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Research article

Polygonum muhammetdalcii (Polygonaceae), A New Remarkable Species from Türkiye

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Abstract

A new dwarf *Polygonum* L. species, *Polygonum muhammetdalcii*, is described from Hatay Province, Türkiye, and compared with the allied species *P. corrigioloides* and *P. polycnemoides*. It is distinguished by a combination of vegetative and reproductive characters. The specimens display prostrate and erect-branched growth forms with consistently blackish-purple stems. Leaves are petiolate and concentrated near the stem base, whereas the smaller bracts are reduced upward. The ochrea is 3–8 mm, 8–10-veined, usually multipartite below, and one- or two-partite to entire above.

Keywords: *Endemic; new species; polygonum; taxonomy; Türkiye*

1. Introduction

The classification of Polygonaceae Juss. suggested by Brandbyge (1993) was accepted in the present study. *Polygonum* Linnaeus is a systematically challenging genus known to contain 171 species (POWO, 2025). *Polygonum* species are similar to each other in general structure. After careful examination, a species can be named. For this purpose, their characters should be examined under a microscope.

The genus *Polygonum* (s. lat.) was reported by Coode and Cullen (1967) with 27 species in the Flora of Turkey vol.2. Later, many species were added to the flora. The first study listing *Polygonum* species (s. lat.) with a new species, *P. istanbulicum* M.Keskin in the flora of Turkey was published by Keskin (2009). In this study, 41 species (and 3 taxa) were listed. Later, Keskin (2012) reported 40 species of the genus *Polygonum* (s. lat.) in a work in preparation for the Illustrated Flora of Turkey. Keskin and Severoglu (2022a) have revised the genus *Polygonum* (s. str.) as it occurs in Türkiye. In this study, they introduced the new species, *Polygonum urnigera* M.Keskin to the scientific literature and added three more new record species for Türkiye (*P. buxiforme* Small, *P. neglectum* Besser, and *P. rurivagum* Jord. ex Boreau) to the flora. They also created a dichotomous diagnostic key for all species present in Türkiye. Other new species were published later than this article: *Polygonum mersinicum* M. Keskin (Keskin et al., 2022), *P. terzioglui* Makbul, Coskunc. & Kundakci (Makbul et al., 2023), *P. uysalii* Makbul, Coskunc. & Kundakci (Coskuncelebi et al., 2024), *P. elazigense* Behcet (Behcet and Gulbasan, 2025), *P. anatolicum* M.Keskin & Eker (Eker and Keskin, 2025) and *P. longipes*, which was collected only 124 years ago, is reported to be in the flora of Istanbul/Türkiye again (Keskin and Severoglu, 2022b).

In a recently published article, Keskin (2025) described the species *P. oktaysinanoglui* M.Keskin. Another noteworthy aspect of this article is the presentation of a letter-based identification key for species in Türkiye and summarizes the development of the genus *Polygonum* in Türkiye since Coode and Cullen (1967). In this study, 38 species were reported, 17 of which are endemic. The endemism rate is 44.74%.

2. Materials and methods

The sample was collected from Hatay, the southernmost

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province of Türkiye in June 1997. It was named *Polygonum setosum* Jacq. during the floristic study (Keskin, 2003a,b) and deposited along with all other samples collected in the herbarium of ISTE. However, in the author's field notebook it is noted with a question mark that there is a deep doubt about the correctness of the name, since the species *P. setosum* is a semi-shrubby, coarse and tall plant, whereas this specimen collected is at most 8 cm tall, dwarf, strict and slender. For this reason, all specimens were re-examined in detail 28 years after collection, during the revision of the genus *Polygonum*, and it was concluded that these specimens represent a new species within the genus *Polygonum*, with isolated, distinctive characteristics. The habitat of this species also presents a special situation. The habitats of most endemic *Polygonum* species are unique ecologically similar habitats (Altay et al., 2013).

Specimens from the Herbaria ANK, E, EGE, GAZI, HARRAN, HUB, ISTE, ISTF, ISTO, KNYA, MUFE, NGBB, and VANF were studied and relevant literature on the genus concerning Türkiye and the neighboring countries was analyzed (Halacsy, 1904; Hayek, 1927; Komarov, 1936; Webb and Chater, 1964; Rechinger and Schiman-Czeika, 1968; Meikle, 1985; Akeroyd, 1986; Snogerup and Snogerup, 1997; Keskin, 2009; Keskin, 2012; Keskin and Severoglu, 2022a; Keskin, 2025).

