

Orchis anthropophora (L.) All. (Orchidaceae), a confirmed species for the flora of Bosnia and Herzegovina

Original Article

Abstract:

Orchis anthropophora (L.) All. (Orchidaceae) is a Mediterranean-Atlantic species distributed around the Mediterranean region and in central and western Europe. During a floristic survey in May 2022, this species was found at the Ravno (Trebimlja) locality (YH35 10×10 km UTM grid cell), which is the first confirmed record of this species on the territory of Bosnia and Herzegovina. The population was found in rocky grassland, on limestone, at an altitude of 423 m. Three individuals of *O. anthropophora* were found within an area of 100 m². Based on the IUCN Red List Categories and Criteria, *O. anthropophora* is estimated as Critically Endangered in Bosnia and Herzegovina.

Key words:

Orchis anthropophora, orchid, flora, Bosnia and Herzegovina, Balkan Peninsula

Apstrakt:

Orchis anthropophora (L.) All. (Orchidaceae), potvrđena vrsta za floru Bosne i Hercegovine

Orchis anthropophora (L.) All. (Orchidaceae) je mediteransko-atlantska vrsta rasprostranjena u mediteranskom regionu, centralnoj i zapadnoj Evropi. Florističkim istraživanjem sprovedenim u maju 2022. godine, ova vrsta je pronađena na lokalitetu Ravno (Trebimlja) (YH35 10×10 km² UTM kvadrat), što je prvi potvrđeni nalaz ove vrste na području Bosne i Hercegovine. Populacija je pronađena na travnom, karbonatnom kamenjaru, na nadmorskoj visini od 423 m. Tri individue vrste *O. anthropophora* zabeležene su na površini od 100 m². Prema kategorijama i kriterijumima IUCN Crvene liste, *O. anthropophora* je procenjena kao krajnje ugrožena vrsta Bosne i Hercegovine.

Ključne reči:

Orchis anthropophora, orhideja, flora, Bosna i Hercegovina, Balkansko poluostrvo

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Introduction

Orchis Tourn. ex L. is a genus in the orchid family (Orchidaceae), occurring mainly in Europe, North Africa, and temperate Asia, with the center of its diversity located in the Mediterranean region (Kretzschmar et al., 2007). This genus once included taxa of the genera *Anacamptis* Rich., *Dactylorhiza* Neck. ex Nevski and *Gymnadenia* R.No. in W.T. Aiton (Tyteca et al., 2012). Molecular analyses have confirmed the polyphyletic status of the genus *Orchis* s.l. and many taxa have been assigned to the

expanded genera *Anacamptis* Rich. and *Neotinea* Rchb.f. (Pridgeon et al., 1997; Bateman et al., 1997, 2003). The genus *Orchis* is divided into the subgenera *Orchis* s.str. and *Masculae* (Kretzschmar et al., 2007). There is also a division of this genus into two genera: *Orchis*, which includes all species and subspecies with a so-called ‘anthropomorphic’ lip (*O. militaris* group), and *Androrchis* Tyteca & Klein, which includes all remaining ‘non-anthropomorphic’ species and subspecies (*O. mascula* group) (Tyteca & Klein, 2008, 2009).

The genus *Orchis* consists of 23 species and



10 subspecies (WCSP, 2022). In Bosnia and Herzegovina, 12 taxa have been known until now: *Orchis anthropophora* (L.) All., *O. italica* Poir., *O. mascula* (L.) L. subsp. *mascula*, *O. mascula* (L.) L. subsp. *speciosa* (Mutel) Hegi, *O. militaris* L. subsp. *militaris*, *O. pallens* L., *O. pauciflora* Ten., *O. provincialis* Balb. ex Lam. & DC, *O. purpurea* Huds. subsp. *purpurea*, *O. quadripunctata* Cirillo ex Ten., *O. simia* Lam. subsp. *simia* and *O. spitzelii* Saut. ex W.D.J. Koch subsp. *spitzelii* (Šabanović et al., 2019, 2021; Milanović et al., 2022). However, in the current „Checklist of the Orchidaceae of Bosnia and Herzegovina” (Šabanović et al., 2021), the status of *O. anthropophora* in Bosnia and Herzegovina is marked ‘L’, which means that there are published data but no herbarium or photographic material confirming its finding.

This study reports the first confirmed record of *Orchis anthropophora* (L.) All. in Bosnia and Herzegovina. The objectives were: a) to provide its morphological description; b) to present its currently known distribution; c) to determine its habitat preferences; d) to determine its population size and e) to estimate the IUCN threat status of this species in Bosnia and Herzegovina.

