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Check-List of the Genus *Biarum* Schott in the Flora of Turkey, with a New Record for Turkey: *Biarum syriacum* (Spreng.) H.Riedl

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Abstract: A check-list of the genus *Biarum* Schott in the Flora of Turkey is presented, with 10 taxa, of which 2 are endemic to Turkey. A list of taxonomical changes that have occurred since the publication of the Flora of Turkey, Supplement II is given. In addition, *Biarum syriacum* (Spreng.) H.Riedl is recorded for the first time (C6 Gaziantep) from Turkey. In this paper an expanded morphological description of this species is provided. Moreover, an image of a type specimen, a photograph of a plant from the field, an illustration of a plant, and a distribution map are presented.

Key Words: Araceae, *Biarum syriacum*, check-list, Flora of Turkey, new record

Türkiye Florasında *Biarum* Schott cinsinin tür listesi ve Türkiye için Yeni Bir Kayıt: *Biarum syriacum* (Spreng.) H.Riedl

Özet: Bu çalışmada, Türkiye'deki *Biarum* Schott cinsinin tür listesi ve Türkiye Florası'nın 2. ek cildinin yayımlanmasından bu yana görülen taksonomik değişikliklere yer verilmiştir. Türkiye Florası için cinsin toplam 10 taksondan oluştuğu ve bunların 2 tanesinin Türkiye için endemik olduğu saptanmıştır. Bununla birlikte, *Biarum syriacum* (Spreng.) H.Riedl türü Türkiye'den (C6 Gaziantep) ilk defa kaydedilmektedir. Bu makalede, türün genişletilmiş morfolojik deskripsiyonu verilmiştir. Ayrıca, türün tip örneğinin görüntüsü, alandan çekilen fotoğrafı, çizimi ve yayılış haritasına yer verilmiştir.

Anahtar Sözcükler: Araceae, *Biarum syriacum*, check-list, Türkiye Florası, yeni kayıt

Introduction

Biarum Schott includes 21 species of dwarf tuberous-stemmed herbs that occur in semi-arid and seasonally dry areas of southern Europe, North Africa, and the Near and Middle East. The centre of diversity is the Middle East, where 75% of the species occur as endemics (Boyce, 2006).

In his treatment of the genus *Biarum* in Turkey, Mill (1984) accepted 6 taxa: *B. tenuifolium* (L.) Schott subsp. *zeleborii* (Schott) P.C.Boyce, *B. davisii* Turrill, *B. carduchorum* (Schott) Engler, *B. eximium* (Schott & Kotschy) Engler, *B. pyrami* (Schott) Engler, and *B. bovei*

Blume. Later, Boyce (1987) described a new endemic taxon from Turkey, *B. davisii* Turrill subsp. *marmarisensis* P.Boyce. Moreover, Bogner and Boyce (1989) described a new endemic species from Turkey, *B. ditschianum* Bogner & P.C.Boyce. Since then Boyce has studied the revision of the genus *Biarum* worldwide and the genus was recently taxonomically revised (Boyce, 2006). According to this new revision (Boyce, 2006), *B. davisii* Turrill subsp. *marmarisensis* P.Boyce is re-evaluated as a distinct species with the name, *Biarum marmarisense* (P.C.Boyce) P.C.Boyce. Furthermore, *B. pyrami* (Schott) Engler is re-evaluated as *B. pyrami* (Schott) Engler var. *pyrami*. On the other hand, it is reported that *Biarum*

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crispulum (Schott) Engl. and *B. kotschyi* (Schott) B.Mathew ex H.Riedl are naturally distributed in Turkey (Boyce, 2006).

Herein we provide a new record in Turkey for *Biarum syriacum* (Spreng.) H.Riedl; thus, the total number of *Biarum* taxa recorded in Turkey is now increased to 10.

