Acta Biologica Turcica, 37(2), M3:1-12, 2024 Received 27 Nov. 2023; Accepted 30 Nov. 2023; Published Online 30 Nov. 2023

ACTA BIOLOGICA TURCICA

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E-ISSN: 2458-7893, http://www.actabiologicaturcica.com

Research article

Allium feqiyeteyranii a new species of *Allium* sect. *Codonoprasum* (Amaryllidaceae) from Van (Türkiye)

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Abstract: A new species, *Allium feqiyeteyranii* (*A.* sect. *Codonoprasum*), is described from Bahçesaray (Mîks)/Van province, Türkiye. From the morphological point of view, it appears to be like *A. maraschicum,* but it differs in several morphological features including scape length, outer tunic's shape of bulb, inner tunic's colour of bulb, leaf hairs, umbels size or number, flower colour, stamens colour and length. A comprehensive description of this species is provided, including detailed photographs, geographical distribution map, habitat and ecology, vernacular names, and IUCN conservation status.

Keywords: *Allium,* endemic, Irano-Turanian, taxonomy, Van

Citing: Fırat, M. (2024). *Allium feqiyeteyranii* a new species of *Allium* sect. *Codonoprasum* (Amaryllidaceae) from Van (Türkiye). *Acta Biologica Turcica,* 37(2), M3:1-12.

Introduction

Allium L. is an extremely polymorphic and taxonomically difficult genus, which is naturally distributed only in the Northern Hemisphere. Its main center of diversity is southwest and central Asia, and it has a second smaller one in North America (Friesen et al., 2006). *Allium* is one of the largest genus in the family Amaryllidaceae (Friesen et al., 2006; Li et al., 2010; Herden et al., 2016) and consists of more than 1000 species (Friesen et al., 2022). The genus is characterized by its bulbs enclosed in membranous (sometimes finally fibrous) tunics; terminal umbel; free or almost free, 1-veined tepals; often a sub-gynobasic style, and loculicidal capsule with 1 or 2 seeds per loculus (Kollmann, 1984; Friesen et al., 2006; Fırat, 2015 and 2017; Ekşi et al., 2016; Fırat et al., 2018). In recent decades, many *Allium* taxa have been newly described from Türkiye and the number of species known to occur has increased to approximately 225 species, (Kollmann, 1984; Koyuncu, 2012; Fırat, 2015 and 2017; Fırat et al., 2018). *Allium* is the largest genera in Türkiye, with 112 of its species endemic to the country (Koyuncu, 2012; Fırat, 2023). Türkiye has approximately 225 *Allium* taxa in 14 sections, ca. one-third of which are endemic, demonstrating that this territory is a prominent part of the southeastern Asian center of *Allium* diversity (Koyuncu, 2012; Ekşi et al., 2015 and 2016). *Allium* sect. *Codonoprasum*, the second largest and most taxonomically complicated section in Türkiye, includes 65 taxa, 35 of which are endemic (Koyuncu, 2012; Fırat, 2015, 2017 and 2023; Koçyiğit et al., 2014).

As a result of discussions with Senior Prof. Dr. Mehmet Koyuncu, whose research focuses on *Allium* in Türkiye, and Dr. Mine Koçyiğit, who conducts research on sections *Codonoprasum* and *Scorodon* in Türkiye, it was concluded that it was new species.

This article was previously published in Annales Botanici Fennici Journal on september 23, 2023, titled "*Allium feqiyeteyranii* a new species of *Allium* sect. It was submitted under the name *Codonoprasum* (Amaryllidaceae) from Van (Turkey)", went through the reviewer process and was sent to the Journal editor Dr. Johannes Enroth stated that the article would be published after some corrections. However, he stated that the name of the plant was political and that he would publish it under

a different name on November 18, 2023. I stated that this name (Feqiyê Teyran as "*Allium feqiyeteyranii*") is not political, that he was just a nature and love poet who lived in the 1600s, and I told him that just because he was Kurdish did not mean that he was political. And I still don't understand this point of view of Dr Johannes Enroth?

2. Materials and Methods

During field exploration carried out in 2011, 2014, 2015, 2016 and 2023 in Van province (eastern Türkiye), an unusual population of *Allium* was discovered. At first glance, it seemed to be similar to *Allium maraschicum* (Koçyiğit & Özhatay, 2012), but important differences (e.g. scape length, outer tunic's shape of bulb, inner tunic's colour of bulb, leaf hairs, umbels size or number, flower colour and gynoecium features, etc.) allowed easy separation. A detailed examination of the collected specimens revealed that they showed a combination of morphological characters not found in any of the know taxa in the genus, and therefore they are described below as a new species, *Allium feqiyeteyranii*.

