



## A revision of *Centaurea* sect. *Phaeopappus* (Asteraceae, Cardueae)

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### Abstract

The taxonomic status of species and infraspecific taxa included in *Centaurea* sect. *Phaeopappus* is revised. The present study is based on morphological characters of the specimens from the authors' expeditions and other herbarium collections. Three subspecies and two varieties are elevated to the species rank, and a new subspecies is described. In addition, *Centaurea phaeopappa* is treated as a valid species and *C. handelii* is reported as new to Iran. The section ranges from N to NW and W to SE in Iran, N Iraq to E Turkey, Armenia, S Transcaucasia and Afghanistan. Finally, a key to all species of the section is provided. In addition, the chromosome count  $2n = 18$  is reported for *C. albonitens*.

**Key words:** chromosome numbers, Flora Iranica, identification key, Iran, lectotypification, new combinations, taxonomy

### Introduction

The genus *Centaurea* Linnaeus (1753: 909), with nearly 200–250 species (Bremer 1994, Wagenitz & Hellwig 1996, Hellwig 2004, Garcia-Jacas *et al.* 2006, Susanna & Garcia-Jacas 2007, López *et al.* 2011), has traditionally been considered problematic, and none of the early attempts to subdivide it (e.g. Cassini 1829, Boissier 1875, Löve & Löve 1961, Dostál 1969, 1973, Holub 1973, 1974) was widely accepted. The taxonomic complexity of *Centaurea*, especially in the Near East, has stimulated much recent research (Wagenitz 1983, Kaya 1986, 1987, Hellwig 1994, Kaya *et al.* 1996, Wagenitz & Hellwig 1997, Wagenitz *et al.* 1998, Türkoglu *et al.* 2003). Cytological data, in particular, which are still inadequate for *Centaurea* species of the Near East, should be involved to resolve taxonomic limits. *Centaurea* s.l. was found to be a non-monophyletic genus, and recent critical studies (Wagenitz & Hellwig 2000, Greuter 2003a, 2003b, Hellwig 2004) divided it into smaller monophyletic genera, namely *Centaurea* s. str., *Cyanus* Miller (1754: 4), *Psephellus* Cassini (1826: 488) and *Rhaponticoides* Vaillant (1754: 165).

According to Flora Iranica (Wagenitz 1980), the genus *Centaurea* comprises 28 sections. *Centaurea* sect. *Phaeopappus* (Candolle 1838: 560) Hoffmann (1895: 330) is a small section that includes 5 species, of which only 3 species occur in Iran, with *C. aucheri* (Candolle 1838: 564) Wagenitz (1963: 180) being a complex group with 5 subspecies (Wagenitz 1980). In some earlier treatments, especially of the Russian School, *C.* sect. *Phaeopappus* was recognized as the distinct genus *Tomanthea* Candolle (1838: 564). Gabrielian & Aghababian (1990) proposed that *Tomanthea* should be further divided into two different genera, the monotypic *Chrysopappus* Takhtajan (1938: 275) for *Chrysopappus stapfianus* (Handel-Mazzetti 1913: 447) Takhtajan (1938: 276) and *Tomanthea* s. str. for the remaining species. However, the generic status of *Tomanthea* was rejected on molecular grounds by Garcia-Jacas *et al.* (2000). *Chrysopappus* also belongs to *Centaurea*. In the molecular phylogeny of the *Jacea* group *C.* sect. *Phaeopappus* appears to be fragmented (Garcia-Jacas *et al.* 2006). On the one hand, this fragmentation could support the views of Gabrielian & Aghababian (1990) that *Chrysopappus* is distinct, if only at the sectional rank. On the other hand, morphological connections between all species of *C.* sect. *Phaeopappus* are rather clear (Wagenitz 1963).