

Taxonomy of the *Carex muricata* group (Cyperaceae) in Europe



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Systematics of muricata group

Summary

Carex, the fifth big plant genus, has a difficult taxonomy because of the closely related and similar species, that together with the hybridization tends to obscure taxa delimitation. It is the case of *muricata* group belonging to sect. *Phaestoglochin* Dumort. There are several local works agreeing with the difficulty of taxa delimitation, and highlight its confuse nomenclature. Our investigations are based on field collections mainly from Cantabrian Range and Pyrenean Mountains in Spain and, French and Italian Alps, and herbarium material from B, FCO, K, LEB, LISU, MA and SANT. Some 1000 samples were revised in the present study; but to perform a statistical and numerical analysis 220 specimens were selected representing all the variation and also included specimens of *Carex otrubae* Podp. in Sect. *Vulpinae* (J. Carey) Christ., (n. 9 in dendrogram) because its morphological similarities with the *muricata* group, and according to the literature, all they easily can hybridize. The main goal of this work is to identify the most useful characters pointed out in former studies, and other that we have selected since they allow us to differentiate taxa. A total of sixty six characters are studied, then using the Gower index, a hierarchical clustering was made calculating distances among taxa. Finally, a cluster analysis from non standardized data (UPGMA) was performed and shown in a dendrogram, computing by SYNTAX 2000. Our results, corroborate there are eleven taxa in the group, five of them (two species an three subspecies) are new and described here (underlined).



1a. *Carex spicata* subsp. *spicata*

1b. *Carex spicata* Huds. subsp. *andresii* subsp. *nova*

Holotypus: [Spain: León:] 30TUM39, 850 m, Codornillos, 17 June 1984, J. Andrés, LEB 49969.

It differs from *C. spicata* subsp. *spicata* by its crowded inflorescence, the small perigynum (4.5-5 mm long) with a little corky base and mostly without denticles in the beak.



Distribution: Iberian Peninsula excepting Andalusia and Atlantic and Mediterranean coast.



2. *Carex coriogyne*

3. *Carex magacis* sp. *nova*

Holotypus: [Spain: Navarra:] Senda 69, c. río Urtxuria, sobre grietas de caliza en borde de camino umbroso, 800 m, 42° 57' N, 1° 03' W, Selva de Irati, 5 Jul 2004, Ana Molina, LEB 82649.



It differs from *C. guestphalica* and *C. muricata* by its pale female glume; perigynium winged, rhombic, wider ($\geq 2,25$ mm), truncate at base and, denticulate at beak with denticles reaching the body.



Distribution: Pyrenean and Iberian Range.

Probably hybrid origin between *C. muricata* and *C. guestphalica*.



4a. *Carex muricata* subsp. *muricata*

4b. *Carex muricata* L. subsp. *cesanensis* subsp. *nova*

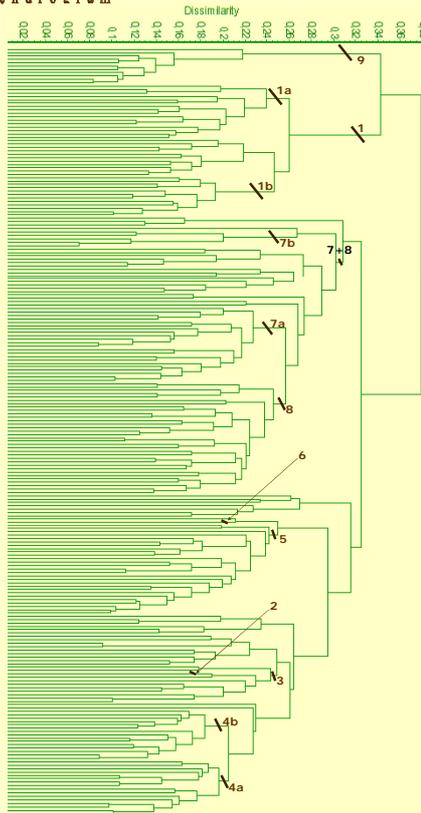
Holotypus: [Italy: Piemonte:] talud boscoso, 1750 m, 44° 57' N, 6° 48' E, Cesana Torinese, 3 August 2003, Ana Molina, LEB 80889.

It differs from *C. muricata* subsp. *muricata* by its rhombic big perigynium (4.5-5 mm), gradually contracted in a beak and truncate at base; achene ovate.



Distribution: European high mountains, mainly Alps.

