

## GENUS *CARDUUS* (COMPOSITAE) AS REPRESENTED IN THE INDO-PAKISTAN SUBCONTINENT

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A taxonomic revision of genus *Carduus* as represented in the Indo-Pakistan subcontinent, has been made. Key to the species, their descriptions, notes on their differentiating characters and distribution have been given. //

From taxonomical standpoint genus *Carduus* is one of the complicated genera of the family *Compositae*. The species of this genus closely resemble those of some other genera found in the subcontinent, e.g. *Cirsium*, *Cousinia* and *Jurinia*. *Carduus* is differentiated from genus *Cirsium*, which has feathery pappus hair (most of the species have been described under *Cnicus* by Hooker)<sup>1</sup> by having simple pappus hair and from *Cousinia* by having hairy filaments and multiseriate pappus hair. *Jurinia* is distinguished from *Carduus* by having glabrous filaments and feathery pappus hair.

Hooker<sup>1</sup> has described two species of genus *Carduus*, viz. *C. nutans* and *C. thomsoni* from the subcontinent. While revising this genus, the author<sup>2</sup> found that *C. nutans* does not occur in this area and *C. thomsoni*, which was transferred by Iljin<sup>3</sup> to the genus *Olgea* has sufficient characters, justifying its inclusion in the genus *Carduus* under the sub-genus *Alfredia*. Whereas Stewart<sup>4</sup> has determined the nutans-like species indigenous to the subcontinent as *C. acanthoides*, the author has observed that *C. acanthoides* is confined only to Europe. The four species of *Carduus* found in the subcontinent are *C. edelbergii* Rech. f., *C. kumauensis* (J.Ar.) Kazmi, *C. thomsoni* Hook. f. and *C. pycnocephalus* L. The first three species being native to the subcontinent, the fourth, i.e. *C. pycnocephalus*, has wide distribution. Key to the species, their descriptions and distribution are given in this paper.

The author has examined material from the following herbaria: Botanical Museum, Copenhagen (C); Botanische Staatssammlung, München (M); Botanisches Institut und Botanischer Garten der Universität, Wien (WU); Botanischer Garten und Museum der Universität, Zürich (Z); British Museum (Natural History), London (BM); Conservatoire et Jardin Botaniques, Genève (G);

Herbarium, North Regional Laboratories Peshawar (NRL); Herbarium, Gordon College, Rawalpindi (RWP); Herbarium and Library, Royal Botanic Gardens, Kew (K); Herbarium Universitatis Florentinae, Instituto Botanico, Firenze (FI); Jardin Botanique de L'Etat, Belgium (BR); Museum National D'Histoire Naturelle, Laboratoire de Phanerogamie, Paris (P). Naturhistorisches Museum, Wien (W); Naturhistoriska Riksmuseet, Stockholm (S); Rijksherbarium, Leiden (L); The Linnean Society of London, London (Linn).

### **Carduus L.**

Spec. Plant. 821 (1753); Mant. Pl. 461 (1771)  
Boiss. Fl. Or. 3: 514 (1875)—Benth. et Hook.,  
Gen. Pl. 2: 467 (1876)—Hook., Fl. Br. Ind. 3:  
361 (1882).

*Type Genus:* *C. nutans* L. Heads homogamous, long peduncled or sessile, scattered or crowded. *Involucre* globose, ovoid or cylindrical, glabrous to densely covered with fine whitish hair. *Involucral bracts* multiseriate, imbricate coriaceous or scarious, margins entire, serrulate, pinnate or appendiculate, bracts at the upper half erect, recurved or reflexed, terminating in a single or appendiculate spiny tips; inner bracts usually erect hardly spinecent and coloured. *Receptacle* flat or convex, densely bristly. *Corolla* long, tubular, usually shortly or deeply 5-lobed often 2-lobed, lobes narrow, tips simple, fleshy or inflexed. *Stamens:* filaments free, tuberculate or hairy; anther cohering into a tube which sheaths the style, anther bases segettate, auricles connate, tails slender. *Ovary* 1-celled, ovate solitary, style exerted, bifid, branches at the tip bearing short papillae. *Pappus* multiseriate, bristles congenial at the base, unequal, smooth or scabris, inner bristles longer, simple at the tips, lightly dilated or barbellate. *Achenes* 3–10 mm long, glabrous, shining or dull, obovate, ± compressed or obtusely 4-angled, smooth or 5–10 ribbed, truncate or the top umbonate areole basal straight or slightly fixed on one side.

