Rech.f. These identifications were also confirmed by comparison with herbarium specimens in K.

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**New Records**

*Echinops ritrodes* Bunge in Bull. Acad. Petersb. 6: 407 (1863) (*rytrodes*) (Figure 1).

= *Echinops kernerii* Heimerl ex Stapf in Denkschr. Acad. Wien I: 61 (1885).

**Type:** Meshkhed in montis ad orientem situs, July 1858, *Bunge s.n.* (K!).

Perennial. Stem bases surrounded by remains of old leaves. Stem 30-60 cm, branched above in 2-3 branchlets, entirely white tomentose-arachnoid hairy, leafy below. Leaves 15-25 × 5-8 cm, lanceolate, pinnatifid into narrowly lanceolate lobes, spiny-toothed, sparsely arachnoid to subglabrous and greyish-green above, densely arachnoid and greyish below; petioles densely arachnoid. Heads 3-3.5 cm



Figure 1. *Echinops ritrodes*. Upper part of the plant (C.Vural 4352).

diam. Capitula 13-15 mm long, yellowish-white. Involucral bracts 20-23 external bracts rhomboidal at apex, acuminate, short-ciliate middle bracts up to 10 mm long, smooth or very thinly-rough, spiny-pointed, ciliate along margins; inner bracts up to 12 mm long, connate in basal 1/2 and accrete into a membranous cylindrical tube. Brush straw coloured, 2-4 mm, usually 1/4 as long as involucre. Corolla bluish tube short-hairy on outer side near throat. Pappus connate at base. Achene elliptic, 8-9 mm.

**Phenology:** Flowers and fruits from July to September.

**Habitat:** Steppe, stony slopes of low mountain region of desert, dry rocky slopes.

**Conservation Status:** *Echinops ritrodes* is restricted to a few localities in Hakkari and Kahramanmaraş provinces in Turkey at altitudes of 1370-1900 m. Vulnerable [VU B2ab (i, ii): area of occupancy is estimated to be less than 2000 km<sup>2</sup> and known at no more than 10 locations] status has been proposed for the species at the national level. At the international level, this species is evaluated as Least Concern (LC) since it also grows in Iran and Iraq (IUCN, 2001).

**Distribution:** Iran, Iraq, and SW Turkey (Figure 2).

**Examined specimens:** Turkey. B6 Kahramanmaraş: Between Göksun and Doğankonak village, 24 km, 38°12'45"N, 36°25'84"E, 1614 m, 04.8.2007, C.Vural 4352 (Erciyes Univ. Herb.). C6 Kahramanmaraş: Ahır Mountain, 37°37'91"N, 36°56'52"E, 1552 m, 04.8.2007, C.Vural 4359 (Erciyes Univ. Herb.); ibid.,

near Küçük Lake, 37°37'60"N, 36°55'00"E, 1379 m, 04.8.2007, C.Vural 4364 (Erciyes Univ. Herb.). C10 Hakkari: 10 km from Bajirge to Yüksekova, 1900 m, shaley hillside on steppe, 18.6.1966, P.H.Davis 45192 (K).

Iran. Zardeh Kuh Mt. Bakhtiari, 20.7.1965, R.Timmis 143 (K); Sanandaj, c. 1830 m, 20.7.1962, P.Furse 3330 (K); Bijas, c. 2040 m, 04.8.1968, J.Sayes 106 (K); E Mazandaran, a few km N of village of Lohondor, which is about 25 km SE of Yanbolagh, 700 m, 06.7.1977, T.F.Hewer 4012 (K); 20' W of Firuzkuh, c. 1830 m, 03.7.1962, P.Furse 3074 (K); Tahran, c. 1830 m, 25.9.1958, E.S.Bronm 758 (K); Kopet Dagh. 15 km NW of Gochan, c. 1830 m, 14.8.1966, P.Furse 8889 (K); Kurdistan, 36°30'-38°30'N, 44°30'-45°16'E, 12.5.1915, R.S.Kole 50 (K); Azerbaijan occidentalis, in monte Chalil Kuh prope Pesan, 01.7.?, 1800-2400 m, J.Renz 48697; Khorasan, faucibus calc. Ab Bakhsh, 48 km S. Bojnurd versus Esfa, 37°08'N, 57°23'E, 1300 m, 15.6.?, Reching 53579 (K); Khorasan, 20-30 km, W Bojnurd, 37°28'N, 57°20'E, in argillosis, 1500 m, 25.7.?, Reching 32527 (K); Elburs, c. 1500, 20-21.7.1902, A.Bornmüller 7926 (K).

