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Thymelaea bulgarica sp. nova (*Thymelaeaceae*) and related species

Abstract

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Thymelaea bulgarica, a new species from S. Bulgaria, is described. Morphological, chorological, anatomical, and karyological data for the two Bulgarian species, *T. bulgarica* and *T. passerina*, are given. A diagnostic key for these two species and the related *T. mesopotamica* and *T. gussonei* is presented. *T. mesopotamica* is recorded as new for the flora of Azerbaijan.

Material and methods

Morphology was studied on fresh material and herbarium specimens. Anatomical structures were investigated on material collected in natural habitats and fixed 75 % ethanol. Each of the quantitative anatomical data results from 30 measurements made on the adaxial leaf epidermis of 10 plants, studied under the microscope. Material from the herbaria W, WU, K, BM, OXF, HUI, and LE was used for comparison. The chromosomes were counted on root tips. Vouchers are deposited at the Agricultural University, Plovdiv (SOA).

Along with Bulgarian distributions, UTM mapping grid squares are indicated parenthetically, codified in conformity with the system detailed by Kožuharov & al. (1983).

Results

Thymelaea (sect. *Ligia* (Fasano) Meisn.) *bulgarica* Cheshm., **sp. nov.** – Typus: m. Stara Planina orientalis loco dicto “Karandila”, ab urbe Sliven bor.-or. versus, in herbis lapidoso-arenosis, 1050 m s.m., 17 Jul. 1989, I. Češmedžiev (holo- SOA No. 45518; iso- SOA No. 45520-45530). – Fig. 4.

Herba annua. Caulis (2-)8-35(-50) cm altus, simplex vel substricto ramosus, superne pilis falcatis antrorsis pilosus. Folia (3-)8-12(-15) × (0.5-)0.8-1.5(-2.4) mm, alterna, sessilia, oblonga vel oblongo-linearia, apice obtusata, glabra vel subtus parce pilosa, margine in sicco involuto. Flores (3-)4-6(-14) in axillis foliorum superiorum, uni- et bisexuales, lutei vel luteovirides vel virescentes, post anthesin saepius fusco-rubelli, basi pilis longis sparsis pilosi; bacteolae (2-)3-4(-6), (1-)2-5(-10) mm longae, ovatae vel lanceolatae, sub-

tus sparse pilosae; pedicelli 0.1-0.2 mm longi. Perianthium florum pistilliferorum 1.3-2.8 mm longum, anguste urceolatum vel cylindricum; lobi 0.4-0.5 mm longi, obtusati; ovarium ellipsoideum, apice puberulum, gynophoro 0.1-0.3 mm longo suffultum; stylus 0.25-0.30 mm longus; stigma globosum. Perianthium florum masculorum 2.3-3.2 mm, hermaphroditicorum 2.8-3.5 mm longum, anguste infundibuliforme; lobi 0.5-0.7 mm longi;