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## KEY TO SPECIES

(a) Corolla lobes inflexed at tips, achenes dull, 6–10 mm long.

1. **C. Thomsoni** Hook. f.

(a) Corolla lobes not inflexed simple, achenes shining, 3–6 mm long:

(b) Capitula oblong or cylindrical.

2. **C. Pycnocephalus** Linn.

(b) Capitula globose or ovoid:

(c) Involucral bracts of the middle series at half length constricted and then gradually narrowed into short spiny tips.

3. **C. Edelbergii** Rech. f.

(c) Involucral bracts of the middle series at the half length not constricted, gradually narrowed into long spiny tips.

4. **C. Kumaunesis** (J. Ar.) Kazmi.

1. **C. Thomsoni** Hook. f. Fl. Brit. Ind. iii: 361 (1882).

*Carduus*, Ladak sp. Clarke, Compos. Indicae, 215 (1876).

*Type Specimen*: Hook. f. et Thomson (K). A perennial herb, stem, 30–50 cm simple, robust, grooved, almost glabrous, and arachnoideus at the top. *Leaves* very coriaceous; lower leaves 15–20 cm long, hardly petiolate, narrow, oblong, pinnatifid; upper leaves not decurrent, sessile, amplexicaul, auriculate, dilated at the bases, lanceolate, serrate (hardly pinnatifid), strongly spinose, lower surface tomentose or glabrous. *Head* large, 5–7 cm dia hemispherical, erect or drooping, many-flowered. *Involucre* densely woolly, bracts at the base ovate lanceolate, spinulose, gradually narrowed in a strong 2.5 cm long recurved spine. *Corolla* glabrous, 32–37 mm long, narrow. *Pappus* hair unequal, scabrid not plumose, 32 mm long. *Achenes* glabrous, upto 6 mm long, areole central.

*Specimens Examined*.—Kashmir, Baltistan, Kasur-mik, STEWART, 20806 (RWP)—Ladak, Hook. f. et THOMSON (K-Holotype, W-Isotype).

*Geographical Distribution*.—Afghanistan, China, Pakistan, Russia.

2. **Carduus pycnocephalus** L. Spec. Plant, 1151 (1753), excl. Syn. Barr. et Triumph.

*C. tenuiflorus* sensu Smith, Engl. Bot. 412 (1814), non Curt.

*C. tenuiflorus* Vis. Strip. Dalm. 29 (1826), non Curt.

*C. microcephalus* Goud. Fl. Helv. 5, 168 (1829).

*C. tenuiflorus* var. *elongatus* Dub. Bot. Gall. 284 (1830).

*C. tenuiflorus* var. *pycnocephalus* (L.) Prodr. 6: 626 (1837).

*C. tenuiflorus* var. *elongatus* DC. l.c.

*C. tenuiflorus* var. *albidus* Friedrichsthal, Reise 269 (1838).

*C. arabicus* sensu Friedrichsthal, l.c. 277 (1838), non Jacq.

*C. argentatus* Willd. ex Steud. Nom. ed. 2, 1, 283 (1841).

*C. pycnocephalus* L. var. *typicus* Fiori in Fiori et Paol. Fl. Anal. It. 3, 359 (1904).

*C. pycnocephalus* var. *typicus* f. *elongatus* (DC) Fiori, l.c.

*C. pycnocephalus* var. *elongatus* (DC) Rouy Fl. Fr. 9:72 (1905).

*C. mouillefarnii* Rouy, Fl. Fr. 9, 72 (1905).

*C. pycnocephalus* ssp. *eu-pycnocephalus* Briq. et Cav. in Burnat, Fl. Alp. Mar., 7, 57 (1931).