Iraq. Pass between Rezaiyeh and Shahpur, 2070 m, 20.8.1966, J.C.Archibald 3179.

*Echinops gaillardotii* Boiss., Diagn. Ser. 2(3): 38 (1856) (Figure 3).

**Type:** In Syria, Littorali ad Sidonem. Gebaa et Libano ad Machmouche et inditione Merdjaïoun s.n. (K!).

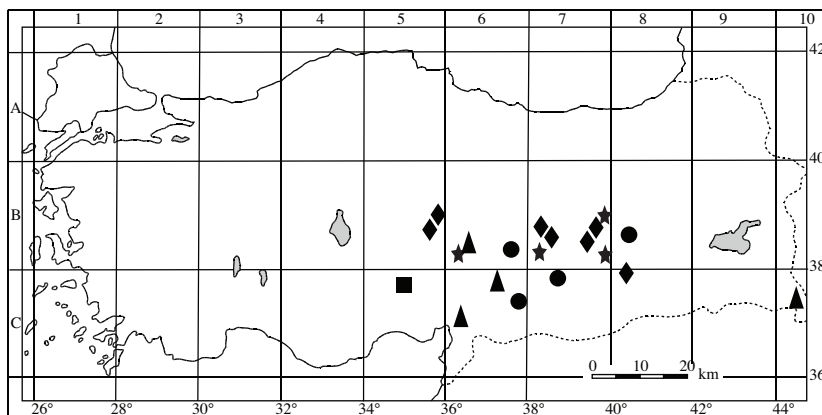


Figure 2. Distribution of *Echinops ritrodes* (▲), *E. gaillardotii* (■), *E. adenocaulos* (●), *E. chardinii* (◆), and *E. tenuisectus* (★) in Turkey.





Figure 3. *Echinops gaillardotii*. Upper part of the plant (C.Vural 4496).

Perennial. Stem bases not surrounded by remains of old leaves. Stem 1-1.7 m, few branched, covered with purple (glandular or eglandular) bristles, or white arachnoid to lanate with purple bristles. Leaves 9-20 × 5-10 cm, lanceolate, 1-3-pinnatisect, green slender, arachnoid or with scabrous and glandular hair above, soft white lanate below. Leaf bases with triangular spiny-lobes, 1/2-2/3 palmate at apex. Uppermost leaves sessile, semi-amplexicaule with

lanceolate lobes spiny at ends. Leaf axis usually winged. Heads 4-6 cm diam. Capitula (20-) 25-30 mm long, bluish-violet. Involucral bracts 19-21, glabrous or woolly; middle bracts 22-30 mm long; inner bracts 20-25 mm long, connate in basal 1/2 or more and accrete in to a membranous cylindrical tube. Brush dirty white or straw coloured, 14-18 mm, usually 1/2 as long as involucre. Corolla bluish-violet. Pappus connate at base. Achene elliptic, 12-13 mm.

**Phenology:** Flowers and fruits in June and July.

**Habitat:** Steppe, clearings in areas dominated by scrub, fields, and roadsides.

**Conservation Status:** *Echinops gaillardotii* is restricted to a few localities in the Mersin region of Turkey and at altitudes of 200-900 m. Vulnerable [VU B2ab (i, ii): area of occupancy is estimated to be less than 2000 km<sup>2</sup> and known at no more than 10 locations] status has been proposed for the species at the national level. At the international level, this species is evaluated as Least Concern (LC) since it also grows in Syria, Lebanon, and Palestine (IUCN, 2001).