During the floristic investigations in south-eastern Anatolia in 2005, the authors collected a number of interesting monocotyledon specimens. Among them were specimens that could not be identified using accounts in the Flora of Turkey (Mill, 1984; Alpınar, 2000); however, using the accounts in Flora of Syria, Palestine, and Sinai (Post & Dinsmore, 1933) the specimens were identified as *Biarum russelianum* Schott. By checking the literature it was realised that this species is recorded from Sülündül, a location between Aleppo and Gaziantep, as well as from Tefderdar and Tarmanin (Engler, 1920; Riedl, 1980). Then, we were confused about whether these locations are from Syria or Turkey. For resolution of this situation we checked some historical maps (Maspero, 1846-1916; Smith, 2002) and realised that Sülündül, Defterdar, and Tarmanin still lie within Syria, near Aleppo, and we decided that the locations are in

Syria. Consequently, we communicated with well-known aroiders Dr. Kerim Alpınar and Dr. Peter Boyce to determine the plant's name. They reported that the plant was indeed *Biarum syriacum* (Spreng.) H.Riedl. (the correct name for *Biarum russelianum* Schott, a name that cannot be used as it is preoccupied). Moreover, both aroiders stated that this was probably a new record for Turkey. After checking some maps and confirming the locations are in Syria, we decided that this was a new record for the Flora of Turkey. The record is not surprising since this species also grows in nearby Syria.

The following description of the species is mainly based on the revision of Boyce (2006) and the specimens that were found in Turkey.

Biarum syriacum (Spreng.) H.Riedl in *Aroideana* 3(1): 19 (1980). Type: (Syria) prope Aleppo, *Russell s.n.* (holotype BM, photo!) (Figures 1-4).



Figure 1. Type specimen of *Biarum syriacum* (BM000848535).



Figures 2.A and B. A view of *Biarum syriacum* from the field, Gaziantep, Turkey.

Arum syriacum Spreng., Syst. Veg. 3: 768 (1826).

B. gramineum Banks & Sol. in Russell, Nat. Hist. Aleppo ed. 2, 2: 264 (1794), *nom. illeg.* Type as for *B. syriacum* (Spreng.) H.Riedl.

B. russellianum Schott, Prodr. Syst. Aroid. 63 (1860), *nom. illeg et superfl.*

B. gramineum (Banks & Sol.) Eig in Journ. Bot. Lond. 75: 189 (1937), *nom. illeg. et superfl.*

The whole plant is 20-40 cm. Tuber is dorso-ventrally compressed-discoid, 1.5-4.5 × 2-5 cm, light to dark brown. Leaves 13-27, proteranthous, long-petiolate, the bases encased by 3-6 ligulate, 6.5-16 × 1.5-3 cm, sub-fleshy, later papery, whitish cataphylls and 2-3 ligulate, 6.5-9 × 1-1.5 cm, fibrous brown cataphylls. Petiole 9-15 × 1-1.8 cm, abaxial surface channelled distally, expanded into a membranous wing proximally, mid to dark green. Leaf lamina linear to linear-elliptic, the first few leaves emerging spatulate, 11-21 cm × 5-12 mm, apex acute, base long-decurrent to cuneate, 3-7 primary lateral veins per side, margins smooth to undulate, lamina mid to dark green, rarely somewhat glaucous abaxially. Inflorescence appearing in spring. Peduncle 6-11 cm × 3-6 mm, dirty white, emerging from amidst the foliage. Spathe 12-18 cm long. Spathe limb elliptic to lanceolate-elliptic, 9-14 × 3-6 cm, exterior green, heavily stained deep purple, interior deep purple. Spathe tube oblong, sub-cylindrical, moderately inflated, 4.5-7 × 1.5-1.8 cm, margins fully connate, exterior dirty white, stained purple around the



Figure 3. *Biarum syriacum*; a) habitus, b) spathe, with base of spadix exposed.

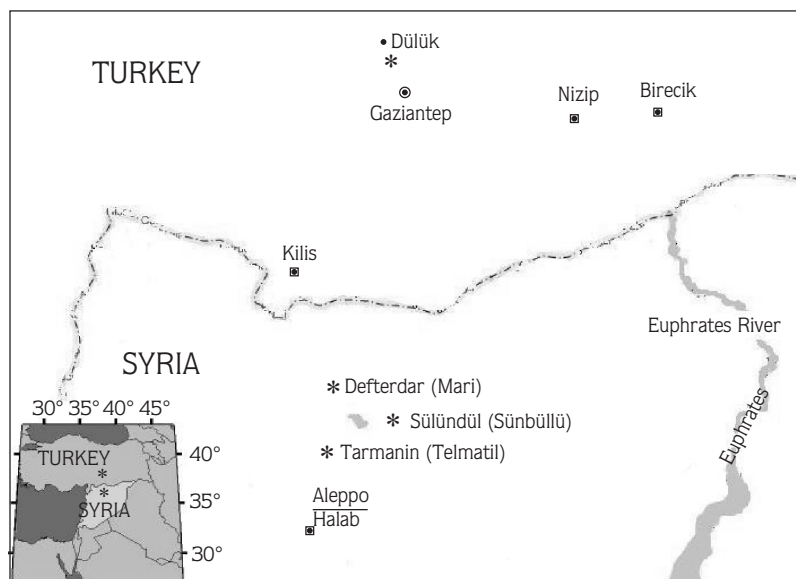


Figure 4. Distribution of *Biarum syriacum* in Turkey (*) and Syria (*).