The specimens from Van province were cross-checked with the available identification keys (Wendelbo, 1971 and 1985; Kollmann, 1984; Özhatay & Tzanoudakis, 2000, Koçyiğit & Özhatay, 2012). Herbarium specimens from AEF, ANK, GAZI, ISTE and VANF herbaria (acronyms according to Thiers 2017) were also examined and compared.

Senior Prof. Dr. Mehmet Koyuncu, who works on *Allium*'s in Turkey, and Dr. Mine Koçyiğit who works on *Codonoprasum* and *Scorodon* section in Turkey. As a result of discussion with them, it was concluded that it was new species.

Images of the living material were taken with a Sony DSCR1 digital camera. Geographical coordinates were identified using a Magellan eXplorist 710 GPS. According to the grid system (Davis, 1965) this new species from Van region falls specifically within the B9 square (Figure 1). A total of 10 herbarium specimens of the new species were collected from three adjacent localities and deposited in the herbaria VANF, and in the personal herbarium of the author (Herb. Fırat). The conservation status of the new species was assessed according to the IUCN criteria (IUCN, 2017).

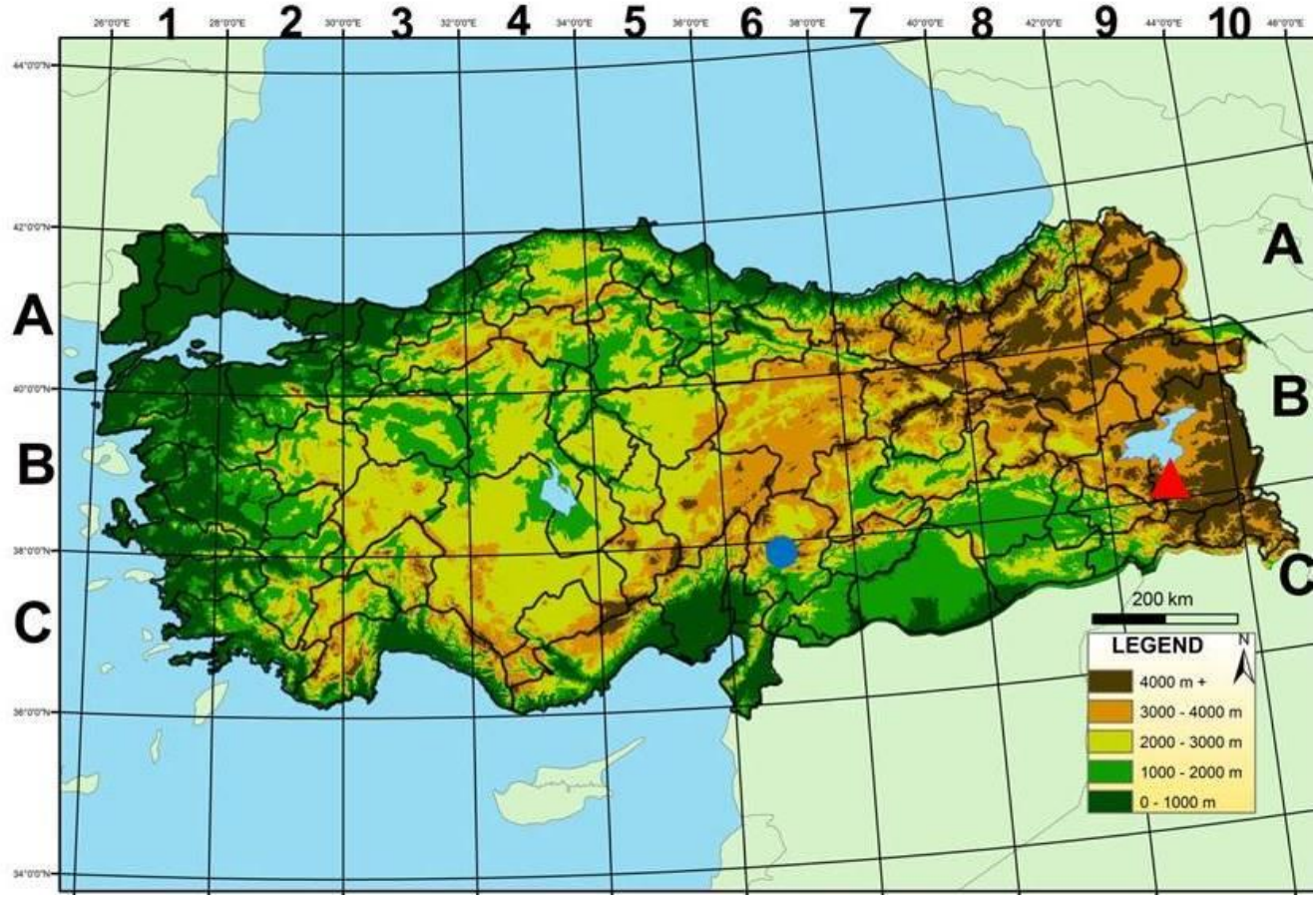

Figure 1. Distribution map of *Allium feqiyeteyranii* (red triangle) and the closely related *A. maraschicum* (blue circle) in Türkiye

3. Results and Discussion

Allium feqiyeteyranii Fırat *sp. nov.* (Figures 2–6)

Diagnosis:— *Allium feqiyeteyranii* resembles *Allium maraschicum*, but it clearly differs by its bulb outer tunics blackish-brown, paralel fibrous, inner tunics blackish to dark brown (*not* light brown to cream, papyraceous, white); Scape 7–27 cm long, distinct angled with ribs, not rise perpendicular to the ground (*not* 9–11 cm tall, with crisped hairs on the ribs); Perigone campanulate (*no*t tubulate or narrowly campanulate); Tepals shiny, ovoid-oval to elliptic, 4.0–5.2 mm, acute (*not* elliptic–linear, 5.5–6.0 mm, obtuse); Stamens included, as long as perigon, 4–5 mm; all filaments filiform, yellowish-green (*not* long-exserted, 1.5 × perigon; filaments 8–9 mm long, pinkish).