**Distribution:** Syria, Lebanon, Palestine, and S Turkey (Figure 2).

**Examined specimens:** Turkey. C5 Mersin: Çamlıyayla, 37°39'13"N, 34°42'25"E, 896 m, 01.7.2008, C. Vural 4496 (Erciyes Univ. Herb.).

Syria. 10.7.1816, *Gaillardot* 1941 (K).

*Echinops adenocaulos* Boiss., *Diagn. Ser.* 1(10): 88 (1849) (Figure 4).

**Type:** Lebanon. Saida, 10.7.1856, *Gaillardot* 1323 (K!).

Perennial. Stem bases not surrounded by remains of old leaves. Stem erect, 50-80 (-120) cm, covered with purple bristles, (glandular or eglandular), bristles varying density and length, or white arachnoid to lanate with intermixed purple bristles. Leaves 15-30 × 8-15, 1-3-pinnatisect, green, shortly setulose-scabrous and glandular hairs or slender scabrid hair above, densely scabrid hair below. Upper leaves sessile, ovate-lanceolate, base of cauline leaves palmatisect in to linear-subulate lobes or sometimes palmately divided to 3/4. Heads 4-6 cm diam. Capitula 25-30 mm long, bluish-violet. Involucral bracts 18-25, glabrous or sometimes woolly; middle bracts 18-22 mm; inner bracts 14-17 mm, united in



Figure 4. *Echinops adenocaulos*. A- upper part of the plant, B- basal leaf (C.Vural 4379).

basal 1/2 or more, and accrete into a membranous cylindrical tube. Brush dirty white, 8-15 (-20) mm, with loose and deciduous seta. Corolla bluish-violet. Pappus connate at base. Achene elliptic, 11-13 mm.

**Phenology:** Flowers and fruits in June and July.

**Habitat:** Roadsides, uncultivated land, rocky and stony hillsides.

**Conservation Status:** *Echinops adenocaulos* is distributed in SE Turkey. At the international and national level, this species is evaluated as Least Concern (LC) since it also grows in Palestine, Syria, Lebanon, and Israel (IUCN, 2001).

**Distribution:** Palestine, Lebanon, Syria and SE Turkey (Figure 2).

**Examined specimens:** Turkey. **B6** Malatya: Between Darende and Gürpınar Waterfall road, near Beybaşı, 38°33'28"N, 37°26'94"E, 1209 m, 06.7.2008, *C.Vural* 4379 (Erciyes Univ. Herb.). **B8** Bingöl: Between Bingöl and Karlıova, 65 km, 39°11'79"N, 40°56'35"E, 1800 m, 26.8.2007, *C.Vural* 4465 (Erciyes Univ. Herb.). **C6** Kahramanmaraş: Between Göksun and Doğankonak, 20 km, 38°11'35"N, 36°27'40"E, 1621 m, 21.7.2007, *C.Vural* 4356 (Erciyes Univ. Herb.). **C7** Şanlıurfa: Birecik, Suruç, 37°03'38"N, 38°09'88"E, 757 m, 06.8.2008, *C.Vural*, 4574 (Erciyes Univ. Herb.).

Lebanon: N. Lebanon, 34°18'34"N, 35°47'48"E, 27 m, 15.9.2002, *Khairallah Leb.* 156 (K).

*Echinops chardinii* Boiss. & Buhse, *Nouv. Mém. Soc. Imp. Nat. Mosc.* 12: 124 (1860) (Figure 5).

**Type:** Muschambar, *Buhse s.n.* (K!).

Perennial. Stem bases not surrounded by remains of old leaves. Stem 50-80 cm, pale brownish, subglabrous with short glandular-pilose and arachnoid indumentum. Leaves 15-30 × 5-12 cm, bipinnatifid and all segments subequal 8-12 mm wide, with long and short spines, slender coriaceous, margins revolute, veins yellowish, sparse or dense arachnoid-tomentose above, sometimes also glandular, white tomentose below. Not extended palmately at base, usually sessile. Heads 6-8 cm diam. Capitula 17-22 mm long, bluish. Involucral bracts 23-26; external bracts coriaceous linear-cuneate; middle bracts 16-22 mm; inner bracts 14-20 mm long, connate in basal 1/2 or more and accrete into

a membranous cylindrical tube. Brush white, 10-14 mm, about half length of involucre or longer. Corolla dark blue, tube 12-14 mm, lobes 8-10 mm. Pappus connate to 1/2 their length. Achene elliptic, 9-12 mm.

