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A New Enigmatic Species, *Cota phitosiana* (Asteraceae) from East Anatolia, Turkey

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Abstract

Cota J. Gay is belongs to Compositae (Asteraceae) family. Cota genus is represented by about 63 taxa in the world and is mainly distributed in Europe (excluding northern Europe), North Africa, Caucasia and Central Asia. In Turkey, the *Cota* genus include about 22 taxa, nine of which are endemic.

Taxa of the *Cota* are mainly distributed and common in the Mediterranean and Irano-Turanian phytogeographic regions of Turkey. *Cota* was earlier classified as a section in the *Anthemis* L. genus in Flora of Turkey. After than the generic and infrageneric concepts of *Anthemis* were changed and *Cota* was accepted as another genus. *Cota phitosiana* Yıld. & Kılıç, a new species from Elazığ province, Karakoçan district, East Turkey, is described and photographed. *Cota phitosiana* is compared with the closest related species *Cota tinctoria* (L.) J.Gay. var. *tinctoria*. The speciation features of the new species is briefly discussed. *Cota nigellifolia* (Boiss.) Álv. Fern. and Vitales subsp. *orientalis* (Grierson) Yıld. is made a new combination.

Keywords: *Cota phitosiana*, Asteraceae, new species, taxonomy.

1. Introduction

The genus *Cota* J.Gay was included as one from three sections in the genus *Anthemis* L. in flora of Turkey (Grierson, Yavın, 1975). Since 2000 years, The genus was divided into two genera as *Anthemis* and *Cota* based on the disc corollas not inflated at base, and achenes compressed in *Cota* by Oberprıeler et al. (Oberprieler, 2001; Oberprıeler et al., 2007; Oberprıeler et al., 2009); Greuter et al. (Greuter et al., 2003), and Lo Presti et al. (Lo Presti et al., 2010). Due to these reasons, sect. *Cota* have been elevated to genus level, and then all taxa attributed to this section transfered to the new genus. According to the "Flora of Turkey", *Anthemis* genus comprising 50 species all of which have been delimitated into 3 different sections by Grıerson and Yavın (Grierson, Yavın, 1975), and these are *Anthemis* sect. *Anthemis* consists of 29 species, *Anthemis* sect. *Maruta* (Cass.) Griseb. contains 9 species, and the remaining 12(+8) species, in the present day, Turkish *Cota* L. genus includes 20 species, 2 subspecies, 4 varieties, with 12 endemic species.

The *Cota* in Turkey has resulted in the description of two new species, increasing the number of species to 20 and taxa to 26 (including present this new species *C. phitosiana* Yıld. and Kılıç and previous new species *C. hamzaoglui* Özbek and Vural (Özbek et al., 2011), and the species transferred from *Anacyclus* L. to *Cota* J.Gay by Vitales et al. (Vitales et al., 2018) (*C. anatolica* (Behçet and Almanar) Alv.Fern., Vitales and Fırat, *C. nigellifolia* (Boiss.) Álv. Fern. and Vitales,

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C. latealata (Hub.-Mor.) Álv. Fern. and Vitales (Vitales et al., 2018). The 12 species are endemics for Turkey (endemism rate 60.0 %) (Table 1).

The genus *Cota* species are distributed in the Europe, SW Asia and N Africa and is represented by about 55 species (60 taxa) throughout the World (9), and the above mentioned areas especially Turkey (W and C Anatolia, and Mediterranean area), Iran and Russia have been considered as the gene centre of the genus (Grierson, Yavın, 1975; Greuter et al., 2003; Özbek et al., 2011; Yıldırımlı, 1999).

2. Materials and methods

During a field trip, we collected some specimens belonging to the genus *Cota*, from Elazığ (Type. Turkey. B7), Karakoçan, Golan thermal springs surroundings, stony slopes, foresty openings from step, 1500-1600 m, 16.08.2018, Ö. Kılıç 5879 & Ş. Yıldırımlı (holo. Yıldırımlı Otluk'u (Hb. Yıldırımlı) (Figure 1). After studying species descriptions in the accounts of related literature, we concluded that our specimens represent a species new to science and named *Cota phitosiana*.

