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# New Combination in *Linum* sect. *Dasylinum* (Linaceae)

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## ABSTRACT

***Linum anisocalyx* P.H. Davis is transferred to *L. pubescens* Banks & Sol. as *L. pubescens* subsp. *anisocalyx* (P.H. Davis) Yılmaz & Kaynak *comb & stat. nova*. It is characterized by eglandular bracts and strongly dimorphic sepal feature, the outer two sepals being elliptic–oblong and hiding the three oblong–rhomboid inner sepals.**

**Key Words: *Dasylinum*, Linaceae, *Linum anisocalyx*, *Linum pubescens*, nomenclature, taxonomy.**

## INTRODUCTION

The *Linum* L. sect. *Dasylinum* (Planch.) Juz. is distributed in central and south Europe, Caucasus and in western Asia with about 24 taxa. This section is one of the easily recognizable groups within the genus *Linum*, distinguished from other sections by its characteristic indumenta. The whole plant consists of hirsute or villous unicellular trichomes. The members of *Dasylinum* are usually perennials and rarely annuals, and the stems are terete. The cauline leaves are alternate, without stipular glands at the base. The sepals are usually glandular margined, conspicuously nerved but not keeled. The petals are usually with coherent claws but sometimes free, and are blue, pink or white in colour (Davis 1957; 1967; Ockendon and Walters 1968; Juzepchuk 1974; Agnew 1980; Zohary 1987; Egorova 2000; Diedrichsen and Richards 2000).

*Dasylinum* currently contains 12 taxa in Turkey. Eight taxa are endemic to Anatolia, i.e. *L. olympicum* Boiss. subsp. *olympicum*, *L. hirsutum* L. subsp. *anatolicum* (Boiss.) Hayek, *L. hirsutum* subsp. *platyphyllum* (P.H. Davis) Yılmaz & Kaynak, *L. hirsutum* subsp. *pseudoanatolicum* P.H. Davis, *L. hirsutum* subsp. *oreocaricum* P.H. Davis, *L. unguiculatum* P.H. Davis, *L. anisocalyx* P.H. Davis and *L. seljukorum* P.H. Davis subsp. *seljukorum*. The remaining four are distributed in both Turkey and neighboring countries, i.e. *Linum hirsutum* subsp. *byzantinum* Azn., *L. densiflorum* P.H. Davis, *L. hypericifolium* Salisb. ex Steud., *L. pubescens* Banks & Sol. subsp. *pubescens* (Davis 1967; Hartvig 1986; Egorova 2000; Yılmaz and Kaynak 2006).

*Linum anisocalyx* and *L. pubescens* are very similar and can be distinguished by their calyx structures. Of these, *L. anisocalyx* has strongly dimorphic sepals, while *L. pubescens* has subequal sepals (Davis 1967). Specimens of *L. anisocalyx* were first collected by Balansa in 1855, and later Davis (1957) described it as a new species. However, Davis (1957) noted "It is not without some hesitation that I have described *L. anisocalyx* as a new species. Its affinity with *L. pubescens* is so close that the type gathering was referred to that species by Boissier".

During a taxonomical revision of *Linum* in Turkey, the first author collected in summer 2005 the endemic species *L. anisocalyx* from the Kuzucubelen district (Mersin province) in southern Anatolia, in the same locality as the holotype (ca. 25 individuals). The specimens of *L. anisocalyx* and *L. pubescens* were compared in the field and with various related specimens kept in ANK, BULU, GAZI and ISTF herbaria. The flowers were dissected with an OLYMPUS SZ51 binocular stereomicroscope. For SEM, selected representative materials were directly mounted onto aluminum stubs. Specimens were coated with gold–palladium, with a BAL–TEC SCD 005 sputter, then examined in a CARL ZEISS EVO 40 at 30 kV and photographed.

## NEW COMBINATION

Linum pubescens Banks & Sol. subsp. anisocalyx (P.H. Davis) Yılmaz and Kaynak comb. & stat. nov.

*Linum anisocalyx* P.H. Davis, Notes Royal Bot. Garden Edinburgh 22: 149. 1957. –Type: [Turkey C5 Içel] plaine de Mersina, v 1855, *Balansa* (holo. K, iso. BM).

