



Nomenclature, morphometry, karyology and SEM cypselae analysis of *Carduus brutius* (Asteraceae) and its relatives

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Abstract

The systematic relationships between *Carduus brutius* and its putatively relative taxa, i.e. *Carduus affinis* and *C. defloratus* subsp. *carlinifolius*, were assessed by means of morphological, morphometric and karyological analyses. Our results highlighted a diploid status ($2n = 2x = 22$) for all the three involved taxa and a higher morphological similarity between *C. brutius* and *C. affinis*, which are also completely allopatric (but collectively sympatric with *C. defloratus* subsp. *carlinifolius*). The names *Carduus affinis* Guss., *C. affinis* var. *brutius* Fiori, *C. affinis* var. *vulturius* Fiori and *C. affinis* f. *pollinensis* Fiori were typified. At the present state of knowledge, a subspecific status seems the most appropriate for *C. brutius*, as *C. affinis* subsp. *brutius*. This taxon can be regarded as schizoendemic, restricted to southern Italy (Montea-Caramolo mountain area, Calabria).

Key words: Apennines, *Carduus affinis*, *Carduus defloratus* s.l., Compositae, endemics, Italy, typification

Introduction

Porta (1879) reported the discovery of a putatively new *Carduus* Linnaeus (1753: 820) species during a field trip carried out in 1877 together with R. Huter and G. Rigo in Monte Mula (Montea-Caramolo mountain area, Calabria, southern Italy). This species was provisionally and informally named “*Carduus brutius*” by that author. Few years later, based on the Huter, Porta & Rigo’s collection, *C. affinis* Gussone (1826: 334) var. *brutius* Fiori in Fiori & Béguinot (1904: 356) was described. According to this author, this variety is distinguished by its glabrescent abaxial surface of leaves (vs. white-arachnoid in the typical variety).

Huter (1906), raising this taxon to the species level, completely ignored *C. affinis* and evidenced the affinities of *C. brutius* with *C. defloratus* Linnaeus (1759: 1200) subsp. *carlinifolius* (Lamarck 1785: 700) Ces. in Cattaneo (1844: 302) (the only subspecies occurring in Apennines, see Gremaud 1981d, Conti *et al.* 2005). On the contrary, Lacaita (1918) pointed out again towards an affinity with *C. affinis*, and the same approach was followed by the monographer Kazmi (1964), who recombined the name at the subspecific level and typified it.

Carduus affinis was described from Abruzzo and Molise, central Italy: “In apricis, vel sylvaticis montosis Samnii; Capracotta, Monte Capraro: Aprutii; Majella alla Majelletta, Morrone” (Gussone 1826), and this name is still lacking typification (Peruzzi *et al.* 2015).

According to the recent inventory by Peruzzi *et al.* (2014), *C. affinis* is endemic to central and southern Apennines, from Marche to Calabria, while *C. brutius* occurs only in Calabria, and doubtfully in Basilicata.

As already evidenced in preliminary contributions (Bernardo *et al.* 2013, 2014), *C. brutius* shows intermediate features between *C. affinis* (for the general habit), and *C. defloratus* subsp. *carlinifolius* (for the leaf glabrescence and phyllaries dimensions). Indeed all the three taxa belong to *Carduus* sect. *Carduus* subsect. *Deflorati* Kazmi (1964: 307), albeit placed by Kazmi (1964) in different series (ser. *Candicantes* Kazmi 1964: 309 for *C. affinis* and *C. brutius*, ser. *Deflorati* Kazmi 1964: 308 for *C. defloratus* subsp. *carlinifolius*). Moreover, no karyological data (Bedini *et al.* 2012a, 2012b) and cypselae features are available neither for *C. brutius* nor for *C. affinis*, except one count on material

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APPENDIX 1. List of examined specimens of *Carduus affinis* subsp. *affinis* and *C. affinis* subsp. *brutius*.

