



A new natural hybrid of *Cousinia* Cass. (Asteraceae) from Türkiye

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Abstract

Cousinia x kurubasgecidiensis Ilcim & H. Ozcelik (Asteraceae) a natural hybrid between *Cousinia vanensis* Hub.-Mor. and *Cousinia boissieri* Buhse from Eastern Anatolia(Türkiye), described as a new to science and illustrated. Morphological, taxonomical and palynological characteristics of *C. x kurubasgecidiensis* compared with its parents. Geographical distribution, ecological features, conservation status and systematical and pollen characters, of the new taxon are given.

Key words: *Cousinia x kurubasgecidiensis*, Asteraceae, Taxonomy, New taxon, Hybride

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Türkiye'den *Cousinia* Cass. 'ın (Asteraceae) Yeni Bir Doğal Hibriti

Özet

Cousinia x kurubasgecidiensis Ilcim & H. Ozcelik (Asteraceae): Doğu Anadolu bölgemizden *Cousinia vanensis* Hub.-Mor. and *Cousinia boissieri* Buhse arasında yeni bir hibrit olarak tanımlanmış ve özellikleri anlatılmıştır. Ataları olan iki türün özellikleri ile morfolojik, taksonomik ve palinolojik özellikleri karşılaştırılmıştır. Bu makalede, yeni kayıt taksonun coğrafi dağılımı, ekolojik özellikleri, koruma statüsü, sistematik ve polen özellikleri verilmektedir.

Anahtar kelimeler: *Cousinia x kurubasgecidiensis*, Asteraceae, Taksonomi, Yeni takson, Hibrit

1. Introduction

The genus *Cousinia* Cass. (Asteraceae), one of the largest genera of the Asteraceae in Türkiye in endemic and taxon numbers. It is comprises approximately 672 species, of which about 235 occur in Iran (Sheidai et al., 2006; Rechinger, 1972; Ranjbar et al., 2012). Main distribution area of the genus is Russia, Iran, Türkiye and other dried habitat countries (Rechinger, 1986). *Cousinia* have a wide distribution in mountains of Iran. It grouped into 50 section in Flora Iranica (Mehregan et al., 2003). It is represented in Europe by one species (Moore, 1975). The genus *Cousinia* contains 38 species in flora of Türkiye (Hub.-Mor., 1975). In this case, we think its gene center is Eastern Anatolia and Iran and its distribution area is mainly as Irano-Turanian region (İlçim et Özçelik, 1997).

During the specimen collection for the revision of Turkish *Cousinia*, some plants seemed to have intermediate characteristics of *C. vanensis* and *C. boissieri*. After morphological and palynological studies and checking and examination of many other specimens, we concluded that those intermediate specimens represent an hitherto undescribed natural hybrid in genus *Cousinia*.

The study is based on *Cousinia* materials deposited in GAZI, HUB, ANK, ISTF, GUL, Mustafa Kemal University Herbaria and the plants collected from the field in 1994-2005 years.

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2. Some important characters of the hybrid (*Cousinia x kurubasgecidiensis*)

2.1. Diagnosis

Affinis *C. vanensis* paulo breviora decurrentibus foliis 0.3-1.5 cm diametro (non 1-4.5 cm), capita paulo arachnoideus-lanatus vel glabratus (non dense arachnoideus-lanatus) phylla breviora 4-12 mm diametro (non 6-15 mm), pappus 5-7 mm diametro (non 2.5 mm). *C. boissieri*, caulis ascendens (non erectus), foliis decurrentibus (non amplexicaulis) capitula spinis inclusis 1.2-3.5 cm (non 1.67-2.05) differt.

Cousinia x kurubasgecidiensis Ilcim & H. Ozcelik (*Cousinia vanensis* Hub.-Mor. x *Cousinia boissieri* Buhse) Hybr. Nov. (Figure. 1).