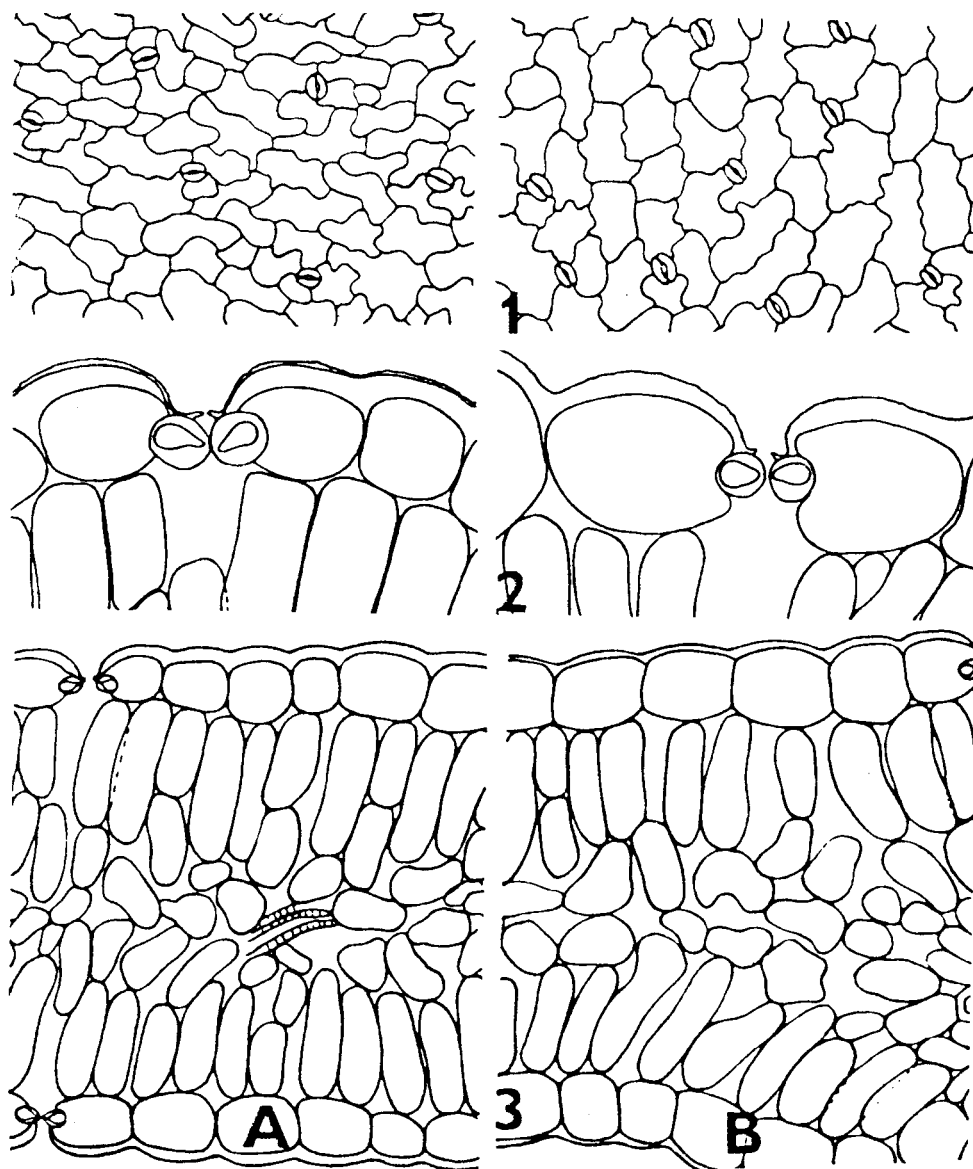


Fig. 1-3. Anatomical details of leaves of *Thymelaea passerina* (A, left) and *T. bulgarica* (B, right). - 1, adaxial epidermis, surface view; 2 id., section; 3, cross section of leaf.

stamina (2-)4-6(-8); antherae 0.30-0.40 × 0.18-0.20 mm, flavae. Nucula 1.7-2.0 × 0.9-1.1 mm, pyriformis, nigra, nitida, in tubo perianthii persistente inclusa. – Fl. Jul.-Aug., fr. Aug.-Sep.



Fig. 4. Isotype specimen (SOA No. 45520) of *Thymelaea bulgarica*, sp. nova.

Table 1. Comparative quantitative data from adaxial leaf epidermis of Bulgarian *Thymelaea* species.

	<i>T. passerina</i>	<i>T. bulgarica</i>
Number of cells per mm ²	(225.7) 279.9 ± 0.18 (347.2)	(173.6) 207.5 ± 0.13 (243.0)
Number of stomata per mm ²	(34.7) 71.4 ± 0.93 (121.3)	(34.7) 67.6 ± 0.13 (104.1)
Stomata length (µm)	(33.0) 34.2 ± 0.20 (38.7)	(32.5) 34.4 ± 0.13 (37.5)
Stomata width (µm)	(24.0) 25.3 ± 0.10 (26.2)	(24.3) 26.2 ± 0.14 (28.8)

Affinitas. – A *Thymelaea gussonei* Boreau praecipue statura humiliore, pilis falcatis (nec rectis appressis), staminum numero inconstante (2-8 nec semper 8), floribus pluribus in axillis foliorum (3-14 nec 1-5), foliis apice obtusatis (nec acuminatis) discrepat. A *T. mesopotamica* (C. Jeffrey) B. Peterson forma foliorum, indumento aliisque notis differt.

