

# NORDIC JOURNAL OF BOTANY

## Research

### *Lepyrodiclis alinihatii* (Caryophyllaceae), a new species from Turkey

Yusuf Menemen, Ramazan Yalçinkaya and Ayşe Erden

Y. Menemen (<https://orcid.org/0000-0002-9546-7986>) ✉ ([yemenemen@yahoo.com](mailto:yemenemen@yahoo.com)), Dept of Biology, Faculty of Science and Literature, Kırıkkale Univ., Yahşihan, Kırıkkale, Turkey. – R. Yalçinkaya (<https://orcid.org/0000-0002-5256-9616>), Dept of Science, Nezahat Gökyiğit Botanical Garden, Atasehir, Istanbul, Turkey. – A. Erden (<https://orcid.org/0000-0002-8990-0616>), Dept of Biology, Graduate School of Natural and Applied Sciences, Kırıkkale Univ., Yahşihan, Kırıkkale, Turkey.

Nordic Journal of Botany

2021: e03037

doi: 10.1111/njb.03037

Subject Editor: Panayiotis Trigas

Editor-in-Chief: Torbjörn Tyler

Accepted 11 January 2021

Published 16 March 2021

A new species, *Lepyrodiclis alinihatii*, is described from the eastern Anatolia region of Turkey. Diagnostic and morphological characteristics that distinguished it from its allied species, *L. holosteoides*, and an identification key for all *Lepyrodiclis* species are provided. *Lepyrodiclis alinihatii* differs from *L. holosteoides* by its paniculate inflorescence, rarely with terminal cymes, glabrous pedicels, ovate or ovate-oblong and glabrous sepals with broad scarious margin, large obovate to subcircular, deeply notched petals, turbinate ovary and thick (not thin) stilus. Moreover, *L. alinihatii* pollen grains differ from those of *L. holosteoides* by their pore number: 18–20, pore diameter: 3.56–5.00 µm, interporal distance: 6.0–6.5 µm, and number of microechini per sample area of 5 × 5 µm: 15–20.

Keywords: Alsinoideae, Bey sığaçası, Bitlis, endemic, *Lepyrodiclis holosteoides*

## Introduction

The genus *Lepyrodiclis* was first introduced by Fenzl (1840) on the basis of a single species previously included in the genus *Gouffeia* (*G. holosteoides* C.A. Meyer), which was validly transferred to *Lepyrodiclis* by Fisher and Meyer (1841) as *L. holosteoides*. Bentham and Hooker (1862) divided the family Caryophyllaceae into three tribes and placed the genus *Lepyrodiclis* Fenzl in Alsineae. Boissier (1867) recognized three species in the genus, which were then placed in the subtribe Eualsineae of the tribe Sabulineae, together with the genera *Bufonia*, *Alsine*, *Qeria* and *Thurya*. In the most common classification of Caryophyllaceae (Pax and Hoffmann 1934, Bittrich 1993), three subfamilies are recognized based on stipule, petal, sepal and fruit characters, and *Lepyrodiclis* is then included in the subfamily Alsinoideae.

*Lepyrodiclis* includes small annual plants, and three valid species have been recognized so far (Boissier 1867): *L. holosteoides* (C.A. Meyer) Fenzl ex Fisher & C.A. Meyer, *L. stellarioides* Schrenk ex Fischer & C.A. Meyer and *L. tenera* Boiss. According to Rabeler and Old (1992), the genus is native to southwestern and central Asia. However, it has been reported that *L. holosteoides* is also found in arable fields in Europe (Germany) (Raabe 1980) and North America (Rabeler and Old 1992). It has been reported that



there are three species (*L. holosteoides*, *L. stellarioides* and *L. tenera*) in Iran (Rechinger 1988) and Pakistan (Ghazafar and Nasir 1974), and two species (*L. holosteoides* and *L. stellarioides*) in the USSR (Schischkin 1936) and China (Dequan and Rabeler 2001). In Flora of Turkey (Cullen 1967), the genus was represented by a single species (*L. holosteoides*), distributed in the eastern Black Sea, central, eastern and southeastern Anatolia (Cullen 1967, Ekim 2012).

During a visit to the Geneva herbarium aiming to a revision of the genus *Lepyrodiclis*, an interesting specimen was detected among the specimens of *L. holosteoides*. It was collected in Bitlis (Turkey) and was cited as *L. holosteoides* in Cullen (1967). This specimen, which looked very similar to *L. holosteoides* in appearance, however differed from the type material in numerous morphological details. The aim of this study is to describe this specimen as a new species of *Lepyrodiclis*, related to but clearly distinct from the widespread *L. holosteoides*.

## Material and methods

The first attempt to identify the specimens of *Lepyrodiclis* was made using major floristic accounts (Schischkin 1936, Davis 1967, Davis et al. 1988, Rechinger 1988, Güner et al. 2000), as well as local floristic studies (Behçet 1989, Altan and Behçet 1994, Altuok and Behçet 2005, Korkmaz et al. 2008, Öztürk et al. 2015, Tel and Eğilmez 2015, Bingöl et al. 2017, Keser and Özgökçe 2019). Morphological examinations and comparisons of the specimens were made at the herbaria of GAZI, ISTE, EGE, HUB, E and G. Pictures were taken at different magnifications with a scanning electron microscope (SEM) to determine the taxonomically important pollen and seed micromorphological characters.

