



## A New Gigantic *Vicia* (Perennial Wild Vetch) (Fabaceae) Taxon From Eastern Anatolia, Türkiye

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### ABSTRACT

*Vicia freyniana* Bornm. subsp. *gigantea* subsp. *nova* (gigantic wild vetch), which has been collected from the Karakoçan district (Elazığ-Türkiye), has been defined as new subspecies for the scientific world. New subspecies; it differs from the typical subspecies primarily in terms of indumentum characteristics, large plant size, leaf and leaflet sizes, inflorescence features, inflorescence/leaf length ratio, flower parts and seed sizes. *Vicia freyniana* subsp. *gigantea* grows mostly in oak forest shades and sometimes in oak forest openings. This newly defined subspecies; description, ecological preferences, distribution map and photographs were given.

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## Doğu Anadolu( Türkiye)'dan Yeni Bir İri *Vicia* (Çok Yıllık Yabani Fiğ) (Fabaceae) Taksonu

### ÖZET

Elazığ(Türkiye)'ın Karakoçan ilçesinden toplanan *Vicia freyniana* Bornm. subsp. *gigantea* subsp. *nova* (dev yabani fiğ), bilim dünyası için yeni alt tür olarak tanımlandı. Yeni alt tür; başta indumentum özellikleri olmak üzere, iri bitki cüssesi, yaprak ve yaprakçık boyutları, infloresans özellikleri, infloresans / yaprak uzunluğu oranı, çiçek kısımları ile tohum boyutları bakımından tipik alt türden farklılık gösterir. *Vicia freyniana* subsp. *gigantea* çoğunlukla meşe ormanı gölgeliklerinde, nadiren de meşe orman açıklıklarında yetişir. Yeni tanımlanan bu alttürün; betimlemesi, ekolojik tercihleri, dağılım haritası ve fotoğrafları verildi.

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### INTRODUCTION

As research on plant diversity in Türkiye increases, new taxa are defined, new record plant taxa are determined for Türkiye and these studies; reveal that the diversity of plants in our country is much more than is known. Many studies on new taxa (Balos et al., 2022; 2023; Behçet et al., 2017; Behçet & İlçim, 2018; Behçet et al., 2019; Behçet & Yapar, 2020, 2021; Behçet & Çetin 2023; Hamzaoğlu et al., 2020; Hamzaoğlu & Behçet 2022; Doğan et al., 2015; İlçim & Behçet, 2016; Sinan et al., 2021; Sonay et al., 2023; Yapar & Behçet; 2020) and new records (Behçet & Altınsoy, 2023; Behçet & Cengiz 2023a, 2023b; Pınar et al., 2018, Yapar & Behçet, 2021) have been published in the last 10 years from Elazığ, where this new taxon was collected, and Bingöl, the eastern neighbour of Elazığ. All these data obtained through new research; it shows that Türkiye's biological richness is more than known.

During his botanical trips in Karakoçan (Elazığ) in 2023, the second author collected some interesting very large Fabaceae members (Figure 1,2). These collected samples; it was as genus *Vicia* L. with the help of the keys and definitions in the 3rd volume of the "Flora of Turkey and the East Aegean Islands" (Davis & Plitmann, 1970).

It was determined that all the leaves of these perennial specimens were imparipinnate (Figure 1,2), and they were similar to *Vicia freyniana* Bornm. (Figure 3), which is endemic to Türkiye, in terms of fruit and inflorescence characteristics. The samples collected from Bingöl; it even resembles *Galega officinalis* L. with its general appearance, fruit characteristics and imparipinnate leaf structure. However, the specimens of the new subspecies differ from *Galega* L. members in that their stamens are diadelphous and their stipules are sagittate. Because the stamens of *Galega* L. members are monadelphous and their stipules are semi-sagittate.