*Type Specimen*: Linne 966/9 (Linn). A tall erect herb, up to 1 m high. *Stem* grooved, simple to branched, branches, unequal, winged or below the head naked, white, tomentose; wings usually narrow or sometimes broad, dentate, lobate or deeply divided, lobes triangular, narrowed into spines, margins entire or bearing minute spinules. *Leaves* up to 40 cm long, 15 cm broad, upper surface glabrous or slightly hairy, lower grey or white tomentose, basal leaves obovate, lobate; lobes round margined with tender spines; sometimes narrowed at the base, pinnate and pinnatipartite; steminal leaves gradually decreasing in size, sub-decurrent or sessile. *Head* oblong or cylindrical, upto 2.5 cm long, base round or slightly truncate, at the top of the stems or branches mostly in groups of 3–4 or sometimes solitary and shortly pedunculate. *Involucre* 5–7 seriate, imbricate, ± glabrous or densely arachnoideus, up to 2 cm long, 2.5 mm broad, bracts of the inner and middle series towards the base ovate, nerveless, in the upper part with strong prominent nerve, gradually attenuated into a strong spine, margins and the middle nerve thick, covered with minute hairs, outer bracts ± erect, middle erect or slightly reflexed, inner bracts oblong-lanceolate, ± nerveless, membranous, acuminate, unarmed. *Corolla* purple rarely white, 15–17 mm long, narrow part of the tube 6–7 mm

long, lobes 5–6 mm long. *Achènes* 4–5 mm long. *Pappus* 11–14 mm long, white, rarely brownish-white.

*C. pycnocephalus* is chiefly distributed along the Mediterranean sea coasts and further extends deep into Europe, Middle Eastern countries, and finally spreading up to Pakistan. This species has not been reported from the subcontinent, although a specimen collected by Stocks is lying in the Kew Herbarium. *C. pycnocephalus* resembles closely *C. arabicus* and *C. tenuiflorus* in character, but varies from *C. tenuiflorus* by having bracts without scarious margins, strong prominent middle nerve and thickened margins. The nerve and the thickened margins are covered densely with minute hair. It is distinguishable from the other species described here by its cylindrical heads.

*A. ssp. pycnocephalus*. Broad involucre bracts at the base ovate at the lower half triangular, at the upper half bent outside.

*Specimens Examined*.—Baluchistan: Urak, SIDDIQUI AND NASIR 3497 (RWP); Quetta, DICK PEDDIE N.A., 17 (RWP)—Dist. Loralai, Near Sanjawi on Sanjawi-Duki Rd., KAZMI, 1781 (NRL); N.W.F.P. (former): Khyber Agency, between Ali Masjid and Charbagh, ARIF J. AHMAD, 23 (NRL).

*Geographical Distribution*.—Afghanistan, Albania, Algeria, Belgium, British Isles, Bulgaria, Egypt, Czechoslovakia, Cyprus (Denmark), France, Greece, Iraq, Iran, Italy, Jordan, Lebanon, Morocco, (Austria), Pakistan, Portugal, U.S.S.R.,

(Sweden), Spain, Canary Islands, Tunisia, Turkey and Yugoslavia.

*B. ssp. albidus*. (M. Bieb) Kazmi, Mitt. Bot. Munchen., 5,446 (1964).

*C. albidus* M. bieb. Fl. Taur. Cauc., 2, 269–70 (1808).

*C. tenuiflorus* var. *albidus* (M. Bieb) DC. Prodr. 6, 626 (1837).

*C. pycnocephalus* var. *albidus* (M. Bieb) Boiss. Fl. Or., 3,521 (1875).

*Type specimen*: Bieberstein Involucral bracts narrow at the base, oblong at the lower half and narrow at the upper half, erect.

*Specimens Examined*.—Baluchistan: Kleichen, STOCKS, 1095 (K) Chitral: DROSH, LYON (W). Swat: Baherain, REHMAN, 45 (BM).

*Geographical Distribution*.—Afghanistan, Bulgaria, Cyprus, (Greece), Egypt, Iraq, Iran, Lebanon, Pakistan, USSR and Turkey.

3. ***C. edelbergii*** Rech. f. Symb. Afgh. 2, 175 (1955).