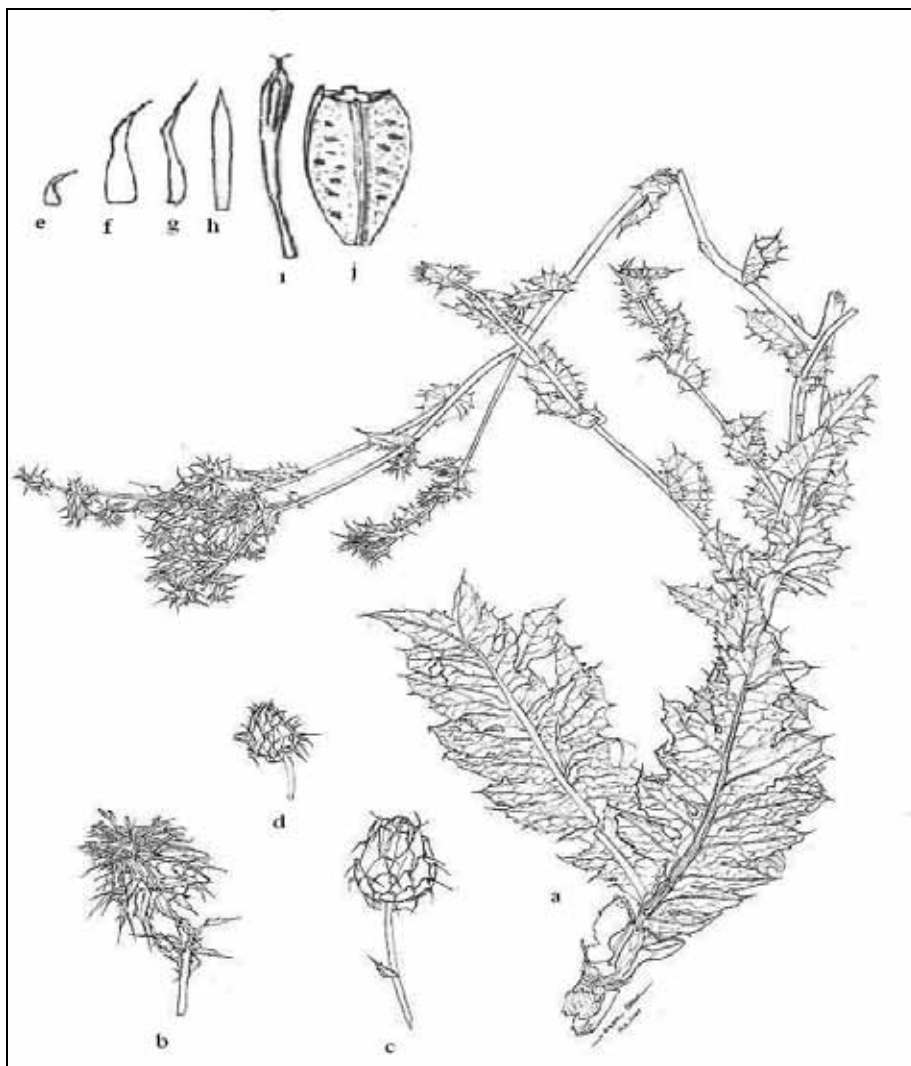


Figure 1. *Cousinia x kurubasgecidiensis* Ilcim & H. Ozcelik hybr. nov. and its parent species: a. Habit, b. capitula of *C. vanensis*; c. Capitula of *C. boissieri*; d. Capitula, e. Lower phyllary, f.g. Median phyllary, h. inner phyllary, i. flower, j. seed of *C. x kurubasgecidiensis*.

Type: Türkiye, B9 Van; Kurubaş pass, steppe vegetation, 1700-1900 m., 10 July 1994, A. İlçim 60 (Holo in MKUH; Isotypes in VANF and GUL Herbaria).

2.2. Description

Biennial herb, stem 40-70 cm long. Stems slender, terete, simple and/or ascending, branches, forming a broad panicle, loosely arachnoid-wooly to glabrous. Basal leaves oblong-ovate to pinnatifid; usually leathery, white arachnoid-tomentose below upper loosely arachnoid, with crowded spiny teeth, ± wavy at margin; basal leaves oblong 8-14 x 2.5-6 cm, with up to 4-12 pairs triangular or linear segments, terminal lobe not enlarged; stem leaves 2-5 x 2.2-3

cm, median leaves gradually smaller, upper leaves abruptly smaller, shallowly lobed or entire, decurrent into wings up to 0.3-1.5 cm long. Capitula 5-62, with 27-103 flowered, flowers tubular deep pink to purple. Involucre broadly ovoid to globose 1.2-3.5 cm board incl. spines. Phyllaries 46-88, loosely arachnoid wooly or soon glabrescent, apical apandage horizontal or reflexed, 4-12 mm long with 2-5 mm long terminal spine and 2-4 very small lateral prickles or not. Corolla pink or purple, 12-21 mm long, achenes obovate to obpyramidal, brown, 3.5-4.5 x 2-2.2 mm, black dotted. Pappus 5-7 mm long. Fl: 7-8.