For pollen studies, the pollen grains from herbarium specimens were prepared for light microscope study by acetolysis (Erdtman 1969), then mounted in glycerin jelly and photographed. For the SEM study, nonacetolyzed pollen grains were scattered on stubs covered with double-sided transparent adhesive tape. All the samples were coated with gold, examined under the SEM and photographed. Pollen grains of each species were selected randomly, and their diameter, diameter of the pores, distance between two pores, microechini density (the number of microechini in a  $5 \times 5 \mu\text{m}$  area of pollen grain surface), microechini size, microperforate diameter and exine thickness were measured. The palynological terminology used was that of previous studies (Erdtman 1969, Punt et al. 2007, Hesse et al. 2009).

## Results

### *Lepyrodiclis alinihatii* Menemen, Yalçinkaya & Erden sp. nov. (Fig. 1, 2)

A species differing from *L. holosteoides* (Fig. 3) in its glabrous pedicels (versus glandular-pilose), ovate or ovate-oblong (versus lanceolate to linear) and glabrous sepals

(versus glandular-pilose) with wide scarious margin (versus narrow), widely obovate to subcircular petals (versus obovate to oblanceolate) that are emarginate to bifid at apex (versus entire or emarginate), turbinate ovary (versus widely elliptic to subcircular) and thick stylus (versus thin) (Table 1).

**Type:** Turkey, Kleinasien [Anatolia], Bitlis to Tatvan, 1700–1900 m a.s.l., 5 Jul 1951, Renz s.n. (holotype: G00446762! [two sheets]; isotype: ADO! [small parts removed from the holotype]).

### **Etymology**

*Lepyrodiclis alinihatii* is named in honor of Ali Nihat Gökyiğit, founder and leading financial contributor of the Nezahat Gökyiğit Botanical Garden and the ANG Foundation, for his continued contributions to the Illustrated Flora of Turkey and Turkish botany.

### **Description**

Annual herb. Stem robust, erect, strongly branched above, terete, slightly striate, densely glandular-pubescent below, glabrous or sparsely glandular-hairy above. Leaves simple, opposite, lanceolate to linear lanceolate,  $5\text{--}30 \times 2\text{--}7$  mm, sessile, exstipulate, glabrous or sparsely glandular or non-glandular pubescent at midvein and margin, their margin entire or slightly undulate, cartilaginous, acute at apex, with lateral veins much less prominent than the midvein. Inflorescence paniculate, rarely with terminal cymes, erect, many-flowered. Pedicels 3–10 mm long, glabrous. Bracts lanceolate to ovate, becoming smaller upwards. Calyx subglobose to campanulate,  $3\text{--}5 \times 3\text{--}5$  mm, glabrous. Sepals 5, slightly gibbous, prominently veined,  $3.0\text{--}4.2 \times 2.5\text{--}3.5$  mm, free to the base in two series, the outer 3 ovate to ovate-oblong, the inner 2 similar to the outer but somewhat wider, obtuse at apex, rounded or very rarely acute at apex, its margin 0.4–0.7 mm wide, scarious. Petals 5, white,  $3.5\text{--}4.5 \times 1.8\text{--}2.9$  mm, widely obovate to suborbicular, glabrous, emarginate to bifid, with lobes 0.9–1.5 mm long. Stamens 7–10, arising from a hypogynous disc. Ovary superior,  $1.0\text{--}1.2 \times 0.7\text{--}0.9$  mm, turbinate, 1-celled, with 4 ovules, glabrous. Styles 2, 1.6–2.0 mm long, glabrous, clavate, with curved apex. Stigma minutely rough to papillate. Fruit a capsule opening with 2 valves.

### **Seed micromorphology**

Mature seeds could not be obtained from *L. alinihatii*; therefore, the shape of the seeds could not be determined, but its surface anticlinal cell wall curvature and ornamentation were very similar to those of *L. holosteoides*. The immature seed anticlinal cell wall and ornamentation of both species were sinuate and reticulate, respectively (Fig. 4).

### **Pollen micromorphology**

Pollen grains of *L. alinihatii* were spheroidal with a diameter of  $24.4\text{--}29.7 \mu\text{m}$  and they had 18–20 round pores uniformly distributed on the surface. The diameter of the pores was between  $3.56$  and  $5.00 \mu\text{m}$  and the distance between two pores was  $6.0\text{--}6.5 \mu\text{m}$ . The pollen grains had microechinate-punctate ornamentation. There were 6–10 granules