upper margins, interior white, stained mid-purple distally. Spadix sub-equal to just exceeding the spathe limb, 10-19 cm in total length. Spadix appendix fusiform, sub-sessile to shortly stipitate, 6-13 cm × 7-14 mm, deep purple. Staminate flowers in a zone 11-15 mm long, 7-10 mm in diameter, anthers cream-light purple. Interstice 1.5-4 cm × 4-5 mm, dark cream-light purple. Staminodes arranged on the lower half of the interstice, moderately dense; bases barely to not swollen, dark cream, filaments filiform, spreading to erect, 4-6 mm long, the longest nearest to the pistillate flowers, cream. Pistillate flowers in a hemispherical cluster 2-3 × 3-5 mm; ovaries oblong, 1-2 × 0.5 mm, dark cream, stigma sub-sessile, capitate, 0.2-0.4 mm in diameter. Infructescence 8-11 × 5-6 mm; berries 2-3 × 1-1.5 mm, head consisting of 50-65 berries, whitish-reddish; immature seeds ovoid, 1.0 × 0.5 mm. Chromosome number not recorded.

Distribution: SE Turkey, NW Syria.

Habitat: Forest spaces, steppe and rocky ground, limestone fields, terra rose type soil. Alt. 1100-1200 m (in Turkey).

Specimens examined: (Turkey): C6 Gaziantep, Dülükbaba forest, 8 km N of Gaziantep, 10.04.2005, steppe and rocky ground, 1100-1200 m, *H. Akan 5565* & *Balos*, *ibid.* 01.05.2005, limestone fields, *H. Akan 5633* & *Balos*, *ibid.* 7.5.2005, *H. Akan 5782* & *Balos*, *ibid.* 03.04.2008, forest spaces, terra rose type soil, *H. Akan 5841*, *Balos* & *Mirdeslioğlu*, *ibid.* 1.05.2008, *H. Akan 5844* & *Balos*.

The herbarium specimens are kept at the herbaria of Harran University and GAZI.

Observation on plant population: *Biarum syriacum* distributed in Dülükbaba forest, Gaziantep, around 1100-1200 m on rocky ground, limestone fields, terra rossa soil, and on steppe with *Iris persica* L., *I. sari* Schott ex Baker, *Helleborus vesicarius* Aucher, *Geranium tuberosum* L. subsp. *tuberosum*, *Ixiolirion tataricum* (Pall.) Herb. subsp. *tataricum*, *Gladiolus atroviolaceus* Boiss., *Hyacinthella nervosa* (Bertol.) Chouard, *Scilla ingridae* Speta and *Muscari discolor* Boiss. et Hausskn.

It was observed that the population of plants was restricted to distribution in the field and there were some negative factors for the species. Afforestation and disorderly grazing were reducing the populations. Additionally, some picnic facilities were established in area. These facilities are yet not very comprehensive, but

the new construction of picnic facilities in the forest is a fear and may pose a threat to plant diversity in the area.

During the field studies it was observed that there were about 50-100 individual plant species. A scarcity of individuals in the population was observed.

Check-list of the genus *Biarum* in Turkey

The plant list is given alphabetically.

1) *Biarum bovei* Blume, Rumphia 1: 114 (1836); Engler in A. & C.DC., Monog. Phanerog. 2: 577 (1879) & in Engler, Das Pflanzenr. 73(IV.23F): 140 (1920); Mill in Davis, Fl. Turkey 8: 58 (1984); Riedl in Townsend, Fl. Iraq 8: 195 (1985); Koach & Feinbrun in Feinbrun, Fl. Palaestina 4: 337 (1986); Koach in Rotem 26 t. 17, 18 (1988).

Biarum homeid Blume, Rumphia 1: 115 (1836).

Caladium bovei (Blume) Steud., Nomen. Bot. ed. 2, 1: 249 (1840).

Ischarum bovei (Blume) Schott, Syn. Aroid. 7 (1856).