2.3. Ecology and geography

Van Lake region in Türkiye is an important center of biodiversity for *Cousinia*. Hybridisation of the genus occur generally in this area. The hybrid is occurring in a small area named as Kurubaşgeçidi on Van and Gürpınar road, almost 10 km. from Van city and at (1700-)1900-2300 m. Vegetation of the area is antropogenic steppe on vulcanic rocks. Elevation of the pass almost 2300 m. at peak and 1700 m. at the base. The area have a strong earthquake and eroded and sandy places and also rich floristical structure and poor vegetation. In the vegetation; *Astragalus* L. spp., *Cousinia vanensis*, *C. boissieri*, *Centaurea virgata* Lam., *Glaucium corniculatum* (L.) Rud., *Crambe orientalis* L., *Gypsophila bicolor* Freyn & Sint., *Echinophora orientalis* Hedge & Lamond, *Scorzonera latifolia* (Fisch. & Mey.) DC., *Cerinthe minor* L., *Phlomis armeniaca* Willd., *Salvia multicaulis* Vahl., *Salvia kronenburgii* Rech. fil., *Delphinium carduchorum* Chowdhuri & Davis, *Delphinium cyphoplectrum* Boiss., *Isatis glauca* Aucher ex Boiss. subsp. *iconia* (Boiss. & Heldr.) Davis, *Linum pycnophyllum* Boiss. et Heldr. subsp. *kurdicum* Davis, *Marrubium parviflorum* Fisch. et Mey. subsp. *oligodon* (Boiss.) Seybold are dominant.



Figure 2. Distributions of *Cousinia x kurubasgecidiensis* (◆) *C. vanensis* (■) *C. boissieri* (▲)

2.4. Conservation status

Known only from type locality. The estimated area of occupancy is less than 10 km². It is suggested that this new species should be placed under the IUCN threat category 'Critically Endangered (CR)' (Anonymous, 2001).

2.5. Pollen characters

Pollens of *C. x kurubasgecidiensis*, *C. vanensis* and *C. boissieri* were studied by light microscopy. Pollens of the taxon were taken from the isotype specimen, some of important characteristics of these pollens results are; pore shape is sphaeroideal, exine thickness in fresh pollen 6.39 and 6.63 µm respectively; intine thickness 1.02 µm. The pollen characteristics of *C. vanensis* are; pore shape sphaeroidal like as in *C. kurubasgecidiensis*; exine thickness in fresh pollen 6.26 µm and 7.13 µm respectively; intine thickness 1.13 µm. The pollen characteristics of *C. boissieri* are; pore shape suboblate different from other two taxa. Exine thickness in fresh pollen are 6.05 µm and 6.11 µm respectively. Intine thickness is 1.24 µm thick. The details of this study are presented in Table 2.

As a result of the palinological research, general morphological properties of pollens were determined as a radial symmetry, Amb shape triangular, exine structure tectate, ornamentation reticulate. Lamina is narrow around aperture and polar while it is wide between apertures. Shape of pollen is prolate. Pollen morphologies of *C. vanensis* and *C. boissieri* were similar each to other, whereas pollen of *C. x kurubasgecidiensis* was smaller than parental two species and it has abnormal morphology. Polar axis, equator axis, mesopodium, amb size, intine thickness, apocolpium values of *C. x kurubasgecidiensis* were smaller than *C. vanensis* and *C. boissieri*. Although pollen shape of *C. x kurubasgecidiensis* was smaller and also equator exine thicker than above two species. It is suboblate of *C. boissieri* while pore shape for *C. vanensis* and *C. x kurubasgecidiensis* are spherical (Figure 3). According to (Aytuğ, 1967) pollen morphologies of hybrids are very different from each to other in shape and abnormal in structure. Proportion of abnormal pollens must be more than 50 %. According to Gauss Bent, the conclusion can be found from 100 measurements in normal pollens and also 300 measurement in the hybrid taxon pollens. This situation is valid for *C. x kurubasgecidiensis*. Pollen morphology of the taxon is very variable (Figure 3).

There are some informations and researches on palynological characters which have taxonomical importance for determination of filogenetic relationship between genus and species (Erdtman, 1957). Number and state, exine structure, ornamentation, general view and greatness of the pores in taxonomical studies are very important characters used to distinguish some genus and species.