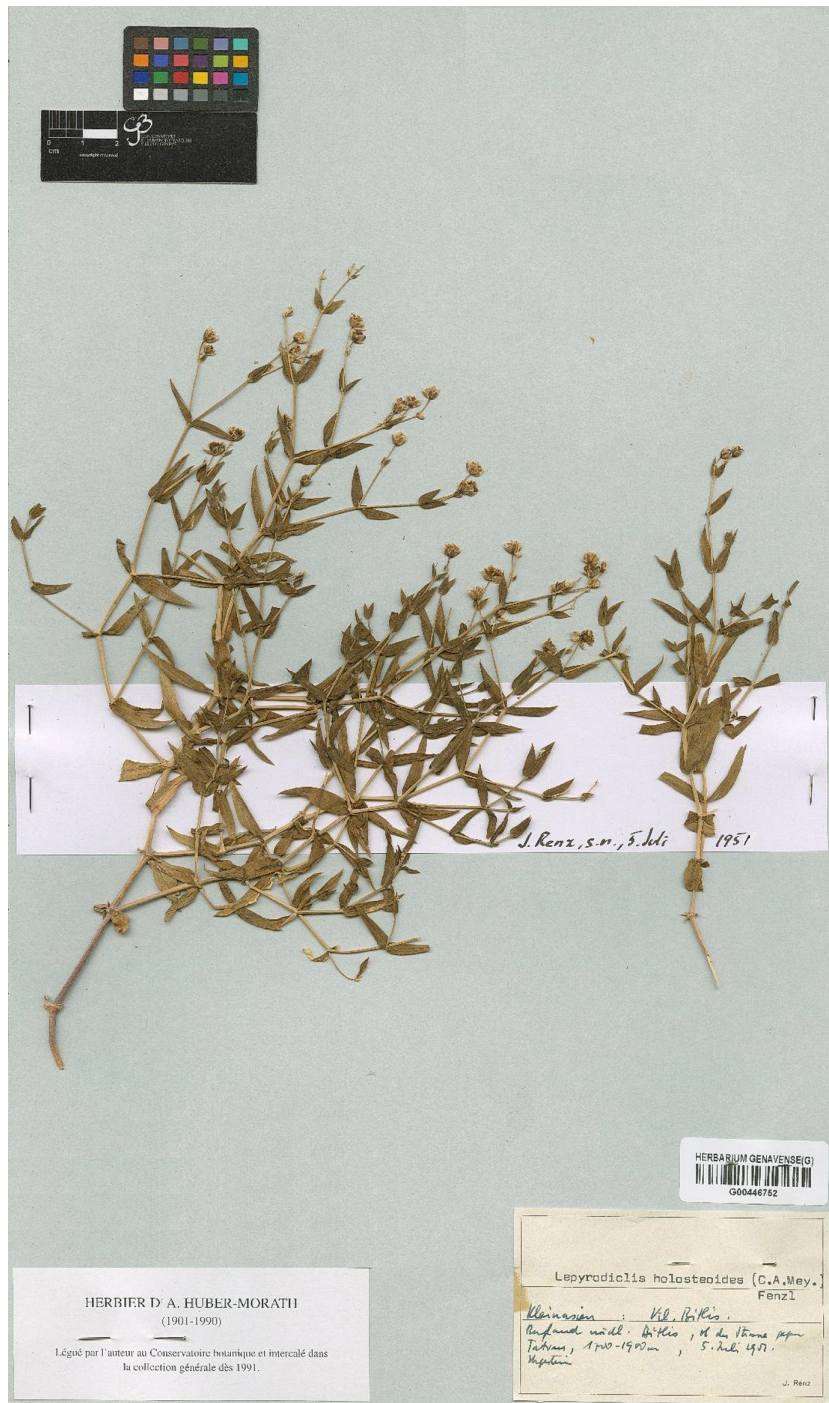


Figure 1. Holotype specimen of *Lepyrodictis alinihatii* Menemen, Yalçinkaya & Erden sp. nov.

on the operculum. The number of microechini per sample area of  $5 \times 5 \mu\text{m}$  ranged from 15 to 20. The height of the microechinae was between 0.25 and 0.32  $\mu\text{m}$  and the diameter of the microechinae base was between 0.33 and 0.57  $\mu\text{m}$ . The microperforate diameter was between 0.10 and 0.22  $\mu\text{m}$ . The exine thickness ranged from 0.80 to 1.50  $\mu\text{m}$  (Fig. 5, Table 2).

#### **Distribution and ecology**

*Lepyrodictis alinihatii* was collected from the Tatvan district of Bitlis (Fig. 6), at 1700–1900 m a.s.l. The area where the new species was collected is phytogeographically within the Irano-Turanian region in eastern Anatolia. Tatvan has Mediterranean climate with mean annual precipitation 817.1 mm (Keser and Özgökçe 2019).