*Linum pubescens* subsp. *anisocalyx* is closely related to *L. pubescens* subsp. *pubescens* (Fig. 1, Table 1.). But the subspecies have two considerable differences and can be distinguished by their bracts and calyx characteristics.

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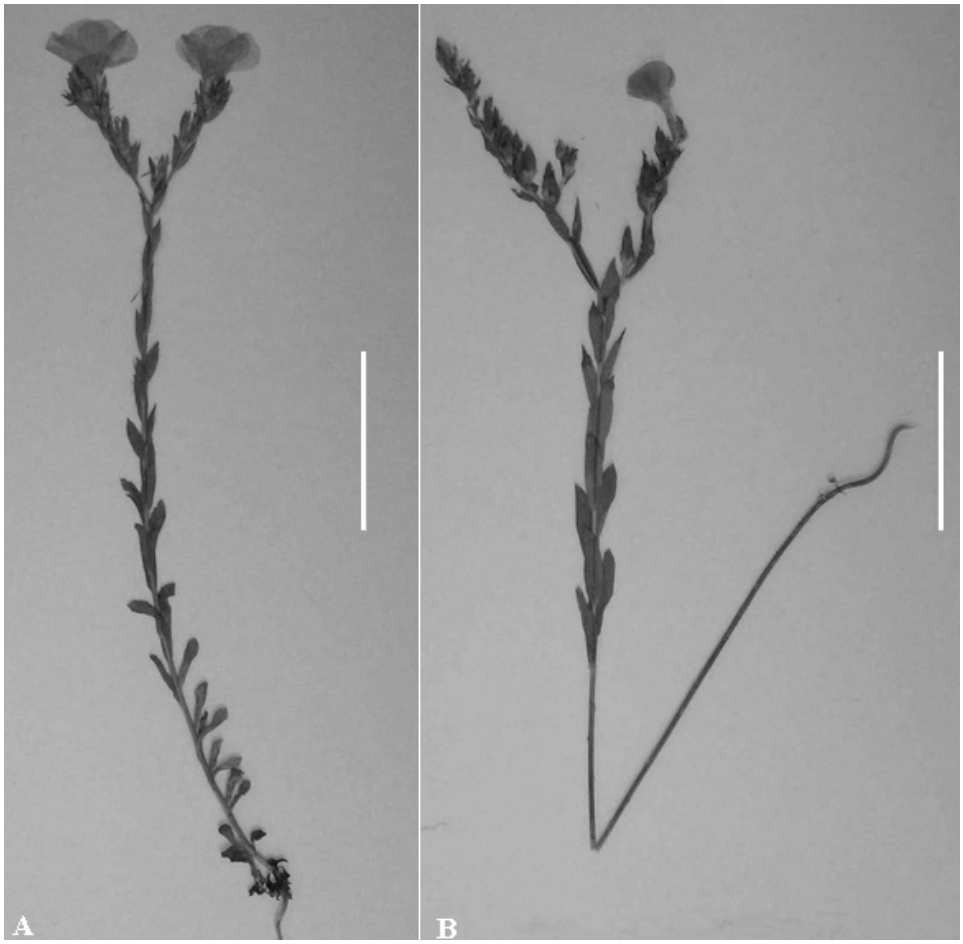


**Figure 1.** Herbarium specimens of (A) *Linum pubescens* subsp. *pubescens* (Ö. Yılmaz 23918) and (B) *L. pubescens* subsp. *anisocalyx* (Ö. Yılmaz 24214) (scale bar 5 cm).