3. Taxonomic treatment

3.1. Polygonum muhammetdalcii M.Keskin, sp. nov. (Fig. 1 and 2, Table 1).

Diagnosis: *Polygonum muhammetdalcii* differs from *P. corrigioloides* Jaub. & Spach and *P. polycnemoides* Jaub. & Spach by very short stems (vs. usually longer than 10 cm). Their appearance in the one-year period is different from that in the two- or multi-year period (vs. in both species, the appearance is always the same in both annual and perennial specimens (Fig. 2). All stem is blackish mauve (vs. green or reddish violet in both species). Ochrea 8-10 nerved (vs. nerveless in both species). Leaves petiolated (vs. sessile in both species). Pedicel to 1.3 mm long (vs. three times longer than tepal in *P. corrigioloides*, very short to subsessile in *P. polycnemoides*.

Description: Dwarf herbs up to 8 cm tall, showing two contrasting growth forms. Some specimens are prostrate-appressed or ascending, whereas others have slender, filiform, and erect branches. **Stems** blackish purple; the developmental significance of these forms remains uncertain. **Ochrea** 3-8 mm and 8-10 nerved, blackish mauve at base and membranous at upper part, usually fibriate, sometimes 1-2 parted or entire at upper parts. **Leaves** petiolated to 1.5 mm, crowded at base, almost absent at upper part; 2-11 × 0.8-2.0 mm, blackish mauve, elliptic-lanceolate, acute at tip, towards the tip of the branches it becomes markedly smaller and sometimes almost spatulate; midvein prominent on the upper surface, mid and lateral veins prominent on the lower surface. **Bracts** like a leaf but much smaller and obtuse at tips, linear-lanceolate or subspathulate to spathulate, usually absent at upper parts. **Inflorescences** usually diffused to the sides, congested in upper part and ochrea usually covers the flowers with or without small bracts in annual stage; growing upright from the tips of the branches, thin-stemmed, leafless, with distinct nodes, often found only at the base of the lower flowers, the ochrea, usually entire or two-parted, never covers the flowers, the flowers at the tip tend to fall off quickly in biennial or perennial stage. **All branching** blackish mauve. **Flowers** 1-2 pieces, pedicellate, to 1.3 mm. **Tepals** pink or dark pink, free part shorter than the tube; young and newly opened flowers campanulate-tubulate, 1.5-2.0 mm; **stamens** (5-)8, arising from the base of the free part, filaments broadly basal, narrowing towards the tip; ovary short, almost ovate, stigma 3. **Fruiting tepal** slightly enlarged at base, 1.8-3.0 mm, broadly campanulate-tubulate to tubulate, **pedicel** prominent; free part distant from each other, with a black spot at the junction; veined, often with several prominent branched veins. **Fruit** a nut, 1.8-2.0 mm, swollen-ovoid, with a regular row of small tubercles, equal or slightly longer than tepals.

Type: Türkiye. Hatay, Yayladagi, Kislak village, Yazi area, 18 June 1997, M.Keskin 1212 (holotype ISTE 78049!) (Fig. 1).

3.2. Etymology

This species is named after Prof. Dr Muhammet Dalci. He is now retired and was the botany teacher of the author of this article at Samsun 19 Mayıs University. His doctoral research focused on the taxonomy of Polygonum sect. Persicaria in the United States east of the Rocky Mountains (Dalci, 1974).

3.3. Habitat and ecology

Polygonum muhammetdalcii grows in the openings *Quercus infectoria* Oliv. subsp. *boisseri* (Reut.) O.Schwarz, and *Q. coccifera* L. in Yazi area of Kislak village, together with *Allium rotundum* L., *Lathyrus gorgoni* Heldr. ex-Nyman, *Trifolium physodes* Steven ex M.Bieb., *T. fragiferum* L., *Astragalus gossypinus* Fisch., *Coronilla cretica* L., *Cytisus villosus* Pourr, *Spartium junceum* L., *Centaurea antiochia* Boiss., *C. iberica* Trevir. ex-Spreng., *Phalaris paradoxa* L., *Aegilops biuncialis* Vis., *Onopordum illyricum* L., *Chrysopogon gryllus* Trin., *Alopecurus myosuroides* Huds. subsp. *tonsus* (C.I.Blanche ex Boiss.) Dogan, *Cyperus capitatus* Poir., *Carex divisa* Huds., *Eremopoa persica* (Trin.) Roshev., *Ainsworthia trachycarpa* Boiss., *Bupleurum odontites* L., *Torilis nodosa* (L.) Gaertn., *Michauxia campanuloides* L'Hér. ex-Aiton, *Convolvulus arvensis* L., *Bryonia cretica* L..