Type:—Turkey. B9 Van: Bahçesaray (Mîks) district, Kavuşşahap mountain, stony steppe in *Astragalus icmadophilus* population, 38°07′32″ N, 42°52′57″ E, 3122 m elevation, 21 July 2011, *M. Fırat 27084* (holotype: VANF!; isotypes: ISTE!, Herb. M. Fırat!).

Description:—*Bulb* oblong to spheroidal, 0.7–2.3 × 0.8–2.5 cm; outer tunics blackish-brown, paralel fibrous; inner blackish to dark brown, without bulblets (sometimes there is scape from the previous year). *Scape* 7–27 cm × 1–3 mm, not rise perpendicular to the ground, cylindrical, green to purplish, often purplish above, cylindrical, distinct angled with ribs, erect, covered for 2/3–3/4 of its length by the leaf sheats. *Leaves* 2–3, semi-cylindrical, fistulose, filiform, angled with ribs, 0.8–2.0(-3.0) mm broad, as long as or longer than scape, scabrid, leaf sheath up to lower 2/3 of the stem, few swollen at base of lamina. *Spathe* persistent with two unequal valves, longer than umbella or as long as (shorter than); valves lanceolate from a broader base, the longer valve 1.5–4 cm, the shorter valve 1–3.5 cm, straw colour membranous, each valve 3–7 veined, acute. Umbel lax and expanded, pendant, erect in fruiting stage, 1.5–3cm in diameter, effused, 10-40 flowered with unequal pedicels, smooth, slender, filiform, 3–15 mm long, bracteolate, bracts lanceolate, white, membranous, 2–4 mm × 0.3–0.7 mm. *Perigone* campanulate; brownish to purplish, brownish-pinkish, greenish to dirty yellow with brownish to purplish midvein (when dry pinkish to purplish or dirty yellowish), tepals shiny, smooth, 4.0–5.2 mm; outer tepals ovoid-oval to elliptic, 4.0–5 mm × 1.4–2.5 mm cucullate, acute at the apex; inner tepals oblong-lanceolate, 4.1–5.2 mm × 1.5–2.3 mm, cucullate, acute at the apex, equal or slightly longer than outer tepals. *Stamens* included, as long as perigone, 4–5 mm; all filaments filiform, yellowish-green, without small teeth at base. Anthers 1.0–1.5 mm × 0.5–0.7 mm, oblong, rounded at apex, yellowish cream to cream. *Pistil* 6–7 mm; style 1.5 × 2.0 mm, filiform, included; ovary obovoid, narrowed at the base (when dry look like prominently stipitate), green, whitish-green, thiny strigillose. *Capsule* spheroidal, eliptic-spheroidal, ovoid, 4.0–4.5 mm, short stipitate, seeds 3.7–4 mm, naviculiform, black.