*Cnicus lucidus* Wall. Cat. n. 2895, nomen.

*C. nutans* var. *lucidus* DC. Prodr., 6, 622 (1837).

*Type Specimen*: Edelberg 1148 (W). Herb erect, upto 1.5 m high. *Stem* grooved simple or branched, glabrous or slightly hairy, winged, wings sinuate, pinnatifid or divided up to the base, lobes

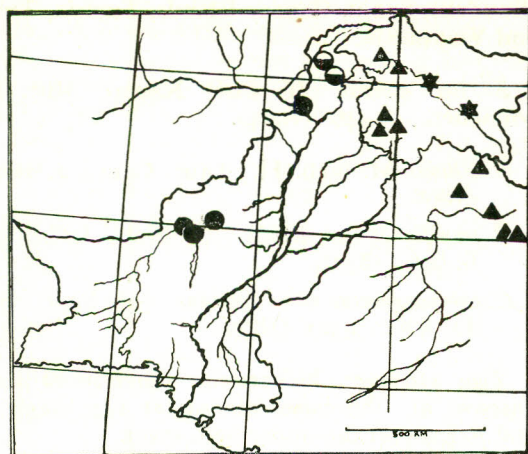


*C. thomsoni* Hook.

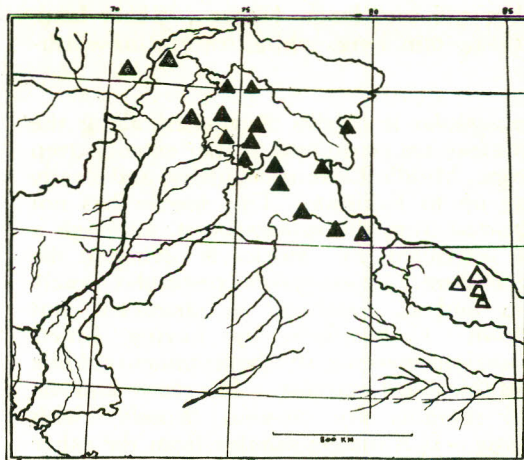
*C. pycnocephalus* Linn ssp. pycnocephalus

*C. edelbergii* Rech. f. ssp. edelbergii

*C. kumaunensis* (J. AR.) KAZMI



*C. pycnocephalus* Linn  
 ● *ssp. pycnocephalus* ● *ssp. albidus* (M.S.) Kazmi  
 ▲ *C. kumaunensis* (J.Ah.) Kazmi  
 ★ *C. thomsoni* Hook



*C. edelbergii* Rech.f.  
 ▲ *ssp. edelbergii* △ *ssp. lanatus* Kazmi

semiorbicular, angled or triangular, margined and tipped with minute or strong spines. *Leaves* glabrous or lightly arachnoideous above, below lightly or thickly covered with non-septate thin or septate thick hairs, sometimes glabrous on both the surfaces; basal leaves lanceolate or oblong lanceolate, 10–30 cm. long, 3–15 cm broad, lobate or up to the  $\frac{4}{5}$  of the lamina pinnatifid, lobes oblique, lobulate, lobules lanceolate, tipped with  $\pm 5$  mm long yellow spines, margined with 1–2 mm long spinules; steminal leaves similar to the basal leaves, except smaller and decurrent. *Heads* upto 5 cm dia usually clustered or sometimes solitary, erect or drooping, usually sessile sometimes shortly pedunculate, peduncles lightly or thickly tomentose. *Involucre*: Involucral bracts multiseriate, imbricate, glabrous or arachnoideous linear lanceolate, mid-rib  $\pm$  inconspicuous, erect or reflexed, above the base slightly constricted further gradually narrowed into a spine, below the constriction upto 3 mm broad. *corolla* purple or rarely white, 18–20 mm long, narrow part of the tube 8–9 mm long, lobes 5–6 mm long *Achenes* 3–4 mm long. *Pappus* 12–16 mm long, white.