Ischarum homeid (Blume) Schott, Syn. Aroid. 8 (1856) ["*homaïd*"].

Biarum bovei Blume var. *blumei* Engler in A. & C.DC., Monog. Phanerog. 2: 577 (1879).

Distribution: Turkey, Syria, Lebanon, Israel, Iran, and Iraq.

2) *Biarum carduchorum* (Schott) Engler in A. & C.DC., Monog. Phanerog. 2: 575 (1879) & in Engler, Das Pflanzenr. 73 (IV.23F): 137 (1920); Mill in Davis, Fl. Turkey 8: 57 t. 2 no. 14 (1984); Riedl in Townsend, Fl. Iraq 8: 194 (1985).

Cyllenium carduchorum Schott, Prodr. Syst. Aroid. 65 (1860).

Biarum platyspathum Bornm. in Feddes Rep. Nov. Sp. 5: 57 (1908).

B. carduchorum (Schott) Engler var. *platyspathum* (Bornm.) Engler in Engler, Pflanzenr. 73(IV.23F): 137 (1920).

B. platyspathum (Schott) Engler var. *bakhtyarum* Parsa in Kew Bull. 4: 36 (1949).

[*B. angustatum* (Hook.f.) N.E.Br. var. *kurdistanicum* Zohary, in sched. nom. nud.]

[*B. bakhtyarum* Stapf, in sched. nom. nud.]

Distribution: S and SE Turkey, Syria, Iraq, and W Iran.

3) *Biarum crispulum* (Schott) Engler in Bot. Jahrb. 5: 334 (1884).

Ischarum crispulum Schott, Prodr. Syst. Aroid. 68 (1860).

Calla orientalis L., Sp. Pl. ed. 2: 1373 (1763).

Arum carsaami Kunth, Enum. Pl. 3: 25 (1841), *nom. illeg.*

Eminium carsaamii (Kunth) Schott, Syn. Aroid. 17 (1856), *nom. illeg.*

Ischarum carsaamii (Kunth) Schott, Prodr. Syst. Aroid. 67 (1860), *nom. illeg.*

Biarum bovei Blume β *carsaami* (Kunth) Boiss., Fl. Or. 5: 34 (1882) [*karsaamii*].

Biarum orientale (L.) Druce in Bot. Exc. Club Brit. Isles 3(5): 415 (1914).

[*Ischarum christmannii* Siehe in sched. Berol. *nom. nud.*]

Distribution: S Turkey (provinces of Adana, Hatay and Konya), NW Syria.

4) *Biarum ditschianum* Bogner & Boyce in Willdenowia 18 (2): 409 (1989).

Distribution: Endemic to SW Turkey.

5) *Biarum eximium* (Schott & Kotschy) Engler in A. & C.DC., Monog. Phanerog. 2: 576 (1879) & in Engler, Das Pflanzenr. 73(IV.23F): 139 (1920); Mill in Davis, Fl. Turkey 8: 57 (1984); Mathew, The Smaller Bulbs 16 (1987).

Ischarum eximium Schott & Kotschy in Oesterr. Bot. Wochenbl. 4: 81 (1854).

Distribution: S Turkey and Jordan.

6) *Biarum kotschyi* (Schott) B.Mathew ex H.Riedl in Aroideana 3 (1): 28 (1980) ("*kotshcyi*").

Ischarum kotschyi Schott, Syn. Aroid. 7 (1856).

Distribution: Endemic to SE Turkey, provinces of Bitlis, Diyarbakir, Urfa, Gaziantep, and Maras.

7) *Biarum marmarisense* (P.C.Boyce) P.C.Boyce in Aroideana vol. 29: 34 (2006). Basionym: *Biarum davisii* ssp. *marmarisense* P.C.Boyce in Aroideana 10 (4): 14 (1987) ("*marmarisensis*").

Distribution: SW Turkey and Greece (Simi Island.)

8) *Biarum pyrami* (Schott) Engler in A. & C.DC., Monog. Phanerog. 2: 576 (1879) & in Engler, Pflanzenr. 73(IV.23F): 139 (1920); Koach & Feinbrun in Feinbrun, Fl. Palaestina 4: 337 (1984); Koach in Rotem 26 t. 15, 16 (1988).

Ischarum pyrami Schott, Prodr. Syst. Aroid. 66 (1860).

I. nobile Schott, Prodr. Syst. Aroid. 66 (1860).

var. **pyrami**

Distribution: SW and central S Turkey, Syria, Lebanon, Jordan, and Israel.

