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Lythrum anatolicum subsp. *vanense* (Lythraceae): a new subspecies from Eastern Anatolia, Turkey

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Abstract: *Lythrum anatolicum* Leblebici & Seçmen subsp. *vanense* (Lythraceae), a new taxon occurring in the province of Van in East Anatolia, Turkey, is described and illustrated. The new endemic subspecies closest to *L. anatolicum* subsp. *anatolicum,* but differs by its broader leaves, shorter bracteole and hypanthium, longer epicalyx segments. The conservation status of *L. anatolicum* subsp. *vanense* was assessed according to IUCN criteria. A distribution map of *L. anatolicum* subsp. *vanense* and related taxon is also presented.

Keywords: Anatolia, Conservation status, *Lythrum*, New subspecies, Taxonomy.

Introduction

Lythrum L. is a small genus in the family Lythraceae, comprising about 38 species and distributed in the temperate world. Commonly known as "loosestrife", they are among 32 genera of the family Lythraceae (Brickell, 2008). The genus *Lythrum* represented by 13 species in *Flora Europaea* (Webb, 1968), 6 species in *Flora Palaestina* (Zohary, 1987), 13 species in *Flora of the U.S.S.R.* (Muraveva, 1949) and 9 species in *Flora Iranica* (Polatschek and Rechinger, 1968).

The genus *Lythrum* was revised by Chamberlain (1972) for the *Flora of Turkey and the East Aegean Islands* Vol. 4. According to Chamberlain (1972), *Lyhtrum* was represented by 9 species in Turkey. After the most recent revision of *Lythrum* in Turkey, one new species has been added in the second supplement of Flora of Turkey: *L. anatolicum* Leblebici & Seçmen (Seçmen, 2000). *Lythrum borysthenicum* (Schrank) Litv. was separated from *Lythrum* and transferred to *Middendorfia* Trautv. (Güner et. al., 2012). Currently, 9 species of *Lythrum* are known from Turkey. One of them is endemic to Turkey, i.e. *Lythrum anatolicum* Leblebici & Seçmen (Aydınkal, 2012).

In this study, I aimed to describe a new subspecies of *L. anatolicum,* endemic to Turkey. Morphology and geographical distribution are discussed and compared to the morphologically similar taxon.

Materials and Methods

In 2002, I collected some peculiar specimens of *Lythrum* samples during a study about the Flora of Upper Çatak Valley, south of the Van province. These specimens were first collected by author 2002 and identified as *L. anatolicum* (Pınar and Adıgüzel, 2011). During an expedition carried out in 2014-2015, this taxon was collected from the same locality in Çatak. These collections are compared with the type photo of *L. anatolicum*, which were obtained from EGE herbaria, and some samples deposited in DUOF herbaria. After a careful examination, it was concluded that this taxon considerably differs the typical specimens of *L. anatolicum*. The examined specimens of *L. anatolicum* from type and different localities are cited below.

Results

Lythrum anatolicum Leblebici & Seçmen subsp. ***vanense*** Pınar subsp. nov.
(Figs. 1-2).

Type: Turkey. [B9 Van] Çatak, North of Çatak Valley, surroundings of Bilgi Village, stream side, wet and sandy places, 1723 m, 25.8.2002, 38°06'184"N, 43°16′213"E, M. Pınar 1229 (holotype: VANF, isotypes: GAZI, EGE).

Additional specimens examined (paratypes): Turkey. [B9 Van] Çatak, North of Çatak Valley, surroundings of Bilgi Village, stream side, wet places, 38.061°N, 43.162°E,

Table 1. A morphological comparison of *Lythrum anatolicum* subsp. *vanense* and *L. anatolicum* subsp. *anatolicum*.