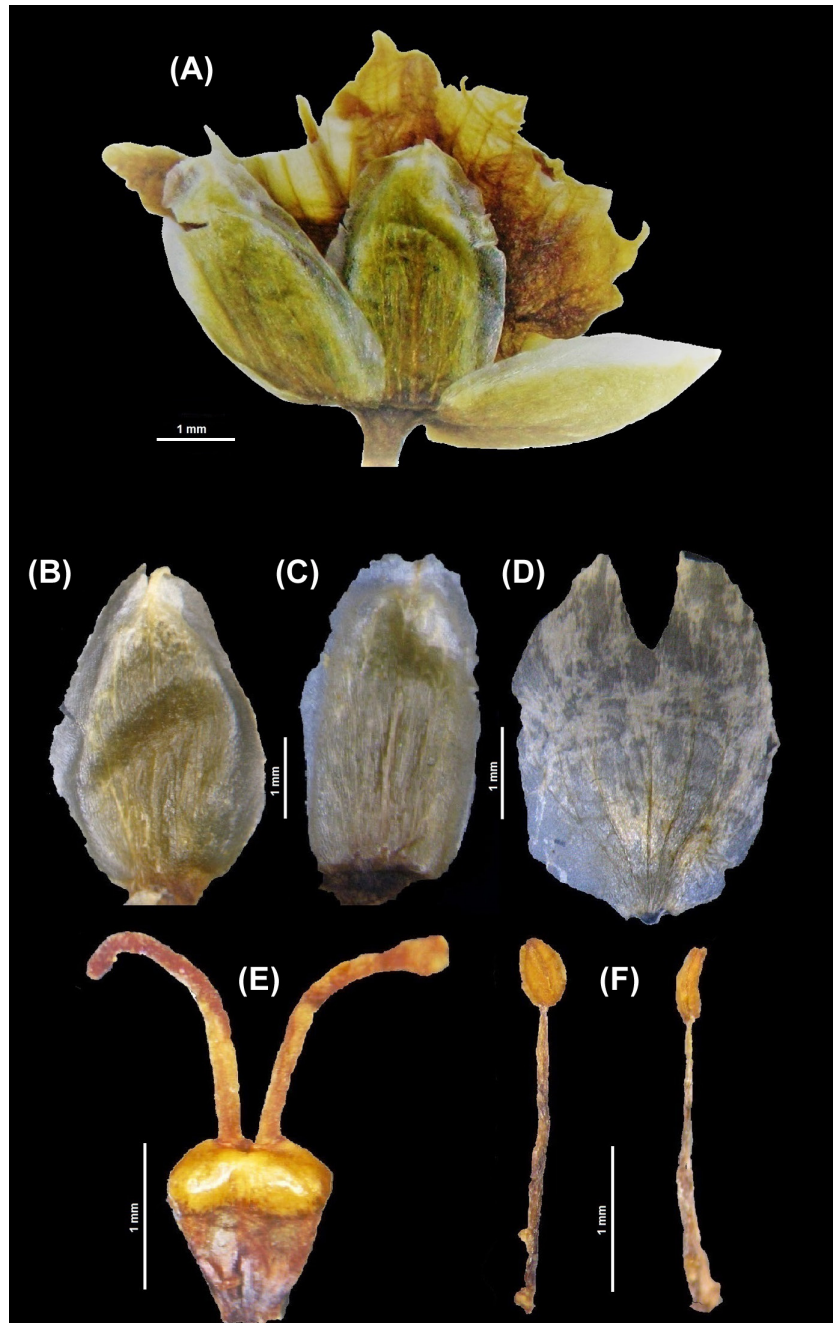


Figure 2. Floral parts of *Lepyrodiclis alinihatii* sp. nov. (A) flower, (B) inner sepal, (C) outer sepal, (D) petal, (E) pistil and (F) stamen (front and lateral view).

#### **Phenology**

Flowering time in early July.

#### **Additional specimens examined**

*Lepyrodiclis alinihatii*: Kleinasien [Anatolia], Bitlis to Tatvan, 1700–1900 m a.s.l., 5 Jul 1951, Renz s.n. (G00446762! [two sheets]; ADO!).

*Lepyrodiclis holosteoides*: Aksaray: Sevinçli köyü, Belpınarı mevki, step, 38°20'20.5"N, 34°06'43.2"E, 1152 m a.s.l., 13 May 2016, M. Çeviren 1401 (GAZI!); Diyarbakır: Ergani, Diyarbakır'dan 20 km, 750 m a.s.l., volkanik

alanlar, 1 Jun 1957, Davis ve Hedge 28813 (E!); Erzincan: Kemah, Maksutuşağı köyü aşağısı, Munzur dağları, Karasu çevresi, 1100–1300 m a.s.l., 29 May 1979, Ş. Yıldırım 29447 (EGE!); Kemah, Maksutuşağı köyü aşağısı, Karasu çevresi, 1100–1300 m a.s.l., 29 May 1979, Ş. Yıldırım 1738 (HUB!); Erzincan-Kelkit, Kelkit'e 35 km, 1700 m a.s.l., 11 Jul 1983, Max Nydegger 18153 (G!); Erzurum: Aşkale, çayır, 7 Jul 1992, H. Zengin 64972 (ISTE!); circa Erzurum, May 1853, Huet Du Pavillon (G!); Giresun: Tamdere'nin doğusu, 1700 m a.s.l., 7 Jul 1958, A. Huber-Morath 14938 (G!); Gümüşhane: Bayburt, 20 Jun 1862,



Figure 3. A topotype specimen of *Lepyroclis holosteoides* (C.A.Mey.) Fenzl ex Fisch. & Mey. (G00545743).