3.4. Conservation status

There is not enough data to assess the threat category for this species. Moreover, since the site was visited only twice after 1997 and no special surveys and measurements were performed for this species, a threat category could not be determined, and it was left in the DD category (IUCN, 2026). On the other hand, the species' habitat is at great risk, both due to the construction of earthquake-resistant housing and increased human settlement activities, as well as agricultural and livestock farming activities.

3.5. Vernacular name

The members of *Polygonum* in Türkiye is known as “Madımak”. The author proposes “Cüce madımak” as a vernacular name for *Polygonum muhammetdalcii* as a new scientific Turkish name according to the guidelines of Menemen et al. (2016).

4. Results and discussion

Polygonum muhammetdalcii represents a morphologically

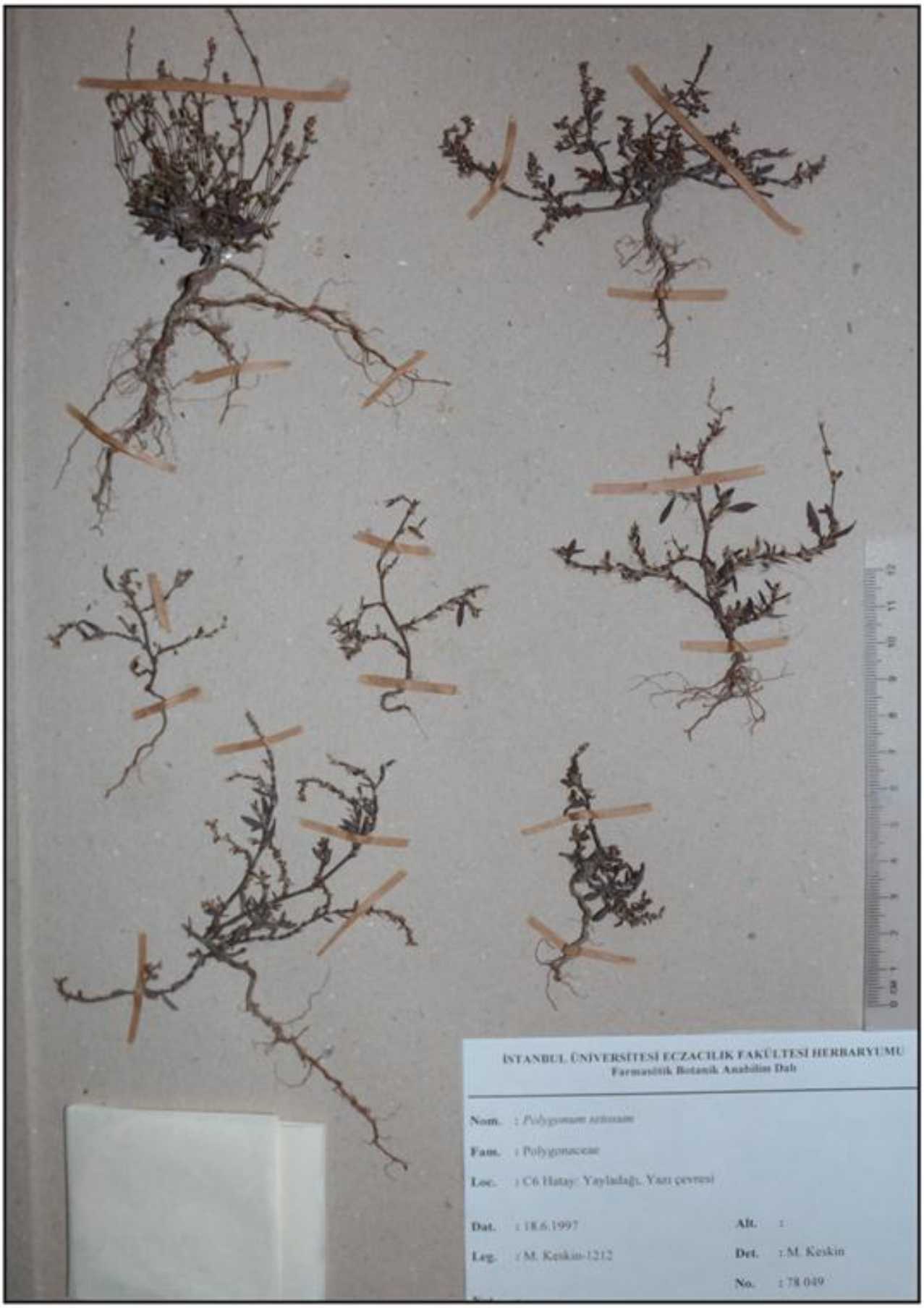

Fig. 1. General view of the holotype.