*C. edelbergii* is distributed in the hilly and mountainous northern parts of the subcontinent, from Chitral to Nepal. It ascends up to 10,000 ft in the central and western Himalayas. The middle bracts are slightly constricted in mature plants. On account of this character it comes under the section and series of *Nutantes*. It considerably resembles *C. nutans* whose distribution is confined to the northern and western Europe, while the distribution of *C. edelbergii* is restricted to the southern Himalayas. The author did not find any intermediate forms between the areas of distribution of these two species. In view of this

observation, it has been recognised to be a distinct species.

#### *A. ssp. edelbergii.*

Leaves on the both surfaces glabrous or on the upper surface pilose and lower surface covered densely or lightly with septate hairs.

#### *Specimens Examined.*—

*India*: Simore, WALLICH, 2895 (G,K)—*Kumaon*: Tehri Garhwal, GAMBLE, 24768 (K) *Punjab*: Chamba, Pongi-Chamba road, DUTHIE, (K)—Kulu Valley, Bhunter, JAIN and BHARDWAJA (W)—Buhan Jarri, DRUMMOND, 22945 (K)—Lahul,—?, DRUMMOND, 22943 (K); GNESHE (K)—Simla Distt: Simla, COLLET, 776 (K); JACQUEMONT, 1166 (1831–32) (K,P); HOOKER and THOMSON (K,P); Rich? (K); DRUMMOND, 1832 (RWP)—Kolgash, GAMBLE, 3165 (K); RABBI, J.M., 2688 (RWP); MOHINDER NATH, 2688 (RWP)—Kashang Valley, MOHINDER NATH, 2884 (RWP)—Tagu to Theog at 7,000 ft, PARKINSON, C.E., 7368 (RWP)—Dakara, DUTHIE (RWP).

*Kashmir*.—Himalaya; Bor. Occ. reg. temp., 6000–10,000 ft, HOOKER and THOMSON (BM,C,FI, G,L,M,P,S,W)—Phachin, EDGEWORTH (K)—Islamabad, DRUMMOND, 13969 (K)—Kashmir,—?, HOOKER and THOMSON (K)—Kistwar, HOOKER and THOMSON (K)—Poonch, RASHID, NASIR and STEWART, 25592 (BM,K)—Purti, GAMBLE, 1517 (K)—Srinagar, SCHLAGINHEIT 4614 (S)—Upper Chenab Valley, GAMBLE, 342 (K)—Taulipir, 10,000 ft, Rashid, NASIR and STEWART, 25593 (RWP)—Bagh, STEWART and NASIR, 23684 (RWP)—Pahalgam, STEWART, R.R. and I.D., 5464.

Pakistan; Chitral, Bundai, HARRISS (BM)—Lutko, Lyon, 1812 (K)—Madaklasht, N-E of Drosh, STANTON, 3147 (W)—Kafiristan, Bashgalian, STANTON, 2707 (RWP)—Chitral, SIDDIQUI (RWP)—Hazara:—?, STEWART, J., (K)—Balakot, DUTHIE (K)—Kaghan Valley, Bhonja ka katha, DUTHIE, 1969I (K)—Nathia, NAROLD (K)—Abbottabad, STEWART, 16376 (RWP)—Kaghan Valley on Balakot-Kiwai Rd., KAZMI, 2054 (NRL)—former *N.W.F.P.*..., ROYLE (K)—*Dir State*: Between Dir and Gujjar, 6,000 ft, BEG, 1340 (RWP)—*Swat State*: Khwaja Khel, SHAUKAT ALI, 26116 (RWP)—Below Kalam, STEWART, 2656 (RWP)—Mingora-Manglaur Rd., Nasir and SIDDIQUI, 367 (RWP)—Margzer near Saidu Sharif, KAZMI, 2432 (NRL)—Between Mingora and Charbagh, KAZMI, 2437 (NRL)—Between Khawajakhel and Asala on Mingora-Madian Rd., KAZMI, 2444 (NRL).

*Geographical Distribution*.—Afghanistan, China, India, Kashmir, Pakistan, Tibet.

*B. ssp. lanatus* Kazmi, Mitt. Bot. Munchen, 5, 346 (1964).

*Type specimen*: Stainton, Sykes and William, 1879 (BM).