Figure 1. Scanned habit parts of *Vicia freyniana* subsp. *gigantea*: A. General view, B. Imparipinnate leaf, C. Inflorescence

Şekil 1. *Vicia freyniana* subsp. *gigantea*'nın taranmış habitus kısımları: A. Genel görünüm, B. İmparipinnat yaprak, C. İnfloresans

But the collected samples; it was determined that they were different from *Vicia freyniana* in terms of structural features such as indumentum characteristics (Figure 4), large plant size (Figure 2), leaf and leaflet sizes, inflorescence characteristics, inflorescence/leaf length ratio (Figure 1,2), flower parts and seed sizes (Figure 6).

The distribution of *Vicia freyniana* (subsp. *freyniana*) (Figure 5), which is endemic to Türkiye and whose type locality is Gümüşhane, is known from Kastamonu, Zonguldak, Giresun, Trabzon, Mersin and Sivas (Davis & Plitmann, 1970; Yıldırım, 2005; GBIF Secretariat, 2022). *Vicia* specimens collected from Karakoçan were compared with the *V. freyniana* descriptions in the Flora of Turkey (Davis & Plitmann, 1970), and isotype images (Figure 3) from herbarium BR; *Vicia freyniana* subsp. *gigantea* has been identified as a new subspecies.

#### MATERIALS and METHODS

Specimens belonging to *V. freyniana* subsp. *gigantea* defined were collected from the Karakoçan district of

Elazığ Province in Türkiye. In addition to the relevant literature (Davis & Plitmann, 1970), photographic images in the BM, K, BR, JE and P herbariums were also used to identify and evaluate the specimens of the subspecies.

#### RESULTS and DISCUSSION

*Vicia freyniana* Bornm. subsp. *gigantea* Behçet & Gülbasan, *subsp. nov.*

Type: Türkiye. B8 Elazığ: Karakoçan district, 3 km south of Üçbudak village, forest areas and moist forest clearings around, 1400m a.s.l., 25.07.2023, *Gülbasan* 986; *ibid*, 13.08.2023, *Gülbasan* 1012, (holo. BIN; iso. ANK, BIN) (Figures 1-2 and 4).

Diagnosis: *Vicia freyniana* subsp. *gigantea* differs from *Vicia freyniana* (subsp. *freyniana*) mainly stem 50-200 cm long and -9-11mm diameter at the base (not 40-70 cm long and 4-6 mm diameter at the base); lower parts glabrous or sparsely soft hairy, above soft white hairy (densely before the flowering period) (-not glabrous); leaflets lanceolate, 10-100 x 4-25 mm, 6-8(-9) paired

and leaflet shape lanceolate, acute or acuminate at apex (not oblong, 10–13 paired and usually obtuse at apex); leaflets 10–100 x 4–25 mm (not 10–35 x 3–10 mm); raceme densely 20–60 flowered (not 6–23 flowered) calyx 3.8–5 mm long usually sparsely white hairy (not 7–9 mm, glabrous or puberulent); legume 12–27(–30) x 1–3 mm, (not 22 x 7 mm); seed 5–6 x 2

mm (not 2.5–4 x 1.5–2 mm). The new subspecies; although it is similar to members of the *Galega* genus (especially *Galega officinalis*) with its imparipinnate leaves and general appearance; it differs from it in that its stamens are diadelphous (not monadelphous) and its stipules are sagittate (not semi-sagittate) (Figure 3,4,6).



Figure 2. Photos of *Vicia freyniana* subsp. *gigantea* with unbranched and leafless robust stem(A) in the lower parts and branching in the upper parts(B)

Şekil 2. *Vicia freyniana* subsp. *gigantea*'nin alt kısımlarındaki dalsız ve yapraksız kalın gövde kısmı (A) ile üst kısımlarında dallanma (B).