Phenology:—Flowering from July to August, fruiting from August to September.

Eponymy:—Feqiyê Teyran, who lived in Bahçesaray (Mîks), is honored by giving his name to this species. Feqiyê Teyran was born in Van, Bahçesaray (Mîks) district in A.D. 1590, and he died in Bitlis, Hizan district in A.D. 1660. He is a Kurdish poet, tale, and epic writer. He is one of the old master writers of Kurdish Sufi folk literature. Although he knew Arabic and Persian, which were the popular languages of his time, he wrote dozens of his books in Kurdish. He is also known as the poet of love and affection. Although he resembles Yunus Emre, who lived under the auspices of the Seljuk state, in some aspects (because he lived in later periods), he is much superior in terms of technique and inscription. Superior to Yunus Emre, apart from poetry, he also writes epics and fairy tales. Another advantage of Feqiyê Teyran is that while he could read and write Kurdish, Persian, and Arabic, Yunus Emre could not read or write. Feqiyê Teyran is also a person who knows bird language and talks to birds.

Distribution:—*Allium feqiyeteyranii* is endemic to Kavuşşahap (Kurrêşahap) Mountain [Van/Bahçesaray (Mîks)], Turkey. It is an element of the Irano-Turanian floristic region (Figure 1).

Vernacular name:—*Allium feqiyeteyranii* is called “Sîrkoke” in Kurdish by the local people of Bahçesaray (Mîks) Province. *Allium* species are known by the local people under many names in Kurdish, e.g. “Bavê sîr”, “Çorîn”, “Giyabizing”, Gûhbizin, “Kahar”, “Karûd”, “Kiniwal”, “Lûşa“, “Lûş”, “Lûz”, “Palîmok”, “Sîrik”, “Sîrim” and “Sîrmok” (Fırat, 2013).

Figure 2. *Allium feqiyeteyranii*: **A.** habitat and general view of the type locality (Kavuşşahap mountain); **B.** habit.