**Table 1.** Morphological comparison of *Linum pubescens* subsp. *pubescens* and *L. pubescens* subsp. *anisocalyx*

| | subsp. *pubescens* | subsp. *anisocalyx* |
|---|---|---|
| Plant | annual | annual |
| Stems | 6–30 cm | 7–25 cm |
| | erect or ascending | erect or ascending |
| Cauline leaves | 12–40 x 2–15 mm | 11–25 x 1.5–4.5 mm |
| | oblong–elliptic | oblong–elliptic |
| | acute | acute or slightly acuminate |
| Bracts | margins with stalked glands | margins without stalked glands |
| Outer sepals | 9–12 x 1–2 mm | 11–12 x 3–3.5 mm |
| | linear or narrowly oblong | elliptic–oblong |
| | densely glandular | sparsely glandular |
| | densely hairy | densely hairy |
| Inner sepals | 8–11 x 1–2 mm | 5–8 x 1–2 mm |
| | linear–lanceolate | oblong–rhomboids |
| | with ovate–rhomboid base | |
| | acuminate | acute, sometimes acuminate |
| | margins narrowly membranous | margins broadly membranous |
| | densely hairy | sparsely hairy |
| Petals | 18–28 mm | 17–25 mm |

The outer two sepals of *L. pubescens* subsp. *anisocalyx* are elliptic–oblong, 3–nerved, sparsely glandular margined and conceal the inner sepals. The three inner sepals are oblong–rhomboids, 3–nerved but lateral nerves obscure, broadly membranous and glandular margined. However, in *L. pubescens* subsp. *pubescens* the outer two sepals are linear or narrowly oblong, 3–nerved, densely glandular margined, but do not obviously conceal the inner sepals. The three inner sepals are linear–lanceolate with an ovate–rhomboid base, conspicuously 3–nerved, narrowly membranous and glandular margined (Figure 2).