**Description:** Perennial, rigid, rootstock creeping, erect,. **Stems** 50–200 cm tall, 8–11 mm diameter at the base, lower parts glabrous or sparsely soft hairy, above soft white hairy (densely before the flowering period). **Leaves** all imparipinnate (ending in a leaflets). **Leaflets** lanceolate to oblong, 6–8(–9) paired, 10–100 x 4–25 mm. **Stipules** separate from the petiole and each other,

sagittate, upper ones semi-sagittate, sometimes with small teeth in the lower parts, usually hairy. **Peduncle** 4–7 cm long, sparsely hairy or glabrous. **Raceme** 6–10 cm long and densely 20–60 flowered. **Calyx** 3.8–5 mm long, usually sparsely white hairy, mouth oblique; lowest tooth shorter than the tube. **Corolla** 10–11 mm long, standard lilac, wings and keel usually white.



Figure 3. The image of *Vicia freyniana* isotype(subsp. *freyniana*) in Meise Botanic Garden Herbarium (BR) (from GBIF Secretariat, 2022).

Şekil 3. Meise Botanic Garden Herbarium (BR)'undaki *Vicia freyniana* izotipinin (subsp. *freyniana*) görünümü (GBIF Secretariat, 2022'den)



Figure 4. Indumentum views of leaves and inflorescences in young (A, B) and mature (C-F) *Vicia freyniana* subsp. *gigantea*.

Şekil 4. *Vicia freyniana* subsp. *gigantea*'nın genç (A, B) ve olgun (C-F) dönemlerindeki yaprak ve çiçeklenme bölgelerinin tüy örtüsü

**Stamens** diadelphous. **Legume** 12–27(–30) x 1–3 mm rhombic-oblong, subtorulose, 1–4 seeded (number of ovules up to 6). **Style** 10–15 mm long, not compressed, round, glabrous, 0.5 mm bifid at the tip. **Seeds** 5.5 – 6 x 2 mm, oblong, surface smooth.

**Ecological preferences:** *Vicia freyniana* subsp. *gigantea* is a local endemic taxon that is distributed in a narrow area in the forest area and forest open areas, 3 km south of Üçbudak village, in Karakoçan district, on the provincial borders of Elazığ in eastern Türkiye. The new subspecies, which prefer moist areas in forests or open forests, grow at altitudes of 1400 m. The flowering period of this taxon continues from mid-June to late

August. The dominant woody forest taxa are *Quercus libani* Oliv., *Q. Petraea* (Matt.) Liebl. subsp. *pinnatiloba* (K.Koch) Menitsky, *Amygdalus communis* L., *Corylus avellana* L. var. *avellana*, *C. maxima* Mill., *Sorbus torminalis* (L.) Crantz, *Cerasus mahaleb* (L.) Mill. var. *mahaleb*, and the following taxa are also distributed in the area; *Hypericum perforatum* L., *Verbascum oreophilum* K.Koch var. *joannis* (Bordz.) Hub. -Mor., *Chondrilla juncea* L., *Agrimonia repens* L., *Cirsium vulgare* (Savi) Ten., *Phragmites australis* (Cav.) Trin. ex Steud., *Centaurea virgata* Lam., *Xanthium strumarium* L., *Campanula sclerotricha* Boiss., *Lythrum salicaria* L., *Lysimachia verticillaris*

Spreng., *L. vulgaris* L., *Scrophularia umbrosa* Dumort., *Clinopodium vulgare* L. subsp. *vulgare*, *Phleum montanum* K.Koch subsp. *serrulatum* (Boiss.) Doğan, *Sambucus ebulus* L., *Silene laxa* Boiss. & Kotschy, *Umbilicus luteus* (Huds.) Webb & Berthel., *Medicago x varia* Martyn.