Leaves pilose or slightly arachnoides on the upper surface slightly or densely covered with non-septate white hairs on lower surface.

The sub-species is endemic in Nepal and it differs from the type by having leaves with dense, white non-septate hairs on the lower surface.

*Specimens Examined*: Nepal.—Bhere valley, Jarakot, POLUNIN, SYKES and WILLIAM, 2380 (BM)—Maharigaon, POLUNIN *et al.*, 4848, 157 (BM)—Mustang, STANTON, SYKES and WILLIAM, 1879 (BM-Holotype); 1384 (BM)—Tookchey, SHAMA, 9 (BM).

*Geographical Distribution*.—Nepal.

4. ***C. kumaunensis* (J.Ar.) Kazmi**. Mitt. Bot. Munchen, 5, 364 (1964) *C. crispus* ssp. *kumaunensis* J. Ar. in *Man., Mus. Nat. Hist. Nauv., Ser.*, 24, 189 (1949).

*Type Specimen*: Strachey Winterbottom, (K). Erect, tall herb. Stem grooved simple or in the upper part branched slightly covered with septate hairs, winged up to the top wings broad, deeply divided lobes  $\pm$  semi orbiculate  $\pm$  deeply divided, broader in the upper part of the stem. Leaves glabrous or the nerves covered with long septate hairs; basal leaves oblanceolate, pinnatifid or up to 4/5 of the lamina pinnatifid, gradually

narrowed at the base; lobes ovate, lobate, dentate or deeply divided, segments  $\pm$  triangular, attenuated into 5 mm long prickly spines, margins spinous ciliate; steminal leaves similar to the basal leaves, smaller, decurrent. *Head* subglobose, 1.5-2.5 cm long, 1.5-3 cm broad, round or lightly truncate at base usually a cluster of 3, rarely solitary *Involucral bracts* multiseriate, imbricate, densely hairy, 1 mm broad, linear, outer and middle bracts strongly nerved, upper part long, plicate, subcauliculate, gradually attenuated in a long prickly spine, reflexed or recurved; inner bracts usually equaling sometimes exceeding the flowers. *corolla* 14-16 mm long, purple, tube 6-7 mm long, lobes 3-5 mm long. *Achenes* 3-4 mm long. *Pappus* 10-13 mm long, white.

*C. kumaunensis* is very easily distinguishable from the other Himalayan species by its dense hairy heads and very narrow (1-mm broad) bracts with very prominent nerves. The bracts are reflexed at half length and at the upper half more or less canalculated. This species has been identified by some worker as *C. acanthoides*. *C. acanthoides* is endemic in Europe with broader bracts narrowed abruptly at the tip into a small spine; the middle bracts are usually longer than the inner ones.

*Specimens Examined*: India.—Kumaon: Ralam (?)—STRACHEY and WINTERBOTTOM, 1 (BR, K-Holotype, P)—Gora Valley, Parbhu, DUTHIE (RWP)—Lahaul:—? HOOKER (K)—Mana (?), EDGEWORTH (K)—Sissu, BOR 10,0100 (K); Drummond, 22944 (K)—Sumdo, STEWART (RWP)—Pabati Valley, BALING (RWP); Kashmir—?, JACQUEMONT, 1167 (P)—Gilgit, Kala pani 668 (K)—Gulmarg?, BARBOUR (BM); Stewart, 1042 (RWP)—Kalhoi, Lidder Valley, DUTHIE (K)—Khyelang (?), JASCHKE (Z)—Pir Panjal, DUTHIE (W)—Sor Sonawarg, STEWART, 6498 (RWP)—Kashmir,—?, SHANTI SARUR (RWP)—W. Himalaya, Sarul, Kogon (?), DUTHIE.

*Geographical Distribution*.—India, Kashmir.

## References

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3. M.M. Iljin, Notul. Syst. ex. Herb. Horti., Botan. Petrop. t. 3., 36-37 (1922), p. 141.
4. R.R. Stewart, *Flora of Rawalpindi District*, Pakistan J. For. (Oct. 1957 and Jan. 1958), reprint, p. 73.