**Phenology:** Flowers and fruits from June to August.

**Habitat:** Rocky hillsides, steppe, roadsides.

**Conservation Status:** *Echinops chardinii* is restricted to a few localities in Yozgat and Malatya regions in Turkey and at altitudes of 900-1190 m. Vulnerable [VU B2ab (i, ii): area of occupancy is estimated to be less than 2000 km<sup>2</sup> and known at no more than 10 locations] status has been proposed for the species at the national level. At the international level, this species is evaluated as Least Concern (LC) since it also grows in Iraq and Iran (IUCN, 2001).

**Distribution:** Iraq, Iran, and C, E, and SE Turkey (Figure 2).

**Examined specimens:** Turkey. **B5** Yozgat: Sorgun, north of Çiğdemli town, between Sorgun and Çekerek, 16 km, 39°50'65"N, 35°18'00"E, 1126 m, 21.8.2007, *C.Vural* 4396 (Erciyes Univ. Herb.); Sorgun, between Gökdere and Çiğdemli, 2 km, 39°58'77"N, 35°23'73"E, 21.8.2007, *C.Vural* 4397 (Erciyes Univ. Herb.); **B7** Malatya: Between Malatya and Gölbaşı, 23 km, 38°16'73"N, 38°05'13"E, 1096 m, 05.8.2007, *C.Vural* 4371 (Erciyes Univ. Herb.); Between Darende and Gürün, Yazıköy, 38°40'62"N, 37°26'08"E, 1210 m, 05.8.2007, *C.Vural* 4380 (Erciyes Univ. Herb.); Between Malatya and Kayseri, 8 km, 38°21'27"N, 38°02'48"E, 919 m, 06.8.2006, *C.Vural* 4376 (Erciyes Ün. Herb.); Between Gürün and Malatya, c. 10 km, E of Darende, banks of Tohmasuyu, c. 900 m, 5.8.1956, *McNeill* 432 (K); Elazığ: Between Elazığ and Malatya, 20 miles from Elazığ, 01.9.1954, *P.H.Davis* 24801 (K); **C8** Mardin: Kasmin, 20.7.1888, *Sintenis* 1375 (K).

Iraq. Agric. Hammam Ahil, c. 30 km, roadside weed near college, 29.6.1978, *M.Harsami* 4313 (K).

*Echinops tenuisectus* Rech.f., *Anz. Österr. Akad. Wiss., Math.-Naturwiss. Kl.* 101: 16 (1964) (Figure 6).

**Type:** Iraq. Saharaban, Diyalah distr., 31.5.1937, *Rechinger* 9714 (K!).

Perennial. Stem bases not surrounded by remains of old leaves. Stem 40-100 cm, with glandular