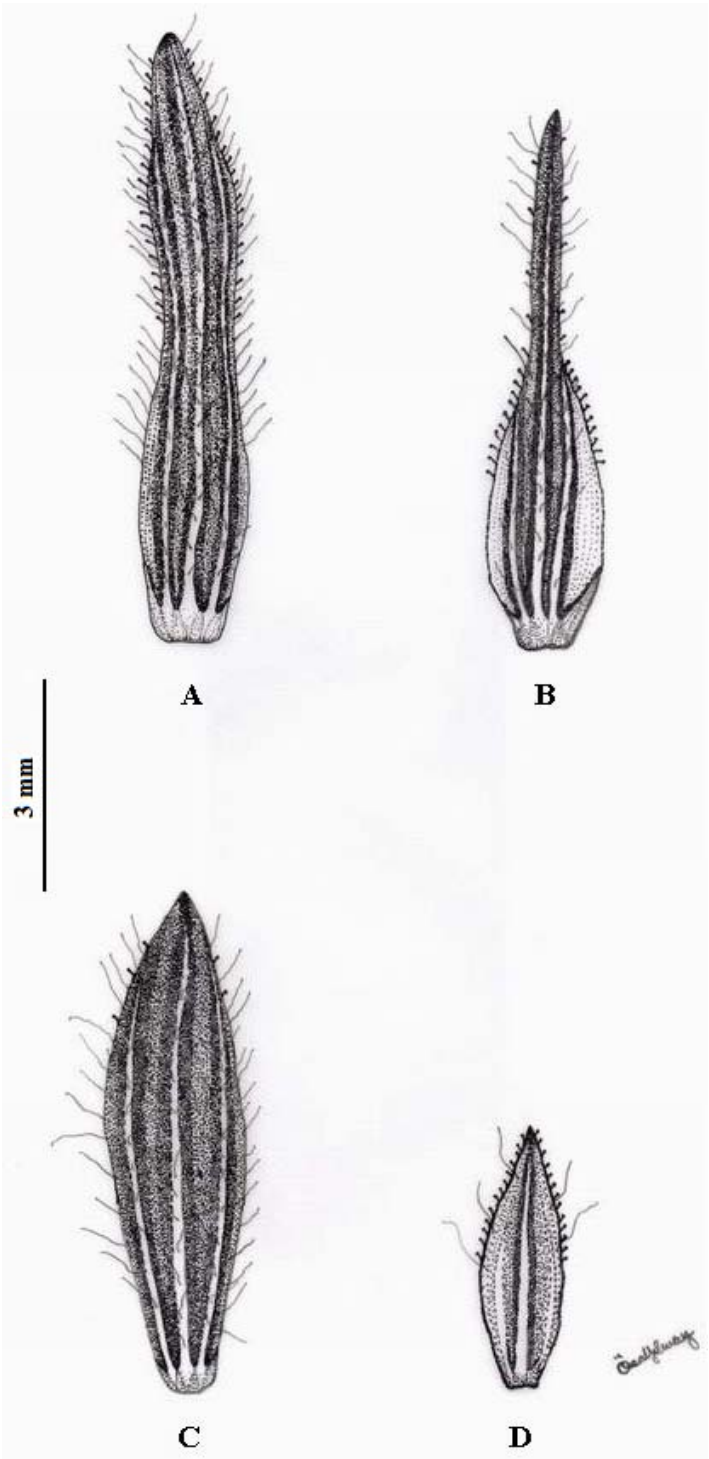


**Figure 2.** Outer (A) and inner sepal (B) of *Linum pubescens* subsp. *pubescens* (Ö. Yılmaz 23918). Outer (C) and inner sepal (D) of *L. pubescens* subsp. *anisocalyx* (Ö. Yılmaz 24214).

Furthermore, *L. pubescens* subsp. *anisocalyx* have eglandular bracts, but in *L. pubescens* subsp. *pubescens* the bracts are always glandular (Figure 3).

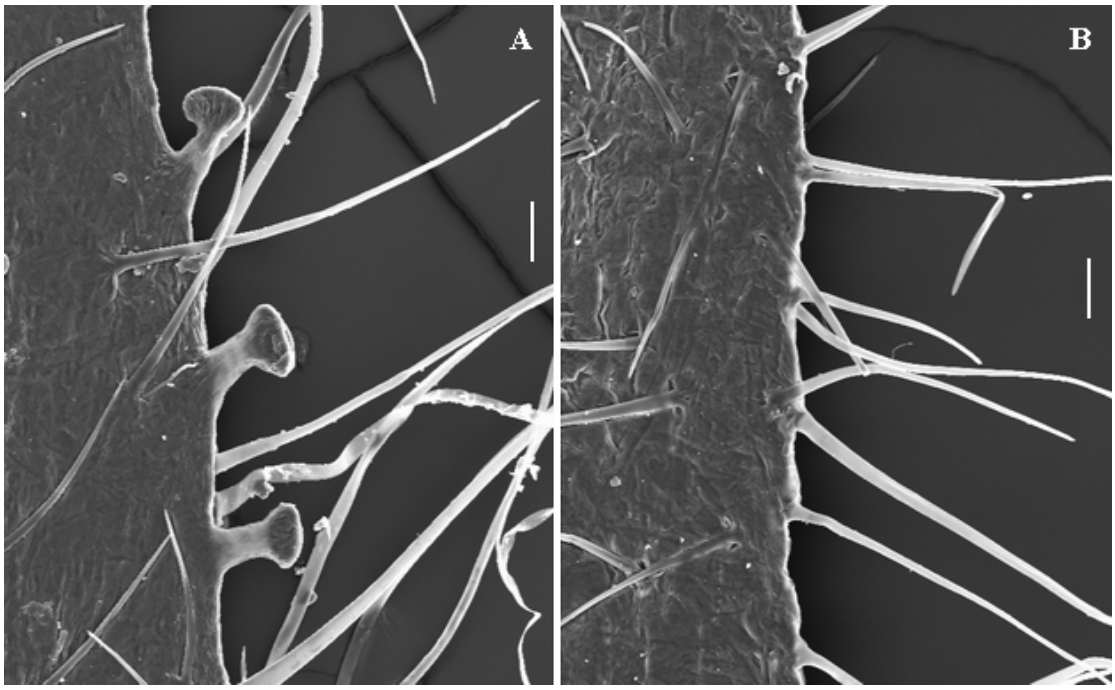


**Figure 3.** The micrographs showing the bract margin of Linum pubescens subsp. pubescens (Ö. Yılmaz 23918) and L. pubescens subsp. anisocalyx (Ö. Yılmaz 24214) (scale bar 100 µ).

*Linum pubescens* subsp. *anisocalyx* and *L. pubescens* subsp. *pubescens* are geographically isolated (Figure 4). *L. pubescens* subsp. *anisocalyx* is an endemic to south Anatolia and distributed in Mersin province. *L. pubescens* subsp. *pubescens*, in comparison, is an East Mediterranean element and distributed in southeast Europe, Cyprus, southeast Anatolia, Syria, Iraq, Lebanon, Israel and Palestine. (Davis 1967; Ockendon and Walters 1968; Zohary 1987).