Materials and Methods

During a floristic survey conducted in May 2022 in the area of Ravno (Trebimlja), data were collected on the morphology, distribution, habitat preferences, and population size of *Orchis anthropophora* (L.) All. The taxon was identified according to Delforge (2006) and Kretzschmar et al. (2007), while the nomenclature followed the World Checklist of Kew Gardens (WCSP 2022). One specimen of *O. anthropophora* was collected for documentation purposes and deposited in the Museum of the Franciscan Monastery in Visoko–Herbarium Collection of Fr. Ivo Radman. The present morphological description of the species is based on own observations and according to Baumann et al. (2006), Delforge (2006), Kretzschmar et al. (2007) and Fay & Taylor (2015). The values of the measured traits of the specimen from Bosnia and Herzegovina are marked with bold numbers.

The distribution of *O. anthropophora* in Bosnia and Herzegovina was mapped on a grid map with squares of 10×10 km, using the Universal Transverse Mercator (UTM) projection, grid zone 33T. Geographic coordinates (longitude, latitude) and altitude were recorded using a Garmin eTrex 30 handheld GPS device in the World Geodetic System 84 (WGS 84). The boundaries of the regions on the distribution map of this species are given according to Čadro et al. (2019). The vegetation units of

the site with *O. anthropophora* were determined according to Braun-Blanquet (1964), whereas the nomenclature follows Mucina et al. (2016). The habitat type was determined according to the EUNIS habitat classification (<http://eunis.eea.europa.eu/>). The geological substrate was determined in the field and from a 1:100,000 scale geologic map of the study area. Abundance of *O. anthropophora* was determined by counting the total number of individuals. For the estimation of the threat status of *O. anthropophora* in Bosnia and Herzegovina, IUCN (2012) Red List Categories and Criteria were applied.

Results

***Orchis anthropophora* (L.) All., Fl. Pedem. 2: 148 (1785)**

Synonyms: *Aceras anthropophorum* (L.) W.T.Aiton, *Arachnites anthropophorus* (L.) F.W.Schmidt, *Himantoglossum anthropophorum* (L.) Spreng., *Loroglossum anthropophorum* (L.) Rich., *Ophrys*



Fig. 1. *Orchis anthropophora* (L.) All. (Bosnia and Herzegovina, Ravno, Trebimlja, 09.05.2022, photo E. Šabanović)

anthropophora L., *Satyrium anthropophorum* (L.) Pers., *Serapias anthropophora* (L.) Jundz. (**Fig. 1**).

Morphological characteristics

Perennial plant, 10–36.1–40 (–50) cm high, with two ovoid tubers. The stem is glabrous and cylindrical. There are 5–6–10 leaves, oblong-lanceolate, shiny above, bluish-green, not spotted, distinctly veined, 5–7.9–15 cm long and 0.5–2.4–4 cm wide. Basal leaves are in a rosette, the middle leaves are erect, an upper leaf is bract-like, while 1–3 smaller sheathing leaves surround the lower part of the stem. The bracts are yellowish-green to pale green, acute, 5–7 mm long and 1.2–2.3 mm wide, shorter than the ovaries. The inflorescence is elongated, denser at the apex, 5–13.4–20 (–28) cm long, with 42–50 (–90) flowers. The flowers are ‘anthropomorphic’. Sepals are oval, 5–8 (–11) mm long and 2.5–5 mm wide, green with reddish margins, forming a dense cap. Petals are linear, hidden inside hood, 5–8 mm long and 1–1.7 mm wide, pale green. The lip is 3-lobed, without a spur, 10–12–16 mm long and 2.5–4 mm wide, dirty yellow, greenish yellow to orange with often darker reddish or brownish margins, with two shiny pale bosses at the base forming a nectariferous cup. The lateral lobes are linear and slender, forming the ‘arms’, 7 mm long. The middle lobe is 10 mm long, always longer than the lateral lobes and divided into two strap-shaped halves, forming the ‘legs’, sometimes separated by a tooth. The column is short, obtuse. The ovary is sessile, twisted.

Taxonomic notes

The studied taxon changed its taxonomic position, starting from *Ophrys anthropophora* L. in the broad definition of *Ophrys* L. Since then it has been classified in *Aceras* R.Br., *Arachnites* F.W.Schmidt, *Himantoglossum* Spreng., *Loroglossum* Rich., *Orchis* L., *Satyrium* L. and *Serapias* L. (Fay & Taylor, 2015). Since 1813, this taxon has been included in the monospecific genus *Aceras* R.Br. as *Aceras anthropophorum* (L.) R.Br. (Delforge, 2006). The only distinctive feature in which *Aceras* differs from *Orchis* is the absence of a spur. However, recent molecular studies have shown that this species actually belongs to the genus *Orchis* s.s., excluding species placed in *Anacamptis* Rich. and *Neotinea* Rehb.f. by Bateman et al. (1997). It is sister to the remainder of the genus (Bateman et al., 2003) and actually belongs to the *Orchis militaris* group and is one of the earliest differentiated species of the genus *Orchis*.