Dendrogram



Identification Key

1. Sheaths, basal leaves, base of stems, and often female glumes purplish-tinged. Ligule acute, longer than wide _____ 1. *C. spicata*
- Perigynium ≥ 5 mm, very corky base, beak denticulate _____ 1a. subsp. *spicata*
- Perigynium 4.5-5 mm, little corky base, beak without denticles _____ 1b. subsp. *andresii*
1. Sheaths, basal leaves, base of stems, and female glumes not purplish-tinged. Ligule wider than long _____ 2
2. Perigynium winged, patent or very patent, inflorescence less than 6 cm _____ 3
3. Female glumes pale _____ 4
4. Perigynium oblong, rounded at base, inflorescence less than 3 cm _____ 2. *C. coriogyne*
4. Perigynium rhombic truncate at base, inflorescence 4-6 cm long _____ 3. *C. magacis*
3. Female glumes blackish brown, inflorescence short, less than 3 cm _____ 4. *C. muricata*
- Perigynium small, 3.75-4.25 mm long, rounded at base _____ 4a. subsp. *muricata*
- Perigynium big, 4-5 mm long, rhombic, truncate at base _____ 4b. subsp. *cesanensis*
2. Perigynium not winged, erect to patent, inflorescence 3-13 cm long _____ 5
5. Female glumes pale brown, inflorescence short, less than 3cm _____ 5. *C. pairaei*
5. Female glumes light, hyaline, inflorescence longer _____ 6
6. Perigynium small, 3-4 (4.25) mm _____ 7
7. Inflorescence short, 4-5 cm, with lowest spikes contiguous _____ 6. *C. mediterranicum*
7. Inflorescence long, 6-13 cm, with lowest spikes separate _____ 7. *C. divulsa*
- Perigynium ovate to ovate-elliptical, gradually contracted in a beak, lowest spikes lax _____ 7a. subsp. *divulsa*
- Perigynium circular, abruptly contracted in a beak, 2-3 lowest spikes dense _____ 7b. subsp. *marocana*
6. Perigynium bigger, 4.25-5.50 mm long _____ 8. *C. guestphalica*

1. *Carex spicata* Huds.
 - 1a. *C. spicata* subsp. *spicata* = *C. contigua* Hoppe
 - 1b. *C. spicata* subsp. *andresii* A. Mol., Acedo & Llamas
2. *Carex coriogyne* Nelmex = *C. divulsa* Stokes subsp. *coriogyne* (Nelmex) Ö.Nilsson
3. *Carex magacis* A. Mol., Acedo & Llamas
4. *Carex muricata* L.
 - 4a. *C. muricata* subsp. *muricata* = *C. muricata* L. subsp. *lamprocarpa* Čelak
 - 4b. *C. muricata* subsp. *cesanensis* A. Mol., Acedo & Llamas
5. *Carex pairaei* F.W. Schultz = *C. muricata* L. subsp. *lamprocarpa* Čelak
6. *Carex mediterranicum* A. Mol., Acedo & Llamas
7. *Carex divulsa* Stokes
 - 7a. *C. divulsa* subsp. *divulsa*
 - 7b. *C. divulsa* subsp. *marocana* A. Mol., Acedo & Llamas
8. *Carex guestphalica* (Boenn. ex Rchb.) O. Lang = *C. leersii* F. W. Schulz, incl. *C. chabertii* F. W. Schulz



5. *Carex pairaei*

6. *Carex mediterranicum* sp. *nova*

Holotypus: [Cyprus:] milieu anthropisé humide, station forestière Paphos, Ayia (34° 45' N, 32° 25' E), 650 m, 23 April 1991, Iter Mediterraneanum IV, MA 495407.



Distribution: Cyprus.



It differs from *Carex divulsa* and *C. pairaei* by its short inflorescence (up to 5 cm) without separate lowest spikes and the small perigynium (3-3.25 mm).



7a. *Carex divulsa* Stokes subsp. *divulsa*

7b. *Carex divulsa* subsp. *marocana* subsp. *nova*

Holotypus: [Morocco:] sobre la segunda caseta, en la vertiente mediterránea del Gurugú (35° 25' N, 3° W), 1 jun. 1915, A. Caballero. MA 17149.



It differs from *C. divulsa* subsp. *divulsa* by its lowest dense spikes and the rounded perigynium, abruptly contracted in a short beak, conspicuously nerved on abaxial side.



Distribution: Morocco and probably western Mediterranean.



8. *Carex guestphalica*