9) *Biarum syriacum* (Spreng.) H.Riedl in Aroideana 3 (1): 19 (1980).

Arum syriacum Spreng., Syst. Veg. 3: 768 (1826).

B. gramineum Banks & Sol. in Russl. Nat. Hist. Aleppo ed. 2, 2: 264 (1794), *nom. illeg.*

B. russellianum Schott, Prodr. Syst. Aroid. 63 (1860), *nom. illeg et superfl.*

B. gramineum (Banks & Sol.) Eig in J Bot. Lond. 75: 189 (1937), *nom. illeg. et superfl.*

Distribution: SE Turkey (Gaziantep) and NW Syria.

10) *Biarum tenuifolium* (L.) Schott in Schott & Endl., Melet. Bot. 17 (1832).

subsp. zelebori (Schott) P.C.Boyce in R. Govaerts & D.G. Frodin, World Checklist Bibliogr. Araceae 245 (2002).

Biarum zelebori Schott in Oesterr. Bot. Wochenbl. 7: 245 (1857).

Biarum tenuifolium (L.) Schott var. *zelebori* (Schott) Engler in A. & C.DC., Monog. Phanerog. 2: 574 (1879) [*"zeleborii"*] & in Engler, Das Pflanzenr. 73 (IV.23F): 136 (1920) [*"zeleborii"*]; Mill, Fl of Turkey. 8:56 t. 2 no. 12 (1984) [*"zeleborii"*].

Distribution: Crete, Rhodes, Kos, and SW Turkey (provinces of Aydin, Izmir, and Mugla).

Discussion

Biarum syriacum had not been recorded in Turkey prior to this study. The genus *Biarum* has recently been revised by Boyce (2006), but these specimens were not included in the revision.

Biarum bovei, *B. carduchorum*, and *B. syriacum* are distributed in south-east Anatolia. They can be distinguished by the following key:

1. Margins of tube fused for 1/2-3/4 of their length, or fully connate.

2. .Flowering, August-September

.....*B. carduchorum*.

2. Flowering, April*B. syriacum*.

1. Margins of tube free, except near base . . .

.....*B. bovei*.

A specific ethnobotanical peculiarity for *B. syriacum* has not been determined; however, the local names for *Biarum* members are mainly “Gardi”, “Kari”, “Gari”, “Fise pire” “Kurt kulağı”, and “Asalan” in Kilis and Gaziantep districts.

According to the revision by Boyce (2006), *B. syriacum* has natural distribution in NW Syria at 150-300 m in limestone-derived red clays; however, according to Engler (1920) this species was recorded from Aleppo at around 500 m in meadows and in karstic formations. In Flora of Syria, Palestine, and Sinai (Post & Dinsmore, 1933), the habitat for this species was given as limestone fields. In Turkey it was decided that the habitat for this species is forests, steppe, rocky ground, limestone fields, and terra rossa-type soil at altitudes between 1100 and 1200 m. These variations are due to the climate, topography, and soil types of the 2 countries. The altitude in Turkey is higher and that is why the flowering time is a little bit later. The flowering time is recorded as March or the beginning of April in Syria, whereas in Turkey it flowers mainly in April.

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Engler A (1920). *Biarum* Schott in A. Engler (ed.), *Das Pflanzenreich*. 73(IV.23F):142.

According to the revision by Boyce (2006), *Biarum* has 21 species throughout the world. The total number of *Biarum* taxa recorded in Turkey has now increased to 10, and 2 are endemic to Turkey. Although *B. davisii* has been stated in Flora of Turkey and East Aegean Islands, it is only recorded from Crete, not Turkey. Thus, the members of *Biarum* in Turkey represent 10 taxa. The endemic taxa for Turkey are *B. ditschianum* and *B. kotschyi*. *B. kotschyi* is distributed in the provinces of Bitlis, Diyarbakır, Şanlıurfa, Gaziantep, and Kahramanmaraş, whereas *B. ditschianum* is distributed in the provinces of south Anatolia. *B. eximium*, which was previously reported as endemic to Turkey, has now been shown not to be, but is distributed in Jordan as well (Boyce, 2006).

In conclusion, the check-list of the genus *Biarum* is given with all the changes, synonyms, and related revisions of the genus. Taxonomical changes that have occurred since the publication of Flora of Turkey, Supplement II are included.

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