Characters	*L. anatolicum* subsp. *vanense*	*L. anatolicum* subsp. *anatolicum*
Leaves wide	upper leaves up to 12 mm	generally 5-9 mm
Leaves shape	upper leaves linear-oblong	generally linear-oblong
Bracteole length	3-3.5 mm	4-5 mm
Hypanthium length	up to 5 mm	5-7 mm
Epicalyx segments	1.5-2 mm long	1-1.3 mm long

1720 m, 18.08.2014, M. Pınar 4627 (VANF); Çatak, North of Çatak Valley, between Bilgi village and Üçüzler district, stream side, 38.062°N, 43.170°E, 1734 m, 20.08.2015, M. Pınar 6911 (VANF).

Perennial herb. Stem pubescent, up to 100 cm, ascending-erect, usually branched from the base. Leaves opposite, sometimes alternate above, upper leaves 20-65×6-13 mm, lower leaves 50-60×13-20 mm, sessile, upper linear oblong, lower elliptic oblong, cordate at base, acuminate at the a×pex, sparsely pubescent above, densely pubescent beneath. Bracteoles 3-3.5 mm long, subulate. Flowers trimorphic, 1(-2) per leaf axil, suberect, hypanthia cylindrical-obconical, tapered gradually to the base, up to 5 mm long, shorter than substanding leaf. Sepals 0.5-0.6 mm long, deltate, epicalyx segments linear, 1.5-2 mm long. Petals purple, 6-7 mm long. Stamen 12 in two whorls. Style length variable from different individuals: in long styled flowers 8-9 mm (exceeding all stamens), in medium styled 4-5 mm long (exceeding short stamens but shorter than long stamens), in short styled flowers 1-1.5 mm long (shorter than all stamens). Capsule shorter than the hypanthium, 3 mm long.

Specimens examined: *Lythrum anatolicum* subsp. *anatolicum*: Turkey. A3 Bolu: Düzce, S. of Efteni (Melen) Lake, aquatic marsh, 140 m, 27.07.1985. Ö. Seçmen, E. Leblebici 6032!, (holotypes and isotypes EGE); A3 Düzce: Efteni Lake, opposite to Forest Management Warehouse, 40.453°N, 31.037° E, 115 m, 30.07. 2005, E, *N. Aksoy* 5772! (DUOF)

Phenology: Flowering time from July to August.

Distribution and ecology: *Lythrum anatolicum* subsp. *vanense* is confined to the North of Çatak Valley (Van), East Anatolia. It grows in wet and sandy place to the side of Çatak River, between 1700-1750 m. This endemic taxon is an element belonging to the Iranian-Turanian floristic region. This taxon is found in areas also containing *Lysimachia vulgaris* L., *Mentha longifolia* (L.) Huds., *Equisetum ramosissimum* Desf., and *Silene latifolia* Poir. subsp. *alba* (Mill.) Greuter & Burdet.

Etymology: The specific epithet is derived from the name of the city, Van, where the type was collected.

Suggested conservation status: *Lythrum anatolicum* subsp. *vanense* is classified as 'Vulnerable', VU (D1), based on the IUCN criteria (IUCN, 2014). The population of this species is very small and restricted area (criterion D), and number of mature individuals less than 1000 (criterion D1).

Taxonomic relationships: *Lythrum anatolicum* shows general aspect similarities to *L. salicaria* L. but differs in having 1-2 flowers in the axils, not winged stem, shorter epicalyx segments (1-2 mm) and petals (6-7 mm). Also it is easily distinguished from *L. junceum* Banks & Sol. for its pubescent plant, longer stem, bigger leaves, and the segments of epicalyx 2×longer than sepals. The subspecies *vanense* is fairly similar to *L. anatolicum* subsp. *anatolicum,* but differs in several characters, such as broader leaves (up to 20 mm), shorter bracteole (3-3.5 mm) and hypantium (up to 5 mm), longer epicalyx segments (1.5-2 mm). Table 1 provides a morphological comparison of the two subspecies.