Flowering time

On May 9, 2022, three specimens of *O. anthropophora* at the Trebimlja site were at peak

flowering. This is consistent with the flowering time reported by Fay & Taylor (2015), who reported that this species flowers from March to July, with an optimal time from April to June. In Greece, the peak flowering time of the species is around mid-April (Tsiftsis & Antonopoulos, 2017).

General distribution

Orchis anthropophora is a Mediterranean-Atlantic species distributed around the Mediterranean region and in central and western Europe, occurring from England, Belgium and the Netherlands in the north to Morocco and Algeria in the south and from Spain and England in the west to Cyprus and Rhodes in the east (Delforge, 2006; Kretzschmar et al., 2007; Fay & Taylor, 2015; WCSP, 2022). It is widespread in western Europe, while rare in the eastern and northern parts of its range. According to published sources, it is distributed in Albania, Algeria, Austria, the Balearic Islands, Belgium, Corsica, Crete, Croatia, Cyprus, France, Germany, Great Britain, Greece, Italy, Lebanon-Syria, Montenegro, Morocco, the Netherlands, Portugal, Sardinia, Sicily, Spain, Switzerland, Tunisia, and Turkey (Delforge, 2006; Kretzschmar et al., 2007; Fay & Taylor, 2015; Tsiftsis & Antonopoulos, 2017; WCSP, 2022).

Distribution in Bosnia and Herzegovina

Orchis anthropophora was found in the southern region of Bosnia and Herzegovina: Ravno, Trebimlja (near the Trebimlja-Čepikuće border crossing, on both sides of the road), N 42.8757111°, E 17.8624806°, MGRS 33T YH35, 423 m a.s.l., rocky grassland, limestone, 09 May 2022; coll. E. Šabanović, det. E. Šabanović, V. Djordjević [the Museum of the Franciscan Monastery in Visoko – Herbarium Collection of Fr. Ivo Radman 00315; photo documentation: E. Šabanović] (**Fig. 2**).

The finding of *O. anthropophora* at the Trebimlja locality (near the Trebimlja-Čepikuće border crossing) is the first confirmed record of this species on the territory of Bosnia and Herzegovina, representing the first record of this species in MGRS 33T YH35 10×10 km UTM grid cell and southern region of Bosnia and Herzegovina. Previously, this species was recorded in Bosnia and Herzegovina only by Protić (1902: 29), who listed the species under the name *Aceras anthropophora* R.Br. and found it at the two localities (Zelengora – UTM CP00 and Prijevor – UTM CN19; **Fig. 2**). These records have been mentioned for Bosnia and Herzegovina later by Hayek (1933: 403) and Šilić (1996: 360), but firstly by Beck-Mannagetta (1904: 512), who considered these records very doubtful. Moreover, this researcher did not collect the plants during his botanical excursion in the mountains in SE Bosnia