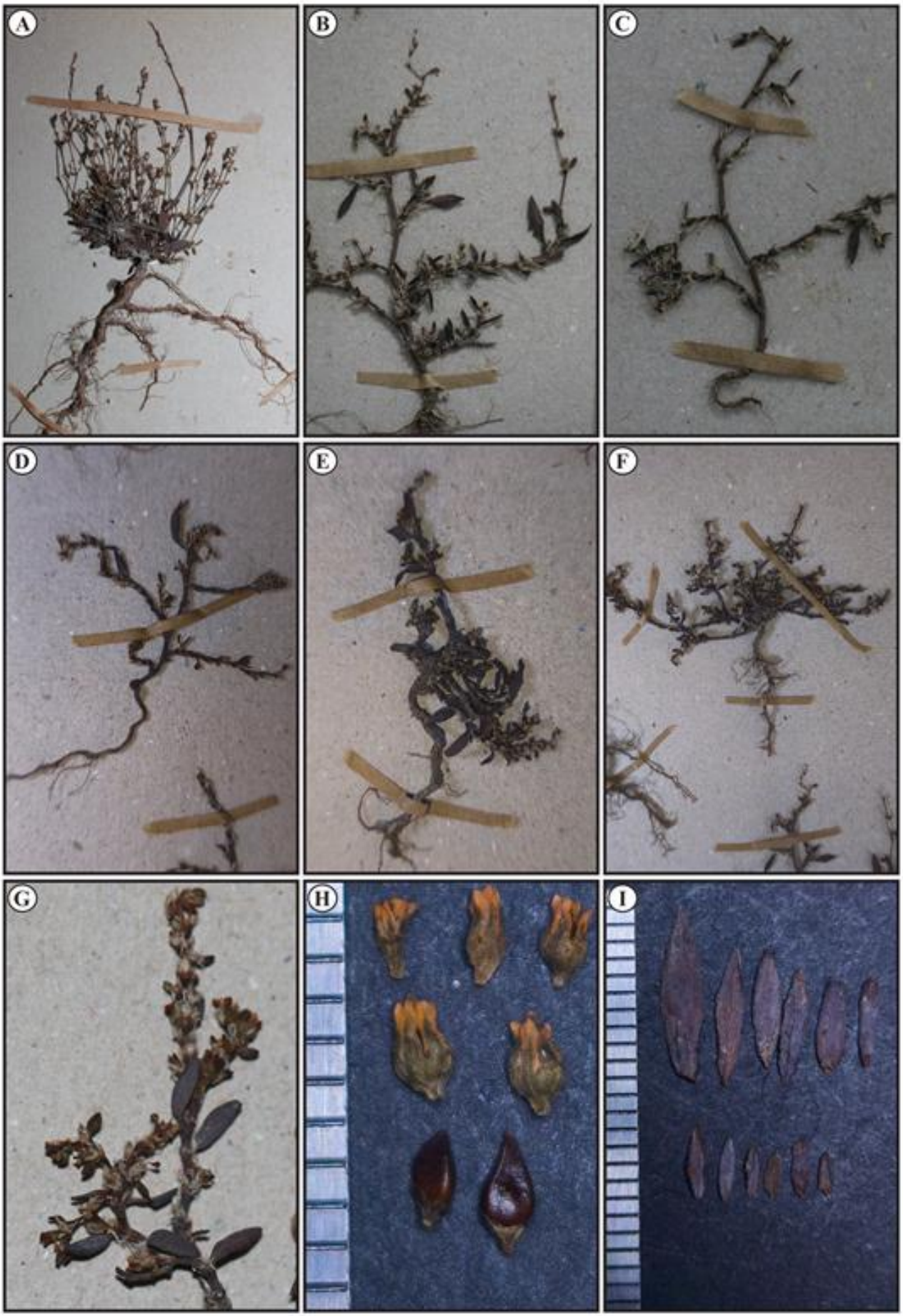

Fig. 2. Close-up views of the specimens listed on the Holotype sheet from A through G. H: Flowers and achenes. I: Leaves (up) and bracts (down).

Table 1
Morphological comparison of *Polygonum muhammetdalcii* and its related species *P. corrigioloides* and *P. polycnemoides*.