Geographically, the two subspecies are certainly isolated (Fig. 2). *Lythrum anatolicum* subsp. *anatolicum* is found in Düzce, Lake of Efteni, belongs to the Öksin floristic region, and is a local endemic to Northwest Anatolia. It grows in aquatic marsh at the altitude of 110-140 m (Leblebici, 1995). *Lythrum anatolicum* subsp. *vanense* is confined to the North of Çatak Valley (Van), distributed in West Anatolia and belongs to the Irano-Turanian floristic region. It grows in wet and sandy place to the side of Çatak River, between 1700-1750 m. That these reasons, was decided that the new subspecies the eastern population.

Key to *Lythrum anatolicum* subsp. *vanense* and related taxa

1a. Inflorescence a compound spike, composed of 3-8 flowered axillary cymes……..……2

Figure 1. *Lythrum anatolicum* subsp. *anatolicum*; A- holotype, and *Lythrum anatolicum* subsp. *vanense*; B- habit, C- inflorescence, D- petal, E- ovary, F- calyx opened out.

b. Flowers 1(-2) in the leaf axils, not forming clearly defined inflorescences...……...……**3**

2a. Leaves narrowly lanceolate to ovate, pubescent; epicalyx segments 2-2.5×as long as sepals ...……...……*L. salicaria*

b. Leaves linear-lanceolate, glabrous; epicalyx segments c. as long as sepals...……*L. virgatum*

3a. Flowers trimorphic; stamens 12……**4**

b. Flowers monomorphic; stamens usually 2-6...……**5**

4a. Plant glabrous; epicalyx segments c. as long as sepals ……*L. junceum*

b. Plant pubescent; epicalyx segments 2×as long as sepals...……*L. anatolicum*

b1. Epicalyx segments 1.0-1.3 mm; hypanthium 5-7 mm...……**subsp.** *anatolicum*

b2. Epicalyx segments 1.5-2 mm; hypanthium up to 5 mm……...……...……**subsp.** *vanense*

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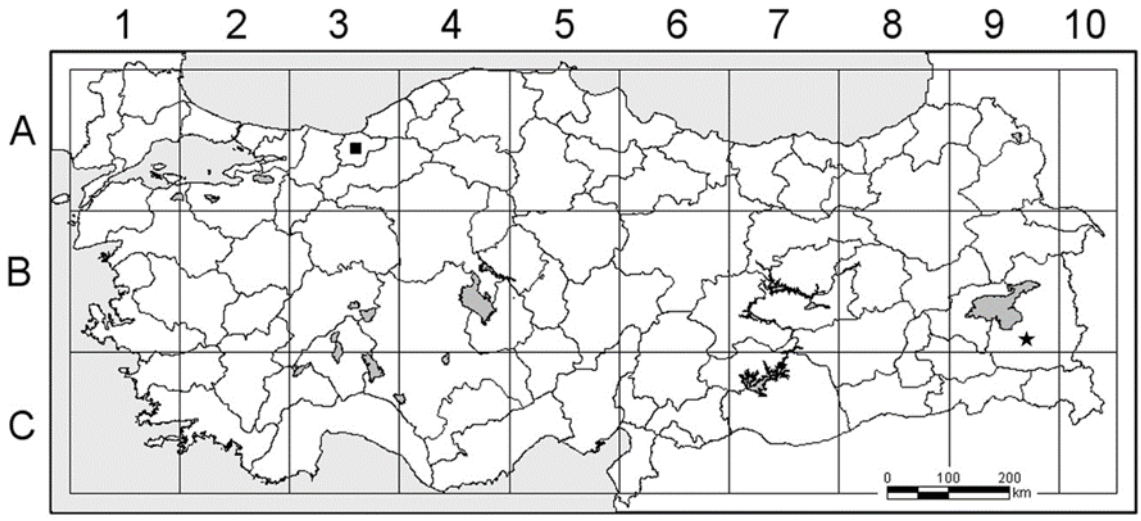

Figure 2. Distribution map of *Lythrum anatolicum* subsp. *vanense* subsp. nov. (★) and *L. anatolicum* subsp. *anatolicum* (■) in Turkey.

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