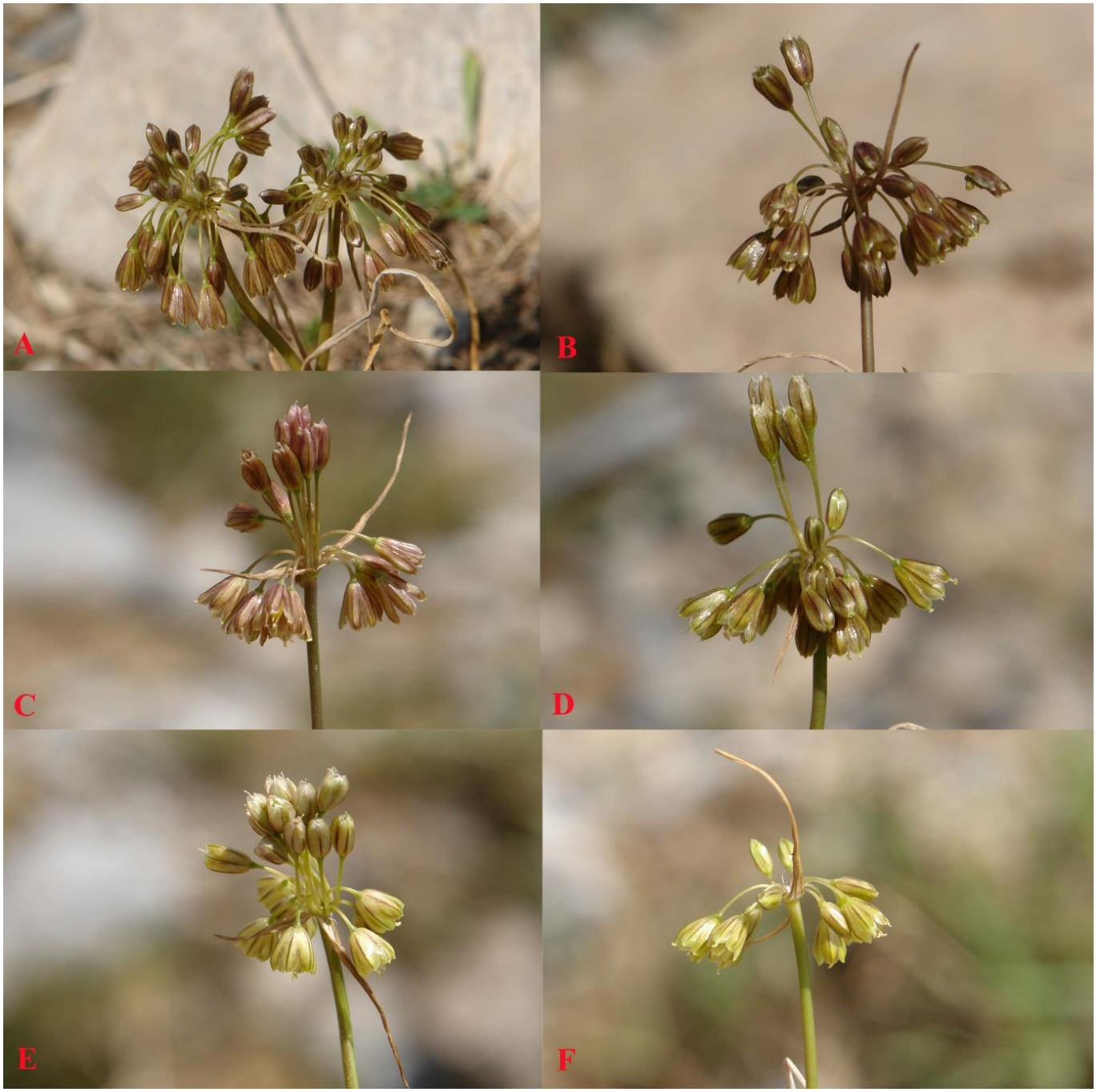

Figure 3. *Allium feqiyeteyranii*: **A-F.** variations of flowers color and spathe in inflorescence

Figure 4. *Allium feqiyeteyranii*: **A.** inner surface of opening perigone, **B**. outer and inner tepals with stamen; **C**. outer surface of perigone; **D.** pistil; **E**. inner surface of opening perigone (when dry ovary looks like stipitate); **F**. stipitate capsule and seed (scales: between two lines 1 mm and equal)

Figure 5. *Allium feqiyeteyranii*: **A.** various bulbs (scales: between two lines 1 mm and equal); **B**. outer tunic (paralel fibrous); **C**. inner tunic; **D.** scape on bulb from the previous year.

Figure 6. *Allium feqiyeteyranii*: **A.** habit (when dry); **B**. leaf sheaths on angled stem; **C**. angled leaf with ribs; **D**. scabrid of the leaf; **E**. fistulose of the leaf.

Habitat and ecology:—*Allium feqiyeteyranii* grows in a dry steppe and meadow, at ca. (2500-)2900–3300 m elevation, with other interesting plants such as *Astragalus icmadophilus* Hand.-Mazz., *Astragalus rechingeri* Sirj., *Cerasus brachypetala* Boiss. var. *bornmuelleri* (Schneider) Browicz, *Cousinia eriocephala* Boiss. & Hausskn, and *Dianthus muschianus* Kostchy & Boiss.

IUCN red list assessment:— The distribution area of *Allium feqiyeteyranii* is less than 35 km^2. The species is known from three localities, in which ca. 1000 individuals were counted. Some anthropogenic or grazing effects were observed on the population. Based on the above data, the IUCN (2017) red list category for *A. feqiyeteyranii* is suggested as "Critically Endangered".

Taxonomic relationships:—*Allium feqiyeteyranii* is morphologically distinct from all other Turkish *Allium* species. Its closest relative appears to be *Allium maraschicum*, from which the new species differs by many remarkable (a morphological differences (Figure 7 and Table 1), and by a different allopatric distribution. *A. feqiyeteyranii* is a narrow endemic from Van, Kavuşşahap (Kurrêşahap) mountain of Bahçesaray (Mîks), where it occurs in stony steppe in *Astragalus* population, at (2500-)2900-3300 m elevation. Conversely, *A. maraschicum* is endemic to Ahır mountain of Kahramanmaraş, dry steppe, at 1800 m elevation (Koçyiğit and Özhatay 2012). The differences that will be obvious at first glance: outer tunics, stem hairs, perigon colour and shape, stamen being longer than perigone, clearly indicate that these two species are very different.