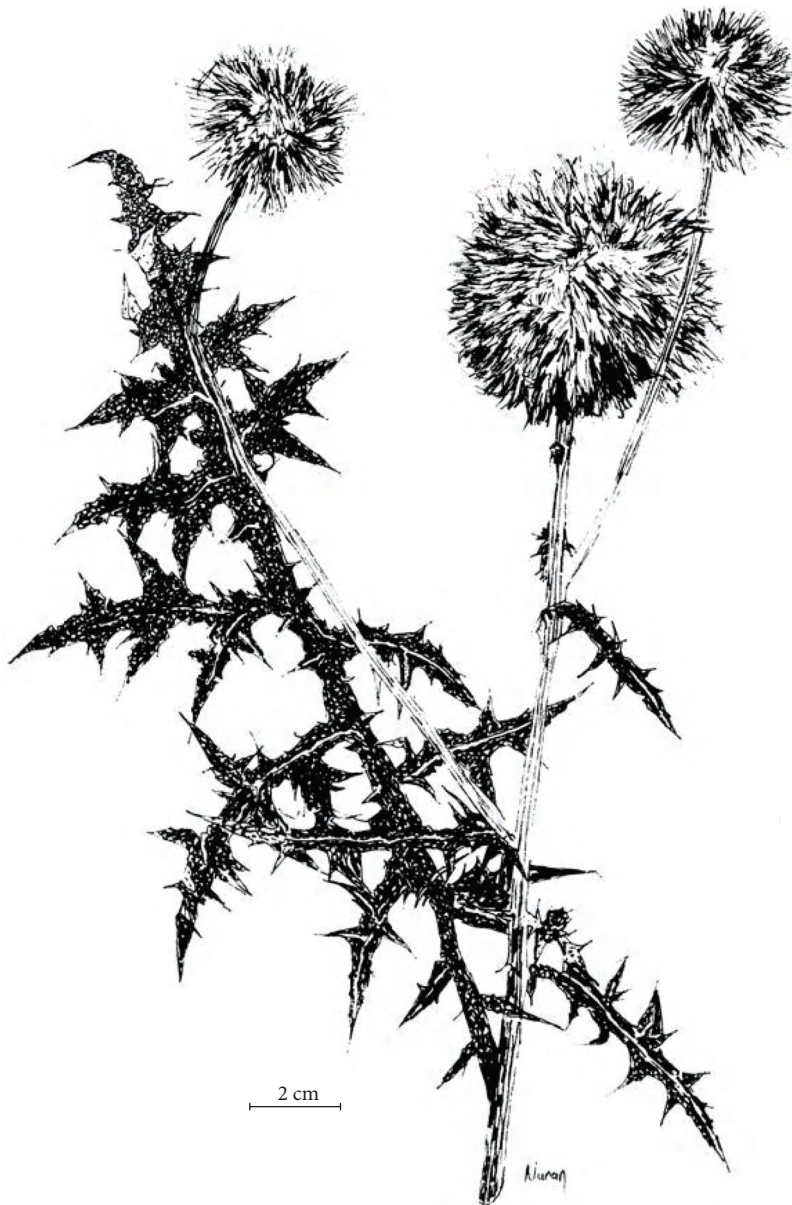


Figure 5. *Echinops chardinii*. Upper part of the plant (C.Vural 4397).

and arachnoid indumentum. Leaves 10-15 × 4-6 cm, lanceolate, tripinnatisect, greenish-shiny, almost glabrous above, densely whitish-arachnoid-tomentose below, lobes narrowly triangular-lanceolate, ending in spine. Uppermost leaves subpinnatisect, narrowly linear-lanceolate. Heads 5-7 cm diam. Capitula 20-25 (-30) mm long, yellowish-green. Involucral bracts 16-18, glabrous, external bracts mucronulate, middle bracts 18-30 mm long, inner bracts 17-22 mm long, united in basal 1/2 or more and accrete into a membranous cylindrical

tube. Brush white, 7-13 mm, about 1/3 of involucre length, bristles scabrous. Pappus connate at base. Achene elliptic, 10-11 mm.

**Phenology:** Flowers and fruits in July and August.

**Habitat:** Steppe, rocky and stony hillsides, field sides, roadsides.

**Conservation Status:** *Echinops tenuisectus* is restricted to a few localities in Elazığ, Malatya, Diyarbakır, and Kahramanmaraş provinces in Turkey and at altitudes of 700-1700 m. Vulnerable



Figure 6. *Echinops tenuisectus*. General view of the plant (C.Vural 4589).

[VU B2ab (i, ii): area of occupancy is estimated to be less than 2000 km<sup>2</sup> and known at no more than 10 locations] status has been proposed for the species at the national level. At the international level, this species is evaluated as Least Concern (LC) since it also grows in Iran and Iraq (IUCN, 2001).