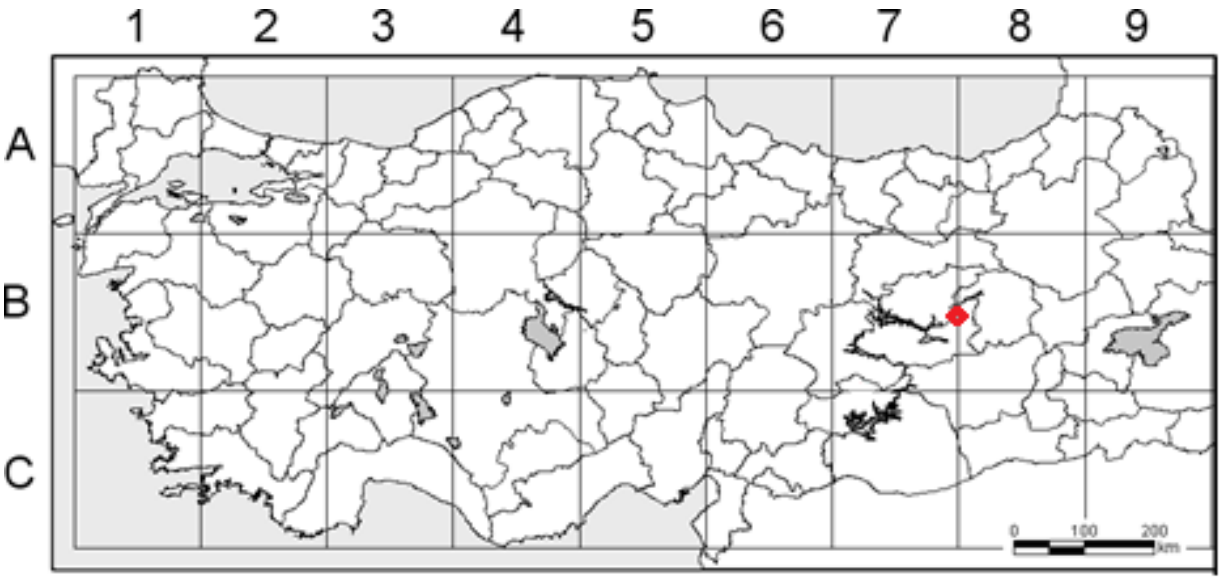

Fig.1. ◆ The holotype locality of *Cota phitosiana*

3. Results and discussion

Anacyclus nigellifolius Boiss. has two subspecies, subsp. *nigellifolius* and subsp. *orientalis* Boiss., in flora of Turkey (Grierson, Yavın, 1975). Vitales et al. 2018 transferred only one subspecies of *Anacyclus nigellifolius* Boiss. subsp. *nigellifolius* to *Cota* but other subspecies *A. nigellifolius* subsp. *orientalis* Grierson not transferred to the genus *Cota* from *Anacyclus* (Vitales et al., 2018). New combination is made here:

Cota nigellifolia (Boiss.) Álv. Fern. & Vitales subsp. *orientalis* (Grierson) Yıld., comb. nov.

Basionym: *Anacyclus nigellifolius* Boissier (1849: 13). Type: Lebanon. Al Biqa: Rascheya, May-June 1846, *E. Boissier s.n.* (holotype G, isotypes G) subsp. *orientalis* Grierson in Notes R.B.G. Edinb. 33: 411 (1975). Type: Turkey. C7 Urfa: Nemrut Da., 1888, *Sintenis* 817 (holo. LD!).

The new enigmatic species was first collected in the summer of 2018 from Elazığ province, Karakoçan (Golan thermal facility) district by Kılıç and Yıldırımlı. It was examined in morphologically. *Cota phitosiana* differs from all others taxa of *Cota* by foliculate or spathiform (not flat) ligules. Especially, on the basis of this feature, the material is described in the present paper as a species new to science, *Cota phitosiana* Yıld. & Kılıç.

Cota phitosiana Yıld. and Kılıç, sp. nov., Figure 2.

Greyish-green perennial. Stems 24-28 cm x 1-1.5 mm, erect, 5-green striate, branching from near base, branches 1-headed, densely covered with adpressed lanate-tomentose pubescence. Leaves c. 1.5-2 x 1 cm, oblong in outline, 1-pinnatisect, primary segments 3-5-paired, linear, c. 5-10 x 1-2 mm, margins 0.5-1 mm, dentate, flat. Capitula radiate. Involucre c. 0.8 x 1.5 cm excluding

ligules, densely white lanate-tomentose; all phyllaries green-brownish, white margined. Ligules c. 15-20, c. 10 x 2 mm, linear, foliculate or spathiform, yellow, tubes 8 mm, lobes 2 mm. Disc flowers 3 x 1 mm, yellow, not inflated distincly at base. Paleae ovate-acuminate, as long as disc flowers. Achenes immature.

Type. Turkey. B7 Elazığ: Karakoçan, Golan kaplıcası çevresi, taşlı yamaç, bozkırda orman açıklığı, 1500-1600 m, 16.08.2018, Ö. Kılıç 5879 & Ş. Yıldırımlı (holo. Yıldırımlı Otluk'u (Hb. Yıldırımlı).

Fig. 2. *Cota phitosiana*

Close to *Cota tinctoria* (L.) J.Gay var. *tinctoria* but leaves 1-pinnatisect (not 2-3-pinnatisect), oblong (not oblanceolate or obovate) in outline; involucre c. 0.8 x 1.5 cm (not l-l.2(-2) cm), densely white lanate-tomentose (not sparsely or densely white tomentose); ligules foliculate or spathiform (not flat); paleae ovate-acuminate (not oblong-acuminate). Endemic. Anatolia-Turanian element. *Cota phitosiana* is known from only a single locality and two specimens, so it should be classified as 'Critically Endangered' (CR) (11).

Eponymy. The new species is dedicated to honour of emeritus Prof. Dr. Dimitrios Phitos, on the occasion of his 90th birthday, from Patras, Greece.

4. Conclusion

The most distinct feature of this new species is foliculate or spathiform ligulate petals. This is unique feature foliculate or spathiform of ligulate petals in the genera *Anthemis* and *Cota* and in fact *Asteraceae* family. This spathiform character is probably because of the Golan thermal spring. This character can be seen at the very hot areas. This is one of the speciation ways. Thus, polyploidy is one of the main evolutionary forces in especially in *Asteraceae* family. This chromosome set multiplication directly impacts the nuclear DNA contents, in terms of variation at holoploid and monoploid levels. Other karyological changes such as aneuploidy or dysploidy might produce genome size alterations as well, therefore playing also a relevant role as evolutionary forces. All these factors may promote speciation, thus having systematic implications (Valles et al., 2012). The chromosome number of the examined a lot of taxa of *Cota* has been indicated as 2n = 18 (Özbek, 2010). If it was possible to count the number of chromosome, it would be revealed that this new species was polyploid.

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