Distributio. – Bulgaria australis: m. Stara Planina orientalis (MN-43; MN-52), ditio Znepole (FN-40; FN-61), m. Slavjanka (LG-29), m. Pirin australis (GM-04; GM-20; GL-19; GL-29), ad 1500 m s.m.

Karyology. – *Thymelaea passerina* (L.) Coss. & Germ.: $2n = 18$ (Plovdiv district, Brestovica, I. Češmedžiev 649). The chromosome number agrees with that found by Kuzmanov (1973) and Feráková (in Májovský 1974). – *T. bulgarica*: $2n = 18$ (Sliven district, Karandila, I. Češmedžiev 682).

Leaf anatomy (Fig. 2). – In both *Thymelaea passerina* and *T. bulgarica*, the basic cells of the leaf epidermis have an irregular form and ± plaited walls, and are not orientated in a definite spatial pattern. The stomata are of the modified tetracytic, seldom anisocytic type (the same types were found by Tan 1980 for the species of *T. sect. Ligia*), with elliptical shape, slightly sunken, with a well-formed exterior vestibule and a but slightly expressed interior vestibule (Fig. 1-2). The leaves of both species can be characterized as amphistomatic (which coincides with Tan's 1980 data on *T. sect. Ligia*), with no significant difference in number of stomata between the adaxial and abaxial epidermis. Differences in the density and width of stomata (Table 1) are statistically significant ($t > 3$). The mesophyll is of the isobilateral type, with upper and lower palisade layer each consisting of one cell tier, the upper being always somewhat better developed. No differences between the two species can be seen. The spongy parenchyma is 1-2(-3)-tiered (Fig. 3). The anatomical features of the leaves emphasize their xeromorphic structure, more pronounced in *T. passerina* than in *T. bulgarica*.

Stem anatomy. – In the bark parenchyma there are groups of sclerenchyma fibres, that are smaller and more numerous in *Thymelaea passerina* than in *T. bulgarica*. The secondary wood in both species is with diffuse pores, uniseriate rays and a rexigenic pith cavity.

Key. – *Thymelaea bulgarica* is closely related with *T. gussonei*, *T. mesopotamica*, and *T. passerina*. These species, all of which are annual, can be distinguished by means of the following key:

1. Stem glabrous. Flowers bisexual (exceptionally unisexual) *T. passerina*
– Stem hairy, at least in the upper part. Flowers uni- and bisexual 2.
2. Hairs straight, appressed to the stem. Stamens always 8 *T. gussonei*
– Hairs falcate or crispate, \pm patent. Stamens 2-8 3.
3. Hairs falcate. All leaves obtuse, widest in the middle (glabrous or covered with sparse hairs underneath) *T. bulgarica*
– Hairs crispate. Upper leaves acuminate, widest in their lower half (the lower ones widest in the middle) *T. mesopotamica*

***Thymelaea mesopotamica* new to Azerbaijan**

In the herbarium at St Petersburg, Russia, there are two herbarium sheets, determined as *Ligia passerina* (L.) Fasano, which I refer to *Thymelaea mesopotamica*: Azerbaijan, Nahičevanskaja A.S.S.R., Norašenskii raion, Otrogi g. Mjunhbala-ogly, Nedaleko ot s. Ul'ja-Norašen, kamenisty južny sklon, c. 900 m, 15 May 1947, A. Grossgejm, I. A. Ilinskaja & M. I. Kirpičnikov (LE); and Azerbaijan, Nahičevanskaja A.S.S.R., Norašenskii raion, 62 km k jugu ot s. Diga, po holmah, c. 800 m, 4 Jun. 1947, A. Grossgejm, I. A. Ilinskaja & M. I. Kirpičnikov (LE). *T. mesopotamica* is an Irano-Arabian element, formerly known to occur in Asia Minor, Iraq, E. Iran, Kuwait (Tan 1982: 531), Lebanon, and Palestine.

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