Bourguau (G!); Iğdır: Karakoyunlu, Koçkiran köyü, 838 m a.s.l., 8 Jun 2008, E. Altundağ 85523 (ISTE!); Kars: Susuz, yaklaşık 1750 m a.s.l., 15 Jun 1957, Davis et Hedge 29574 (GAZI!); Sarıkamış, Mescitli köyü-sarıçam ormanı arası,

1800–2000 m a.s.l., 11 Jul 1981, O. Güneş 1968 (HUB!); Posof, al köyü tarlalarından Posof çayına, 1500–1700 m a.s.l., 27 Jul 1985, N. Demirkuş 3017 (HUB!); Ardahan-Ardanuç, Ardahan'a 7 km, 1700 m a.s.l., 28 Jul 1979, Max

Table 1. Comparison of morphological features between *Lepyroclis alinihatii* and *L. holosteoides*.

Character	<i>L. alinihatii</i>	<i>L. holosteoides</i>
Inflorescence	paniculate, rarely with terminal cymes	panicle of terminal or axillary cymes
Pedicel	glabrous	glandular-pilose
Sepal	ovate or ovate-oblong, glabrous, with wide scarious margin	lanceolate to linear, glandular-pilose, with narrow scarious margin
Petal	widely obovate to subcircular, emarginate to bifid	obovate to oblanceolate entire or emarginate
Ovary	turbinate	widely elliptic to subcircular
Style	thick	thin

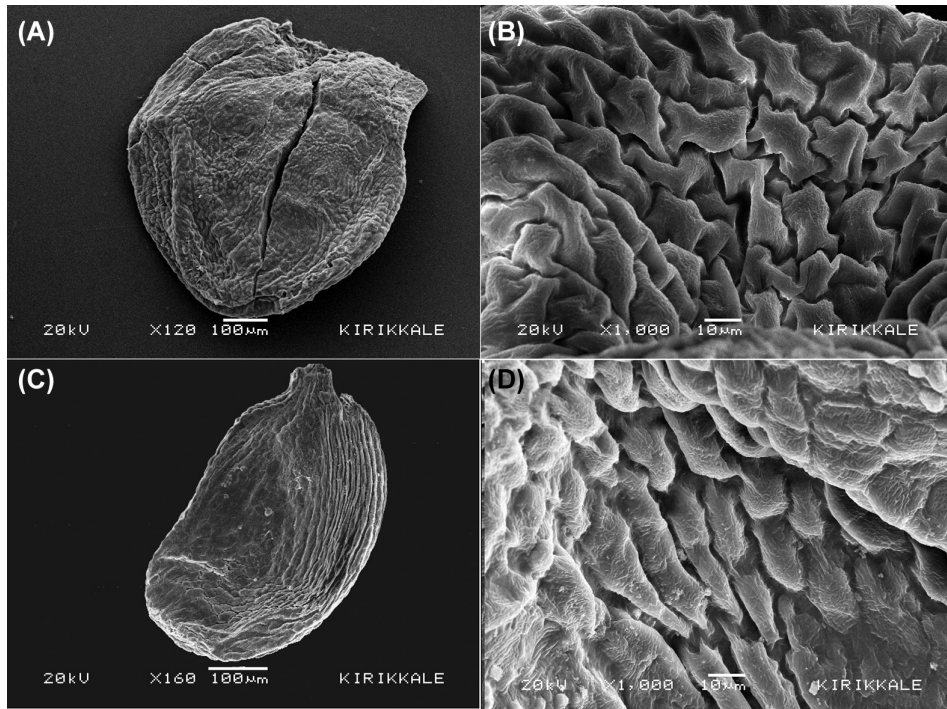


Figure 4. Immature seed micromorphology of *Lepyrodiclis alinihatii* (A, B) and *L. holosteoides* (C, D).

Nydegger 14667 (G!); Kayseri: Develi, Karahisar, 10 Jun 1939, H. Reese (G!); Rize: 100–200 m a.s.l., çitlerin içinde, 27 Aug 1952, Davis 20780 (E!); Van: Baghlar nr. 1907–1908, Tchitouny 47a (G!).

**Turkish name proposed for the new species**

The genus *Lepyrodiclis* is called ‘Sığaç’ in Turkish. We propose ‘Bey sığaçı’ as a vernacular name for *L. alinihatii* according to the guidelines of Menemen et al. (2016).