**Distribution:** Iraq, Iran, and S, SE and E Turkey (Figure 2).

**Examined specimens:** Turkey. B6 Kahramanmaraş: Between Göksun and Doğankonak, 20 km, 38°11'35"N, 36°27'40"E, 1621 m, 04.8.2007, C.Vural 4355 (Erciyes Univ. Herb.). B7 Diyarbakır:



Between Ergani and Diyarbakır, 25 km, 743 m, 07.8.2007, *C. Vural* 4589 (Erciyes Univ. Herb.); Elazığ: Between Elazığ and Bingöl, 48 km, 38°36'97"N, 39°40'89"E, 1069 m, 26.8.2007, *C. Vural* 4472 (Erciyes Univ. Herb.); Malatya: Between Malatya and Gölbaşı, 23 km, 38°16'73"N, 38°05'13"E, 1096, 05.8.2007, *C. Vural* 4370 (Erciyes Univ. Herb.).

Iraq: Distr. Mosul, Zakho, 04-09.7.1957, *Rechinger* 10738 (K).

## Discussion

*Echinops ritrodes* was classified in sect. *Echinops*, but *E. gaillardotii*, *E. adenocaulos*, *E. chardinii*, and *E. tenuisectus* were classified in sect. *Ritropsis* Greuter & Rech.f. *Echinops ritrodes* is closely related to *E. ritro*, but capitulum is 12-15 mm, not 15-25 mm and brush is 1/4-1/5, not 1/2-1/3 as long as involucre. *Echinops gaillardotii*, *E. adenocaulos*, *E. chardinii*, and *E. tenuisectus* are related to *E. spinosissimus* and *E. orientalis*, but they have some different features related to indumentum, leaf shape, and brush, as indicated in the key. A revised section key and a key of the section *Ritropsis* for the Turkish taxa of *Echinops* are provided below.

### Revised sectional determination key of the genus *Echinops*

1. Annual plants, leaves unarmed or with a few weak spines, compound heads conspicuously involucre ..... Sect. *Acantholepis*
1. Perennial or biennial plants, plants with prickly leaves, compound heads not involucre
  2. Innermost phillaries free or connate to at most 1/5 their length
    3. Biennial plants, compound heads 10-15 cm diameter, corolla green ..... Sect. *Psectra*
    3. Perennial plants, compound heads less than 10 cm diameter, corolla white to blue ..... Sect. *Echinops*
  2. Innermost phillaries connate to 1/2 or more their length
    4. Phillaries 16-25 in number, innermost phillaries accrescent to form membranous cylindrical tube.....Sect. *Ritropsis*

4. Phillaries 12-15 in number, innermost phillaries accrescent to form tough coriaceous tube (usually pentagonal).....Sect. *Oligolepis*

### Determination key for the species of *E. ritro* and *E. ritrodes*

1. Compound heads 3.5-6 cm diameter, capitulum 15-25 mm, brush 1/2-1/3 as long as involucre ..... *E. ritro*
1. Compound heads 3-3.4 cm diameter, capitulum 12-14 mm, brush 1/4-1/5 as long as involucre ..... *E. ritrodes*

### Revised determination key of section *Ritropsis*

1. Stem usually lanate with long multicellular purple glandular seta.
  2. Stem white or purplish, with or without lanate seta ..... *E. spinosissimus*
  2. Stem brown, arachnoid or sometimes arachnoid with small glandular seta
    3. Base of cauline leaves (at least of some cauline leaf) widened into auricles palmately divided to 1/2-2/3 in to triangular spiny-tipped lobes. .... *E. gaillardotii*
    3. Base of cauline leaves palmatisect in to linear-subulate lobes or sometimes palmately divided to 3/4.....*E. adenocaulos*
1. Stem densely short glandular seta sometimes also arachnoid without purple glandular seta
  4. Leaves glandular-papillose or glabrous above
    5. Brush at least 1/2 as long as involucre or longer; stem glandular ..... *E. orientalis*
    5. Brush less than 1/2 as long as involucre; stem glandular and chno..... *E. tenuisectus*
  4. Leaves sparse or densely arachnoid-tomentose above, sometimes also..... *E. chardinii*

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