Allium feqiyeteyranii belongs to *Allium* sect. *Codonoprasum* according to Flora of Turkey (Koyuncu, 2012; Fırat, 2023). This group now comprises 66 species, with the addition of *A. feqiyeteyranii.*

Table 1. Morphological comparison between *Allium feqiyeteyranii* and *Allium marashicum** (Koçyiğit & Özhatay 2012*)

Characters	***Allium feqiyeteyranii***	***Allium maraschicum****
Bulb	**oblong to spheroidal**, 0.7–2.3 × 0.8–2.5 cm	**globose**, 0.7–1.0 cm in diameter
Outer tunics	blackish-brown, **paralel fibrous**	light brown to cream, **papyraceous**
Scape	7–27 cm long, cylindrical, **distinctly angled with ribs,** erect, **not rise perpendicular to the ground**, covered for 2/3–3/4 of its length by the leaf sheats,	9–11 cm long, cylindrical, **with crisped hairs on the ribs**, erect, covered for 3/4–4/5 of its length by the leaf sheats, distinct
Leaves	2-3, semi-cylindrical, fistulose, filiform, angled with ribs, 0.8–2.0(-3.0) mm broad, as long as or longer than scape, **scabrid**, leaf sheath up to lower 2/3 of the stem	3(-4), 1 mm wide, longer than the scape, semicylindrical, fistulose, **scabrous**
Spathe	two unequal valves, **longer than the umbella or as long as (shorter than)**; valves lanceolate from a broader base, the longer valve **1.5–4** cm, the shorter valve 1.0–3.5 cm, straw color membranous, each valve 3–7 veined, acute	two unequal valves, **longer than the umbella**; valves lanceolate from a broader base, the longer valve **4–8** cm, the shorter valve 3.0–3.5 (-4) cm
Umbel	lax and expanded, pendant, erect in fruiting stage, 1.5–3.0 cm in diameter, effused, **10–40** flowered with unequal pedicels, smooth, slender, filiform, **3–15** mm long, color flowers	lax and expanded, pendant, erect in fruiting stage 3.5–4.0 cm in diameter, effused, **25–50** flowered with unequal pedicels, slender, filiform, **1.5–2.5** cm long
Perigone	**campanulate; brownish to purplish, brownish-pinkish, greenish to dirty yellow with brownish to purplish midvein**	**tubulate or narrowly campanulate**, **pinkish light brown margin or brownish pink with darker green midvein**.
Tepals	**shiny**, smooth; outer tepals ovoid-oval to elliptic, 4.0–5.0 mm × 1.4–2.5 mm cucullate, **acute at the apex**; inner tepals oblong-lanceolate, 4.1–5.2 mm × 1.5–2.3 mm, cucullate, **acute at the apex**, equal or slightly longer than outer tepals.	5.5–6.0 mm; tepals elliptic–linear, **obtuse**
Stamens	**included, as long as perigone, 4–5 mm**; all filaments filiform, **yellowish-green, without small teeth** at base	**long-exserted, 1.5 × perigon; filaments 8–9 mm long**, **pinkish**, connate into an annulus 1.0–1.5 mm high.
Pistil	6.0–7.0 mm; style 1.5 × 2.0 mm, filiform, included; ovary obovoid, **narrowed at the base** (when dry prominent look like stipitate), green, whitish-green, **thiny strigillose**	ovary narrowly ovoid, **glabrous**, **stipitate**, 2.0–2.5 mm long. Style 2 mm long, included
Capsule	**spheroidal, eliptic-spheroidal, ovoid**, 4.0–4.5 mm, **short stipitate**	**trivalved, sub-globose**, 4.0–4.5 mm × 4.0–4.2 mm

Figure 7. Comparison between *Allium feqiyeteyranii* (A and B) and *A. maraschicum* (C and D) **A.** and **C.** habit; **B.** and **D.** inflorescence**.**

Allium feqiyeteyranii is like in *A.* section *Codonoprasum* in that its spathes are longer than the umbella, and it resembles the *A.* section *Scorodon* in that its spathe are as long as or shorter than the umbella. Distinguishing these two sections is difficult in some plants. That's why these sections need to be united under a single name.