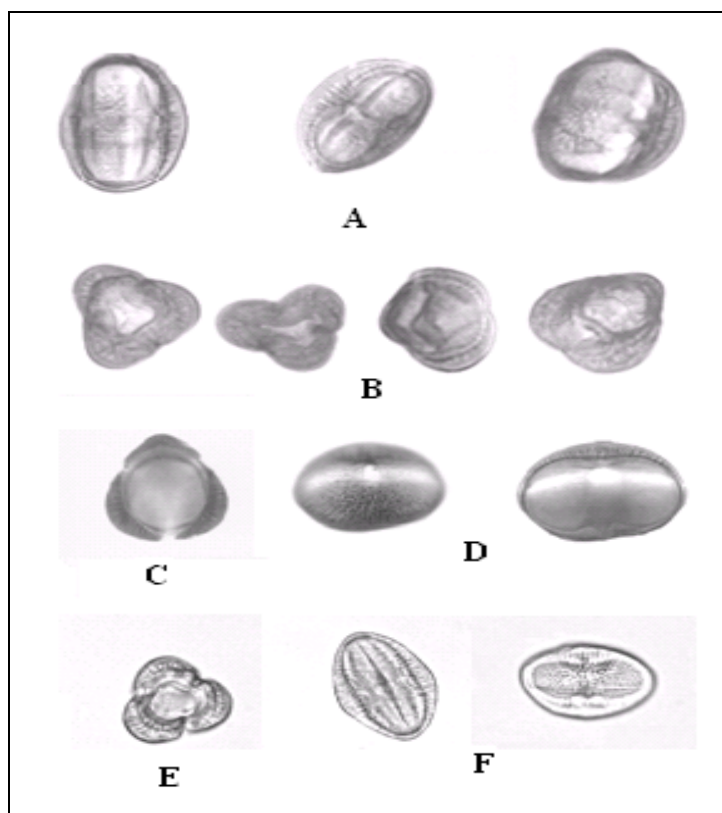


Figure 3. Pollen morphologies: A. equatorial view B. polar view of *C. x kurubasgecidiensis*; C. polar view D. equatorial view of *C. vanensis*; E. Polar view F. equatorial view *C. boissieri*.

3. Discussion and results

This new taxon share same locality with *C. boissieri* and *C. vanensis*. Its similar to *C. vanensis* but clearly differs from it short decurrent wings 0.3-1.5 cm (not 1-4.5 cm) capitula loosely arachnoid wooly or soon glabrescent (not densely arachnoid-wooly) phyllaries short 4-12 mm (not 6-15 mm) length of pappus 5-7 mm (not 2-5 mm). Also, it differs from *C. boissieri* in that it having ascending stems (not erect). The leaves are decurrent (not amplexicaule), and the capitula are larger 1.2-3.5 cm. (not 1.67-2.05).

The pollens of *C. kurubasgecidiensis*, *C. vanensis* and *C. boissieri* were studied by light microscopy. The pollens of *C. kurubasgecidiensis* studied from the isotype, some of the important characteristics of these pollens results are; por shape is sphaeroidea thickness of the exine in fresh pollen are 6.39 μm and 6.63 μm respectively. Intine is 1.02 μm thick. The details of this study are presented in Table 2.

The pollens characteristics of *C. vanensis* are; por shape is sphaeroidea like as in *C. kurubasgecidiensis*. The thickness of the exine in fresh pollen are 6.26 μm and 7.13 μm respectively. Intine is 1.13 μm thick.. The details of this study are presented in Table 2.

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As a result of the palinological research, general morphological properties of pollens were determined as a radial symmetry, Amb shape triangular, exine structure tectate, ornamentation reticulate. Lamina is narrow around aperture and polar while it is wide between apertures. Shape of pollens are prolate. Pollen morphology of *C. vanensis* and *C. boissieri* were similar to each other whereas *C. x kurubasgecidiensis* was smaller than those two species and have abnormal morphology. Polar axis, equator axis, mesopodium, amb size, intin tickness, apocolpium values of *C. kurubasgecidiensis* were smaller than *C. vanensis* and *C. boissieri*. Although pollen shape of *C. x kurubasgecidiensis* was smaller than another two species, equator exine thicker than *C. vanensis* and *C. boissieri*. Pore shape in *C. boissieri* was suboblate while in *C. vanensis* and *C. x kurubasgecidiensis* it was sphaeroidea (Figure 3). According to (Aytuğ,

1967) polen morphology of hybrides is very different from each other with shape and have abnormal morphology. Proportion of abnormal pollens are more than 50 %. Hybride species have variable polen morphology. In the normaly in pollens Gauss Bent can be found from 100 measurements whereas in the hybride pollens it can't be obtainable at 300 measurement. This situation also was observed at *C. x kurubasgeciensis* because of the different and variable polen morphology of this species (Figure 3).

There are some informations and researches on palynological characters which have taxonomical impotence for determination of filogenetic reallationship between genus and species (Erdtman, 1957). In taxonomical studies number of the pores and state, exine structure, ornamentation, general view and greatness are an important characters used to distinguish some genus and species.

Irano-Turanian is the most important region for genus *Cousinia*. Most of its species grow naturally in this region. Herbal parts of the plants used for fuel by local people. Most of them are endemics for Türkiye and they are breeding a large number of seeds. Germinations are very low because of embryos of these seeds are used for food by some insect larvas. Van Lake region in Türkiye is an important center of diversity for *Cousinias*. Hybridisation occur generally in this area. In this paper, one of these hybrids is reported. Tremblings of the earth (usually produced by volcanic action or other forces under the earth's crust) and landslips in volcanic areas might be effected to hybridisation in the genus.

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