Morphological characters	*P. muhammetdalcii* M.Keskin, *sp. nov.*	*P. corrigioloides* (Komarov, 1936; Rechinger & Schiman-Czeika, 1968).	*P. polycnemoides* (Komarov, 1936; Rechinger & Schiman-Czeika, 1968).
Stem	5.0-8.0 cm, blackish mauve	2.0-45 cm, glaucous or reddish-violet	3.0-23 cm, green or sometimes violet
Branches	Prostrate-adpressed to soil and filiform, strict	Adpressed to soil, spreading in all directions, flexuous, at length ascending	Prostrate, filiform, weak, smooth
Ochrea	8-10 nerved, blackish mauve at base and membranous at upper part, usually fibriate, sometimes 1-2 parted or entire at tips	Oval, pellucid, nerveless, the margin toothed or lacerate	Pellucid, nerveless, oval-lanceolate, entire or often fringed-incised
Leaves	Petiolated, elliptic-lanceolate, acute at tip, 2-11 × 0.8-2.0 mm, blackish mauve	Sessile, linear-spathulate, narrowed towards to base, 1-nerved, slightly fleshy, 4-5 × 1.0-1.5 mm, green	Sessile, somewhat fleshy, subulate-linear, almost smooth, 1-nerved, 5.0-12 × 1.0-1.5 mm, green
Bracts	Leaf-like but much smaller and obtuse, linear-lanceolate or subspathulate to spathulate, usually absent at upper parts	Leaf-like but much smaller and linear or linear-spathulate, obtuse or acute, attenuate, subsessile	Leaf-like but much smaller, long lanceolate-linear, sessile
Pedicel	to 1.3 mm	3 times the length of tepal	Very short to subsessile
Inflorescence	1-2 flowered	3-6 flowered	1-2 flowered
Tepal color	Pink or dark pink	Whitish roseate or bright rose	Roseate
Tepal length	Young and newly opened flowers 1.5-2.0 mm; mature 1.8-3.0 mm	Almost 2.0 mm	Almost 2.0 mm
Nut	Swollen-ovoid, with a regular row of small tubercles, equal or slightly longer than tepals, 1.8-2.0 mm.	Lustrous, almost black, triquetrous, 1.5 mm long, shorter than tepal	Lustrous, puncticulate, less than 2.0 mm long, rather gently trigonous

distinctive and taxonomically isolated species within the genus *Polygonum* in Türkiye, differing clearly from the most closely related taxa examined. The whole plant has a blackish purple coloration. While the first form of the plant is an annual, in the later stages it has a biennial to perennial character. For this reason, it is not possible to clearly call the new species an annual, biennial or perennial. One-year-old individuals grow in an almost creeping form, after which tiny twigs grow upwards from the tips of the branches. Before these branches appear, the flowers are in a very compact state. It is difficult to distinguish between leaves, ochrea and flowers. On these branches are formed very small whorls of 1-2 flowers. The flowers are tubular to cup-shaped in the early stages and completely tubular in the fruiting stage.

Even though the plant is dwarf, the flowers are large for its size. Leaves are dense at the base but few and deciduous on the upper parts of the stem. In the upper part of the inflorescence, it is usually absent or very small in comparison with the leaves. While the ochreae are fragmented in the lower part, they change towards being whole towards the top.

Although it has such different characters, it also resembles *P. corrigioloides* and *P. polycnemoides* in some characteristics. Both species are thin and creeping; stems usually short; young inflorescences compact; upper leaves sometimes almost spathulate or subspathulate. Even, Rechinger and Schiman-Czeika (1968) stated that *P. corrigioloides* can be both annual and perennial. Their differences are summarised in Table 1.

One of the important criteria affecting the lifespan of natural plants in the habitat where they develop morphologically is root structure and development capacity. Thus, the root structure of a plant provides it with an important ecological adaptation ability against environmental changes (Jung and McCouch, 2013). However, in some herbaceous forms with a two-year lifespan, differences can be observed depending on the morphological development stage of the plant (Biles et al., 1989). Thus, root development can be evaluated morphologically by considering criteria such as dry root weight, root number, root surface area, root diameter, and root length (Bohm, 1979; Kramer, 1988; Kaspar and Bland, 1992).

The life cycle of *Polygonum muhammetdalcii* is truly fascinating, but studies conducted on specimens indicate that this species is shifting from an annual, biennial or a short-lived perennial. It is understood that the individuals of the same plant species collected from our relevant habitat and depending on the population density show different root adaptations between first-year and second-year individuals.

It is also known that other species within the *Polygonum* genus exhibit such variability in their life cycle: *Polygonum roberti* Loisel. (Styles, 1962), *P. oxyspermum* subsp. *raii* (Bab.) D.A.Webb & Chater (Crouch, 2025) and *P. corrigioloides* Jaub. & Spach. (Rechinger and Schiman-Czeika, 1968).

Conflict of interest: The author declares that he has no conflict of interests.

Informed consent: The author declares that this manuscript did not involve human or animal participants and informed consent was not collected.

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