*Vicia freyniana*, which is endemic to Türkiye, differs

from other *Vicia* species with its imparipinnate leaf feature (Davis & Plitmann,1970). In addition to being a perennial, *Vicia freyniana* subsp. *gigantea* is similar to *Vicia freyniana* subsp. *freyniana* in terms of some other morphological features such as imparipinnate leaf and fruit characteristics; it differs from subsp. *freyniana* in many characters, especially indumentum (Table 1 and Figure 6)

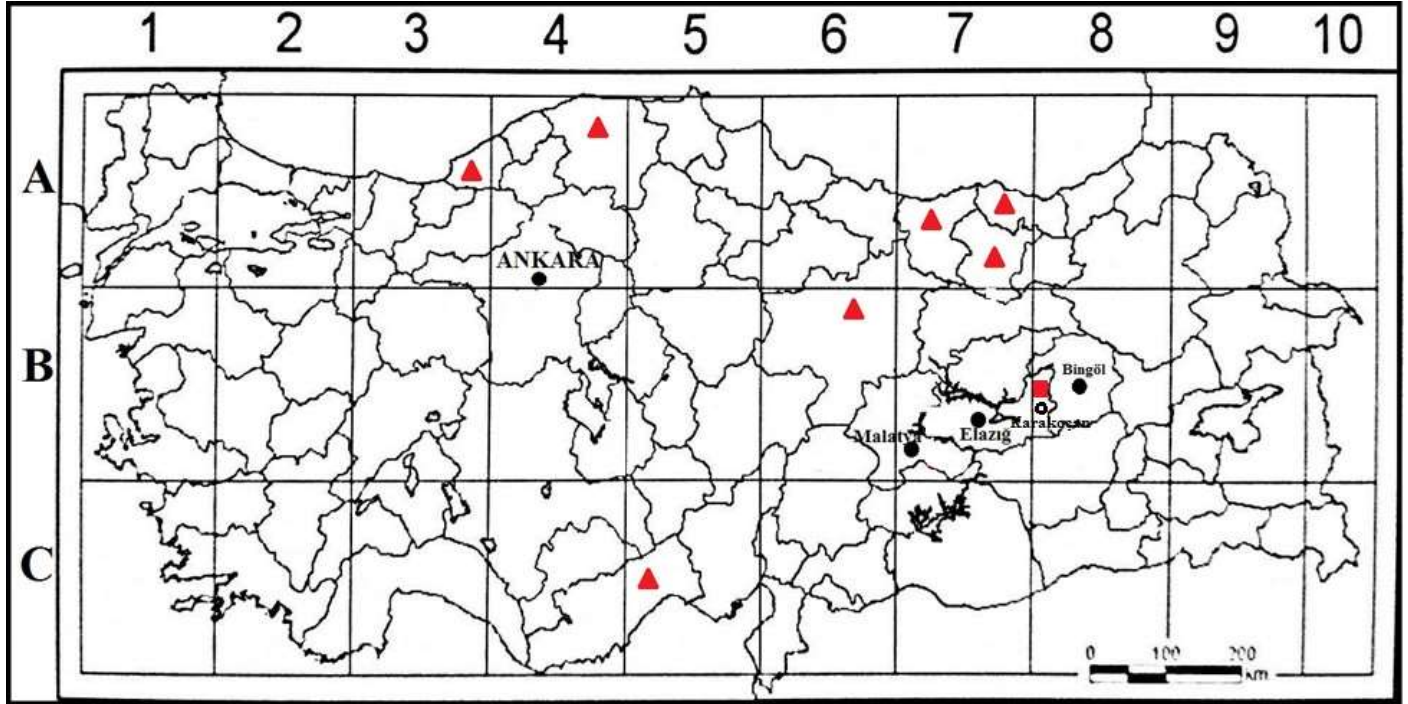


Figure 5. Distribution map of *Vicia freyniana* subsp. *gigantea* (■) and *Vicia freyniana* subsp. *freyniana* (▲) in Türkiye

Şekil 5. *Vicia freyniana* subsp. *gigantea* (■) ve subsp. *freyniana* (▲)'nın Türkiye'deki dağılışı haritası



Figure 6. Calyx(a), full flower(b), fruit(c) and seed(d) photo views of *Vicia freyniana* subsp. *gigantea*

Şekil 6. *Vicia freyniana* subsp. *gigantea*'nın kaliks(a), tam çiçek(b), meyve(c) ve tohum(d)