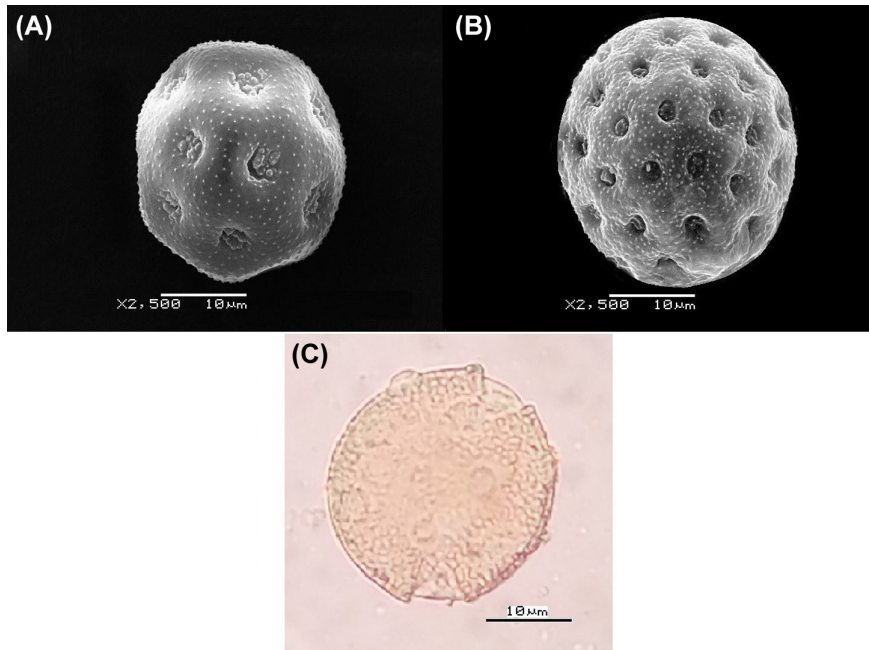


Figure 5. Pollen grains of *Lepyrodiclis alinihatii* (A, C) and *L. holosteoides* (B).

Table 2. Comparison of palynological features between *Lepyrodiclis alinihatii* and *L. holosteoides*.

Characteristics	<i>L. alinihatii</i>	<i>L. holosteoides</i> (Cui et al. 2020)	<i>L. holosteoides</i> (our results)
Pollen diameter (µm)	24.4–29.7	25.15–30.89	27.4–33.4
Pollen shape	spheroidal	spheroidal	spheroidal
Pore number	18–20	44 counted in the picture given	44–50
Pore diameter (µm)	3.56–5.00	1.58–2.77	2.68–2.88
Interporal distance (µm)	6.00–6.50	2.97–5.54	2.81–4.53
Number of microechini (per sample area of 5 × 5 µm)	15–20	40 counted from the picture given	38–48
Size of microechinae, height × base (µm)	0.25–0.32 × 0.33–0.57	not given	0.27–0.45 × 0.27–0.35
Microperforate diameter (µm)	0.10–0.22	not given	0.18–0.33
Number of granules on the operculum	6–10	3–8	4–8
Exine thickness (µm)	0.80–1.50	1.21–2.59	1.18–2.10

## Discussion

*Lepyrodiclis alinihatii* is a distinct species differing from *L. holosteoides* (Fig. 3) in having paniculate inflorescence, rarely with terminal cymes (versus panicle of cymes terminal or axillary), glabrous (versus glandular-pilose) pedicels, ovate or ovate-oblong (versus lanceolate to linear) and glabrous (versus glandular-pilose) sepals with wide (versus thin) scarious margin, widely obovate to subcircular (versus obovate to oblanceolate), emarginate to bifid (versus entire or emarginate) petals, turbinate (versus widely elliptic to subcircular) ovary and thick (versus thin) stylus (Fig. 1, 2, Table 1). *Lepyrodiclis alinihatii* pollen grains differ from those of *L. holosteoides* by their pore number 18–20 (versus 44–50), pore diameter 3.56–5.00 µm (versus 2.68–2.88 µm), interporal distance 6.0–6.5 µm (versus 2.81–4.53) and number of microechini per sample area of 5 × 5 µm 15–20 (versus 38–48) (Table 2). Moreover, *L. alinihatii* differs from *L. stellarioides* distributed in Iran by stem robust and erect (versus drooping), pedicel indumentum (glabrous versus densely glandular-pilose), calyx subglobose to campanulate (versus tubular), sepals

ovate or ovate-oblong (versus lanceolate or linear), 3.0–4.2 mm (versus 5–10 mm) and thick (versus very narrow) and petals widely obovate to subcircular, emarginate to bifid (versus linear to linear-oblanceolate, deeply bifid). Also, the pollen grains of *L. alinihatii* is different from those of *L. stellarioides* which are almost identical to *L. holosteoides* (Perveen and Qaiser, 2006). An identification key was prepared and presented below for all *Lepyrodiclis* species.

## Key to the species

1. Lower leaves petiolate, ovate or broadly lanceolate ..... *L. tenera*  
– All leaves sessile, linear to lanceolate ..... 2
2. Calyx 5–6 mm long, tubular; petals linear to linear-oblanceolate ..... *L. stellarioides*  
– Calyx 3–5 mm long, infundibuliform or campanulate; petals broadly obovate to suborbicular ..... 3
3. Inflorescence a panicle of cymes terminal or axillary; pedicel glandular-pilose; sepals lanceolate to linear, glandular-pilose, with narrow scarious margin; petals