Carduus affinis* subsp. *affinis:—ITALY. **Marche**. Prov. Ascoli Piceno, Arquata del Tronto, Valico di Forche Canapine, calcareo, 1300 m, 24 August 1926, *A. Fiori s.n.* (FI!); al Capo del Tenna, Piceno, 24 July 1845, *Marzialetti s.n.* (FI!); [...] nell'Appennino Piceno, 6 July 1836, *Parlatore s.n.* (FI!); **Lazio**. Campania sept., in regione montana “Passaggio dell’Orso”, ad radicem montis Zaffineto, supra Picinisco (prov. di Sora), 8 August 1874, *E. Levier s.n.* (FI!); Pantani di Accumoli (Rieti), margine di faggeta, 1620 m, esp. E, substrato calcareo, 30 July 1992, *E. Lattanzi et A. Scoppola s.n.* (FI!); Prato di Mezzo (Picinisco), pascoli sassosi, 1450 m, s. d., *F. Conti s.n.* (APP!, n. 23062); Morrone delle Rose, tra lago di Cardito e Morrone delle Rose (S. Biagio Saracinisco), pascoli sassosi, 2 October 1991, *F. Conti s.n.* (APP!, n. 23072); Liscia - Forcellone, Valle Cerasa (Picinisco), pascoli sassosi, 1 October 1991, *F. Conti s.n.* (APP!, n. 23071); Liscia - Forcellone, Valle Cerasa (Picinisco), pascoli sassosi, 1 October 1991, *F. Conti s.n.* (APP!, n. 23073); **Abruzzo**. Majella alla Majelletta di Roccamorice, August 1824, *G. Gussone s.n.* (NAP!, Herb. Gussone, lectotype of *C. affinis* Guss.); Majella all’Orfenta, September 1826, *G. Gussone s.n.* (NAP!, Herb. Gussone); Majella al Vallone presso la Manerba, 31 July 1834, *G. Gussone s.n.* (NAP!, Herb. Gussone); Italia media: Aprutis in pascuis Majellae m.tis loc. “la Rapina” sol. calcar. 3–4000’, 7 August 1885, *Porta et Rigo 60* (FI!); M.te Morrone, declivit. orient. supra Rocca di Caramanico, in sylvaticis lapidosis regionis fagi, 26 July 1874, *E. Levier s.n.* (FI!); Abruzzo, Parco Nazionale d’Abruzzo, Valico e Rifugio di Forca d’Acero, m. 1540, 2 August 1953, *A. Chiarugi, R. Corradi et A. Contardo s.n.* (FI!); Ciafassa, Abruzzo, 25 August 1903, *Grande 88* (FI!); Villavallelonga, Abruzzo, Assegno di Mastro Ciccio, 16 July 1904, *Grande s.n.* (FI!); M. Morrone in pascuis elatioribus - calc. - m. 1800–2000, July–August 1905, *G. Rigo s.n.* (FI!); In Aprutii montosis, 1846, *Tenore 609* (FI!); in saxosis et sylvaticis Pizzo di Tivo, s.d., *Orsini s.n.* (FI!); in pascuis montis Morrone, Aprutii, 21 July 1856, *E. Huet du Pavillon et A. Huet du Pavillon 386* (FI!); Majella, in pascuis alpinis ad septentr. vallis Orfenta prope Scrimacavallo, 8 August 1874, *E. Levier s.n.* (FI!); M.te Majella, in pascuis subalpinis supra Caramanico (Prato della Corte), 24 July 1874, *E. Levier s.n.* (FI! two sheets); Scrima a Cavallo, Majella, Abruzzi, August 1874, *H. Groves s.n.* (FI!); Maiella, summer 1906, *Izzatello s.n.* (FI!); Portella Gran Sasso al [...], 14 August 1893, *U. Martelli s.n.* (FI!); M.te Morrone, in pascuis subalpinis et alpinis lateris orientalis (scendendo da Lago di Caramanico verso Rocca di Caramanico), 27 July 1874, *E. Levier s.n.* (FI!); in pascuis subalpinis montis Sirente (Pozzo di Biaggio supra Rovere, decliv. occid.), 1 August 1876, *E. Levier s.n.* (FI!); Majella, in pascuis alpinis ad septentr. vallis Orfenta (Majella), prope Scrimacavallo, 5 August 1874, *E. Levier s.n.* (FI!); Gran Sasso d’Italia, Porta di S. Francesco presso il Pizzo [...], 16 August 1893, *U. Martelli s.n.* (FI!); Monte Velino (Abruzzo), August 1903, *U. Martelli s.n.* (FI!); in Valle Mala Cupa, declivitatibus occidentalis montis Morrone supra Sulmona, 1 August 1873, *E. Levier s.n.* (FI!); Morrone, July 1909, *Guadagno s.n.* (PI!, Herb. Guadagno); Majella, Valle S. Spirito, July 1908, *Guadagno s.n.* (PI!, Herb. Guadagno); M. Morrone, August 1909, *Guadagno s.n.* (PI!, Herb. Guadagno); in sylvaticis apricis montosis scaliceae Metiae, s.d., *G. Gussone s.n.* (NAP!, Herb. Gussone); Monte Morrone, vers. orientale in loc. Rava della Breccia (WGS84 33T 412287 4665549), radura di faggeta, 1640 m, 29 August 2014, *F. Bartolucci s.n.* (APP!); Campo Imperatore in loc. Le Fontari (WGS84 33T384641 4699282), stazzo, 1740 m, 26 August 2014, *F. Bartolucci s.n.* (APP!); Montagna dei Fiori, loc. il Vallone (Valle Castellana), pascoli rocciosi, 1400 m, 3 July 1999, *F. Conti, G. Capecci, D. Tinti s.n.* (APP!, n. 149); Monti della Laga, Bosco di Langamella, da Padula verso il Ceppo (Cortina), margine di bosco, 1176 m, 23 June 2005, *F. Conti et al. s.n.* (APP!, n. 15929); Gruppo della Laga - Valle del Rio Castellano, Pianaccio (Valle Castellana), praterie, 1850–2090 m, 14 July 2005, *F. Conti, S. Cecchetti s.n.* (APP!, n. 20682, 20683); salita a M Tranquillo (Pescasseroli), pascolo arido, 23 September 2006, *s. coll. s.n.* (APP!, n. 31607–31609); sopra Fonte dell’Orso (Crognaleto), 1780 m, 16 July 2006, *F. Conti, F. Minutillo, G. Tondi, R. Di Pietro s.n.* (APP!, n. 33505); Pizzo Cefalone (L’Aquila), pendii rupestri, 1500 m, 23 July 2009, *F. Conti s.n.* (APP!, n. 51393); **Molise**. M.te Capraro presso Capracotta nel Sannio, 21 July 1826, *G. Gussone s.n.* (NAP!, Herb.