Table 1. Diagnostic characters between *Vicia freyniana* subsp. *gigantea* and *Vicia freyniana* (subsp. *freyniana*).  
*Çizelge 1. Vicia freyniana* subsp. *gigantea* ve *Vicia freyniana* (subsp. *freyniana*) arasındaki ayırt edici karakterler

Characters / Karakterler	<i>Vicia freyniana</i> subsp. <i>gigantea</i>	<i>Vicia freyniana</i> (subsp. <i>freyniana</i> )
Plant indumentum/ Bitki Tüy durumu	lower parts glabrous or sparsely soft hairy, above soft white hairy (densely before the flowering period)	glabrous
Stem height (cm), appearance, and diameter at the base(mm) / Gövde boyu, görünümü ve tabanda çapı	50–210, rigid, striate, 9–11mm diameter	40–70 cm, 4–6 mm diameter at the base
Pairs of leaflets per leaf and shape of leaflets/Yaprak başına yaprakçık çift sayısı ve yaprakçık şekli	6–8(–9) paired, lanceolate, acute or acuminate at apex	10–13–paired, leaflets oblong usually obtuse at apex
Stipule/Stipül	sagittate, upper ones semi-sagittate, sometimes with small teeth in the lower parts, hairy	mostly incised, only the uppermost often entire, glabrous
Leaflet size (mm)/Yaprakçık boyutları	10–100 x 4– 25 mm	10–35 x 3–10 mm
Number of flowers in a raceme / Rasem başına çiçek sayısı	20–60	6–23
Calyx/Kaliks	3.8–5mm usually sparsely white hairy	7-9 mm, glabrous or puberulent
Corolla/Korolla	10–11mm long, standard lilac, wings and keel usually white.	12–16 mm long, standard lilac, wings and keel white suffused with lilac.
Seed /Tohum	5.5– 6 x 2 mm	2.5–4x 1.5–2 mm

**Additional Specimens Seen:** *Vicia freyniana* subsp. *gigantea* (paratype): Türkiye, B8 Elazığ: Karakoçan district, 3 km south of Üçbudak village, 1400m, forest areas and moist forest clearings around, 1440 m a.s.l., 13.08.2023, *Gülbasan* 1012 (BIN; ANK). *Vicia freyniana* subsp. *freyniana*: Türkiye, A7: (Türkiye). Szandschak Gümüşkhane(Sancak Gümüşhane), 06.06.1894, *Sintenis* 5743 (isotypes of *Vicia freyniana*: BM000946822, K001051336, BR0000005177233, JE00013451 visual image!); C5 İçel: Arslanköy-Çamlıyayla, W Çamlıyayla, 13.05.1987, 900 m, *Neydegger* (P03067060, visual image!); B6 Sivas: Suşehri- Zara, 14 km N Zara, 03.06.1990, 1580 m, *Neydegger* (P03067061, visual image!).

*Vicia freyniana*, in addition to being a perennial, has a very different habit structure from other *Vicia* members, with its strong root system; robust, round (aside from being striped) and thick stem, and its leaves being imparipinnate (leaves with this structure are seen only in this species in the *Vicia* genus). Specimens of the new subspecies are close to *Vicia freyniana* in these aspects (with some important differences such as indumentum, size and number differences of structures, stipule features). The structure and appearance of flowers and fruits, which are the generative parts of *V. freyniana*, which is

**endemic** to Türkiye, show basic structural similarities with the new taxon samples. It was evaluated as a subspecies, especially considering the structural features of fruits and flowers (generative structures).

The number of taxa increased to 90 with this new subspecies of the genus *Vicia*, which is represented by 62 species and 89 taxa (endemism rate 12.35%) in Türkiye (Ertekin, 2012).

#### Author's Contributions

The contribution of the authors is equal.

#### Statement of Conflict of Interest

Authors have declared no conflict of interest.

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