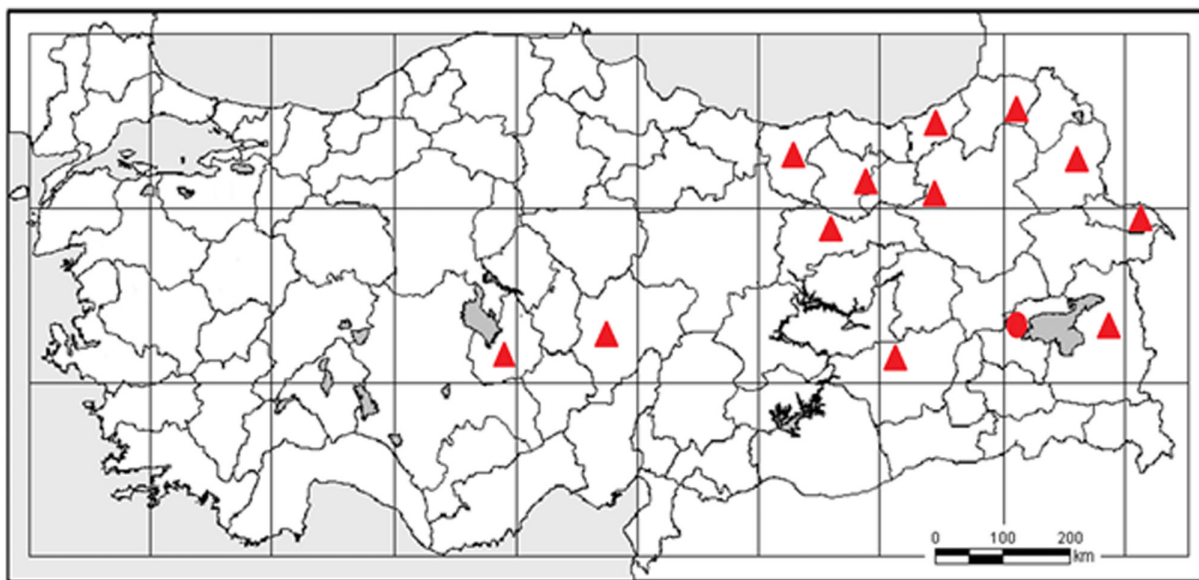


Figure 6. Distribution of the genus *Lepyrodiclis* in Turkey: *L. alinihatii* (●) and *L. holosteoides* (▲).

obovate or oblanceolate; pollen grain pores 44–50, diameter 1.58–2.88  $\mu\text{m}$ , interporal distance 2.81–5.54  $\mu\text{m}$ ...  
 ..... *L. holosteoides*  
 – Inflorescence paniculate, rarely with terminal cymes; pedicel glabrous; sepals ovate to ovate-oblong, glabrous, with wide scarious margin; petals widely obovate to subcircular; pollen grain pores 18–20, diameter 3.56–5.00  $\mu\text{m}$ ; interporal distance 6.0–6.5  $\mu\text{m}$  ..... *L. alinihatii*

*Acknowledgements* – We are deeply indebted to the curators of E, EGE, G, GAZI, HUB and ISTE for allowing us to use their facilities, and especially to Nicholas Fumeaux in Geneva herbarium for kindly finding and bringing herbarium specimens and literature whenever needed.

*Funding* – We would like to thank the ANG Foundation for sponsoring this study for the Illustrated Flora of Turkey Project.

### Author contributions

**Yusuf Menemen:** Conceptualization (equal); Data curation (equal); Formal analysis (equal); Funding acquisition (equal); Investigation (equal); Methodology (equal); Project administration (equal); Software (equal); Supervision (equal); Validation (equal); Visualization (equal); Writing – original draft (equal); Writing – review and editing (equal).

**Ramazan Yalçınkaya:** Conceptualization (equal); Data curation (equal); Formal analysis (equal); Funding acquisition (equal); Investigation (equal); Methodology (equal); Project administration (equal); Resources (equal); Software (equal); Supervision (equal); Validation (equal); Visualization (equal); Writing – original draft (equal); Writing – review and editing (equal). **Ayşe Erden:** Conceptualization (supporting); Data curation (equal); Formal analysis (equal); Funding acquisition (equal); Investigation (equal); Methodology (equal); Project administration (supporting); Resources (equal); Software (equal); Supervision (equal); Validation (equal); Visualization (equal); Writing – original draft (equal); Writing – review and editing (equal).

### References

Altan, Y. and Behçet, L. 1994. Hizan (Bitlis) Florası. – Turk. J. Bot. 19: 331–344.  
 Altok, A. and Behçet, L. 2005. The flora of Bitlis River Valley. – Turk. J. Bot. 29: 355–387.  
 Behçet, L. 1989. B9 (Bitlis) karesi ve Türkiye için yeni floristik kayıtlar. – DOGA T. Botanik Dergisi 13: 512–516.  
 Bentham, G. and Hooker, J. D. 1862. Caryophylleae. – In: Bentham, G. and Hooker, J. D. (eds), Genera plantarum, Vol. 1. Reeve, pp. 140–154.  
 Bingöl, Ö. et al. 2017. The Flora of Deveboynu Peninsula (Gevaş-Van/Turkey) and its Environment. – Turk. J. Life Sci. 2: 117–141.  
 Bittrich, V. 1993. Caryophyllaceae Juss. – In: Kubitzki, K. et al. (eds), The families and genera of vascular plants, magnoliid, hamamelid and caryophyllid families, Vol. 2. Springer, pp. 206–236.  
 Boissier, P. E. 1867. Flora Orientalis, Vol. 1. – H. Georg, Genova.