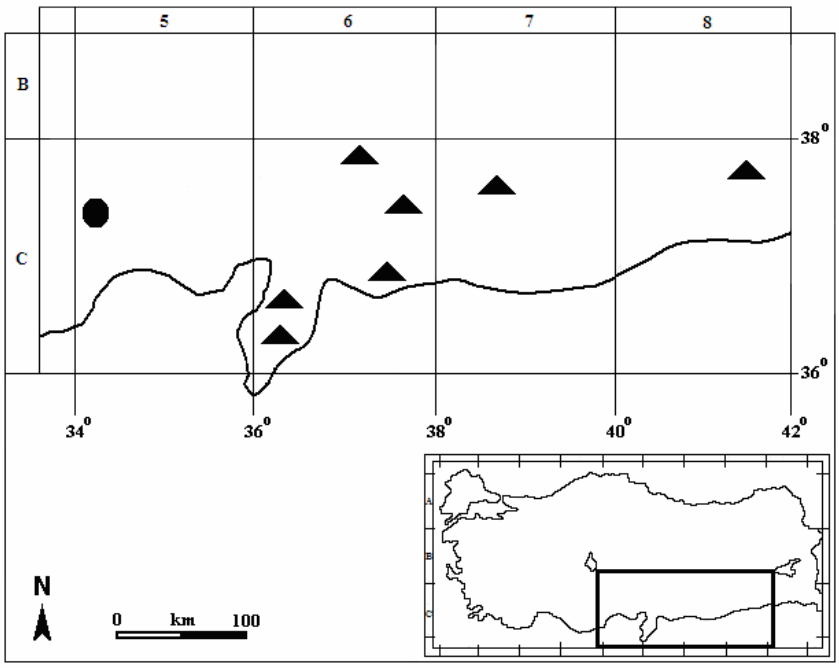


**Figure 4.** Distribution of *Linum pubescens* subsp. *pubescens* (▲) and *L. pubescens* subsp. *anisocalyx* ( ● ) in Turkey.

Ekim et al (2000) proposed that the *Linum pubescens* subsp. *anisocalyx* (as *L. aniscalyx*) can be placed in the Endangered (EN) category according to IUCN. However, our observations indicate that this subspecies should be placed under the category Critically Endangered (CR) (Criteria B1, B2) (IUCN, 2001). *L. pubescens* subsp. *anisocalyx* kown only from one locality and the population include approximately 200–250 individuals. The estimated area of occupancy is less than 10 $km^2$.

Additional specimens examined. Turkey. *Linum pubescens* subsp. *pubescens*. C6 Kahramanmaraş: Ahır Dağı, Ulucak tepe, Bakacak sırtları, 1200–1500 m, Z. Aytaç, H. Duman 4616 (GAZI). C6 Gaziantep: Gaziantep–Maraş, 1100 m, Balls 888 (ANK). Gaziantep, P. H. Davis 27259 (ANK). C6 Hatay: Şenköy, 800 m, P. H. Davis 27217 (ANK). İskenderun, Belen, 550 m, Y. Akman 7886 (ANK). Yayladağ–Samandağ, 534 m, Ö. Yılmaz, T. Çenil 23918 (BULU). Antakya–Reyhanlı, Narlıca çıkışı, 100 m, Ö. Yılmaz, T. Çenil 23919 (BULU). C6 Kilis: Kilis–Hassa, Kilis çıkışı, 640 m, Ö. Yılmaz, T. Çenil, 23915 (BULU). C7 Adıyaman: Bucak–Kâhta, Feribot İskelesi, 554 m, G. Kaynak, Ö. Yılmaz 19103 (BULU). C8 Batman: Kozluk–Silvan, 740 m, A. S. Ertekin (BULU). *Linum pubescens* subsp. *anisocalyx.* C5 Içel: Mersin–Kuzucubelen, A. Atilla (ISTF). Viranşehir–Kuzucubelen, Cemilli çıkışı, 535 m, Ö. Yılmaz 24214 (BULU).

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