Additional specimens examined:—*Allium feqiyeteyranii;* Turkey. B9 Van: Bahçesaray (Mîks) district, Kavuşşahap mountain, stony steppe in *Astragalus icmadophilus* population, 38°07′32″ N, 42°52′57″ E, 3122 m elevation, 7 September 2011, *M. Fırat 27788* (Herb. M. Fırat!) (in fruit). Bahçesaray (Mîks) district, Kavuşşahap mountain, stony steppe in *Astragalus rechingeri* population, 38°08′11″ N, 42°53′20″ E, 3084 m elevation, 21 July 2014, *M. Fırat 31619* (paratype: Herb. M. Fırat!) (in flower). Bahçesaray (Mîks) district, Kavuşşahap mountain, stony steppe in *Astragalus rechingeri* population, 38°05′55″ N, 42°55′53″ E, 3224 m elevation, 29 July 2015, *M. Fırat 32660* (paratype: Herb. M. Fırat!) (in flower). Bahçesaray (Mîks) district, Kavuşşahap mountain, stony steppe in *Astragalus rechingeri* population, 38°08′24″ N, 42°53′04″ E, 3013 m elevation, 17 July 2016, *M. Fırat 32930* (paratype: Herb. M. Fırat!) (in flower). Bahçesaray (Mîks) district, Kavuşşahap

mountain, stony steppe in *Astragalus rechingeri* population, 38°11′41″ N, 42°52′36″ E, 3125 m elevation, 5 August 2023, *M. Fırat 40103* (paratype: Herb. M. Fırat!) (in flower), ibid. 7 september 2023, *M. Fırat 40149* (paratype: Herb. M. Fırat!) (in fruit).—*Allium maraschicum;* Turkey. C6 Kahramanmaraş: Ahırdağı, 1800 m a.s.l., 15 Jul 2009, *M. Koçyiğit, ISTE 86 113* (holotype: ISTE!, isotype: AEF!).

Comments

When I sent the article to the Annales Botanici Fennici Journal, one of the referees (probably a Turkish reviewer) said, "I think he does not know botany or the *Allium* genus." *Allium feqiyeteyranii* is very close to *Allium longispathum* and *A. oleraceum*. I believe it is just *Allium longispathum*. So, I am not sure that it is a new species. In summary, I can say that I think it is very stupid for a botanist who is aware of geographical distribution to think this. The reason is the referee obviously does not know much about this genus and is unaware of its geographical isolation and spread. He probably came to this idea by looking at the plant pictures of this section on the internet. Evidence that the two species he mentioned do not exist is detailed below.

The new species detailed in this article has no similarities with the species *Allium longispathum* and *Allium oleraceum*. For this reason, it has been compared to its relative, *Allium maraschicum*.

Allium oleraceum is a plant distributed in Europe, has bulbils in the inflorescence, has pink flowers, spathe are 3-5 times longer than the inflorescence, and the scape is at least 50-60 cm tall. It is a plant grown in parks and gardens and in natural areas at altitudes of 200-500 meters.

On the other hand, the presence of *A. longispathum* in Turkey has not been confirmed, yet. However, in some literature, it is considered a taxon that includes the *A. paniculatum* species, and in some literature, it includes the *A. dentiferum* species. Systematic problems with this species persist. However, this species is also a densely flowered species (50-60 flowered), approximately scape 50-70 cm tall, with spathe 2-3 times longer than the inflorescence. It can spread at very different altitudes, from sea level to 1000 m.

Details of the newly described species are already presented in the article. However, its length is significantly shorter than the mentioned species, measuring a maximum of 27 cm. Its spathe is equal to the inflorescence or slightly longer than the inflorescence, certainly not 2-3 times as long. There is absolutely no bulblet in the inflorescence. It is an alpine plant distributed at (2500-)2900-3300 m.

Acknowledgements

Dr. Mehmet Koyuncu for expressing her opinion in some critical discussions regarding the article, the authority on genus *Allium* in Türkiye and Dr. Mine Koçyiğit PhD study on *A.* sect. *Codonoprasum* in Türkiye. I would like to thank for sharing some critical discussions about the article and the pictures she took of *Allium maraschicum* in its natural environment.

Ethical Approval

No need to ethical approval for this study.

Conflicts of Interest

The author declares that he has no conflict of interest.

Funding Statement

The author does not declare any fund.

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