Cui, X. et al. 2020. Pollen morphology of tribes Alsineae and Sperguleae (Caryophyllaceae) and its systematic significance. – Palynology 44: 597–620.  
 Cullen, J. 1967. *Lepyrodiclis* Fenzl. – In: Davis, P. H. (ed.), Flora of Turkey and the East Aegean Islands, Vol. 2. Edinb. Univ. Press, pp. 68–68.  
 Davis, P. H. 1967. Flora of Turkey and the East Aegean Islands, Vol. 2. – Edinb. Univ. Press.  
 Davis, P. H. et al. 1988. Flora of Turkey and the East Aegean Islands (Suppl. 1), Vol. 10. – Edinb. Univ. Press.  
 Dequan, L. and Rabeler, R. K. 2001. *Lepyrodiclis* Fenzl. – In: Wu, Z. Y. et al. (eds), Flora of China, Vol. 6. Science Press, Beijing & Miss. Bot. Gard. Press, pp. 31.  
 Ekim, T. 2012. *Lepyrodiclis* Fenzl. – In: Güner, A. et al. (eds), Türkiye Bitkileri Listesi (Damarlı Bitkiler). Nezahat Gökyiğit Botanic Garden and Flora Research Society Publishing, pp. 343.  
 Erdtman, G. 1969. Handbook of palynology. Morphology–taxonomy–ecology. An introduction to the study of pollen grains and spores. – Verlag Munksgaard.  
 Fenzl, E. 1840. *Lepyrodiclis* Fenzl. – In: Endlicher, S. (ed.), Genera plantarum. Friedrich Beck, pp. 966.  
 Fisher, F. E. L. and Meyer, C. A. 1841. Enumeratio Plantarum Novarum, Vol. 1. – G. Fisheri.  
 Ghanzafar, S. A. and Nasir, Y. J. 1974. *Lepyrodiclis* Fenzl. – In: Nasir, E. and Ali, S. I. (eds), Flora of Pakistan, Vol. 175. Karachi Univ. Press, pp. 18.  
 Güner, A. et al. 2000. Flora of Turkey and the East Aegean Islands (Suppl. 2), Vol. 11. – Edinb. Univ. Press.  
 Hesse, M. et al. 2009. Pollen terminology. An illustrated handbook. – Springer.  
 Keser, A. M. and Özgökçe, F. 2019. The Flora of Karz (Garez) Mountain (Tatvan, Bitlis/Turkey). – Biol. Divers. Conserv. 12: 78–91.  
 Korkmaz, H. et al. 2008. An investigation on the floristic characteristics of the Boztepe Protected Forest Area (Unye-Ordu). – EurAsian J. Biosci. 2: 1–17.  
 Menemen, Y. et al. 2016. Türkçe Bilimsel Bitki Adları Yönergesi. – Bağbahçe Bilim Dergisi 3: 1–3.  
 Öztürk, M. et al. 2015. General characteristics of flora and vegetation formations of Eastern Anatolia Region and its environs (Türkiye). – SDU J. Sci. 10: 23–48.  
 Pax, F. and Hoffmann, K. 1934. Caryophyllaceae. – In: Engler, A. and Harms, H. (eds), Die Natürlichen Pflanzenfamilien, 2nd edn., Vol. 16c. Wilhelm Engelmann, pp. 275–364.  
 Perveen, A. and Qaiser, M. 2006. Pollen flora of Pakistan-LI-Caryophyllaceae. – Pak. J. Bot. 38: 901–915.  
 Punt, W. et al. 2007. Glossary of pollen and spore terminology. – Rev. Palaeobot. Palynol. 143: 1–81.  
 Raabe, U. 1980. Weitere Funde der Blasenmiere (*Lepyrodiclis holosteoides* (C.A.Mey.) Fenzl ex Fisch. & Mey.) in *Trifolium resupinatum* – Äckern. – Natur und Heimat 40: 87–89.  
 Rabeler, R. K. and Old, R. O. 1992. *Lepyrodiclis holosteoides* (Caryophyllaceae), 'New' to North America. – Madroño 39: 240–242.  
 Rechinger, K. H. 1988. *Lepyrodiclis* Fenzl. – In: Rechinger, K. H. (ed.), Flora Iranica Cont. 163. Akademik Druck. U., pp. 54–58.  
 Schischkin, B. K. 1936. *Lepyrodiclis* Fenzl. – In: Komarov, V. L. and Schischkin., B. K. (eds), Flora of USSR, Vol. 6. Izdatel'stvo Akademii Nauk SSSR, pp. 368–369.  
 Tel, A. Z. and Eğilmez, Ç. 2015. A research on the floristic composition and ecological features of the vegetation types of Gölbaşı Lakes Basin (Adıyaman/Turkey). – Adyütayam 3: 1–28.