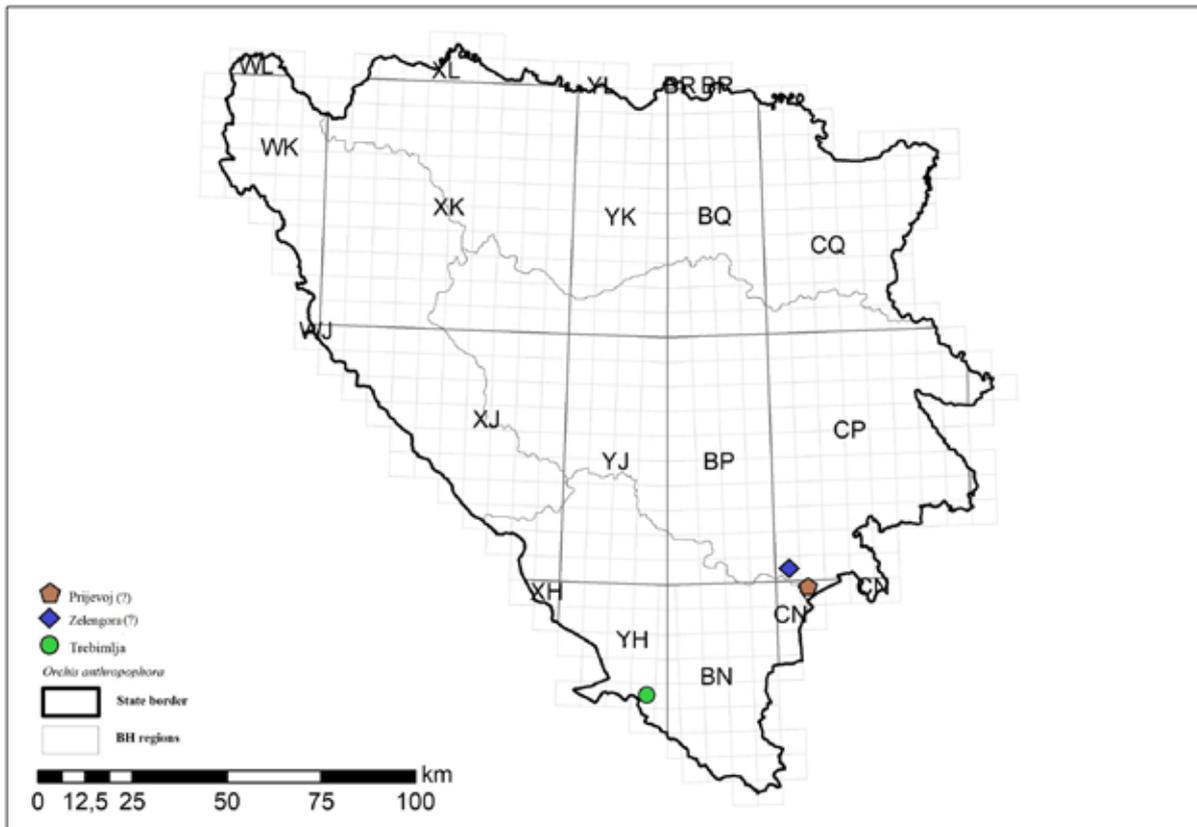


Fig. 2. Distribution of *Orchis anthropophora* (L.) All. in Bosnia and Herzegovina



Fig. 3. Habitat of *Orchis anthropophora* (L.) All. (Bosnia and Herzegovina, Ravno, Trebinjka, 09.05.2022, photo E. Šabanović)

(Fukarek, 1969), and there is no herbarium evidence or photographic material confirming these findings. Since these records are located deep in the Dinaric Mountains, outside the climatic conditions and habitats suitable for this species, they must be treated as at least very doubtful or even erroneous (**Fig. 2**).

Habitat and ecology

Orchis anthropophora was found on the locality Trebimlja in submediterranean rocky grassland of the alliance *Chrysopogono grylli-Koelerion splendidis* Horvatić 1973 within the ordo *Scorzoneretalia villosae* Kovačević 1959, partially overgrown by some individuals of *Fraxinus ornus* L. and *Pistacia terebinthus* L (**Fig. 3**). The following accompanying taxa were recorded at the site with *O. anthropophora*: *Brachypodium retusum* (Pers.) P. Beauv., *Koeleria splendens* C. Presl (aggr.), *Achnatherum bromoides* (L.) P. Beauv., *Micromeria juliana* (L.) Benth. ex Rchb., *Salvia officinalis* L., *Euphorbia spinosa* L., *Tanacetum cinerariifolium* (Trevir.) Sch. Bip., *Genista sylvestris* subsp. *dalmatica* (Bartl.) H. Lindb., *Inula verbascifolia* (Willd.) Hausskn. and others. According to the EUNIS classification, this habitat type belongs to the Eastern sub-Mediterranean dry grasslands (E1.55 code; <https://eunis.eea.europa.eu/habitats/997>). The population of *O. anthropophora* was recorded on limestone, under full light regime, at an altitude of 423 m. The habitat preferences of this orchid recorded in Bosnia and Herzegovina correspond to its habitat preferences and ecological requirements in other parts of its range. Namely, many authors pointed out that this species occurs on calcareous substrates, in full sun to mid-shade conditions, in xerophilous short grasslands, garrigue, scrub, forest edges, and more rarely in open forest habitats (Delforge, 2006; Kretschmar et al., 2007; Fay & Taylor, 2015; Tsiftsis & Antonopoulos, 2017). This species has been found on soils with pH ranging from 5.5 to 8.6, but generally prefers alkaline soils (Sundermann, 1980; Wallenwein & Saad, 2000; Vakhrameeva et al., 2008; Djordjević & Tsiftsis, 2022). The recorded altitudinal range of this species from other countries is between 0 m and 1,700 m (Baumann et al., 2006; Delforge, 2006; Tsiftsis & Antonopoulos, 2017).

Population size

Only three individuals of *O. anthropophora* were found within an area of 100 m². Therefore, its population size falls within the IUCN category of fewer than 50 mature individuals.

Conservation status

Orchis anthropophora is protected by the Convention on International Trade in Endangered Species

of Wild Fauna and Flora (CITES). The current status of this species in Bosnia and Herzegovina is estimated as Critically Endangered – **CR D**. The IUCN status of the species in other countries is as follows: Regionally Extinct in Cyprus, Critically Endangered in Austria and Bavaria, Endangered in the United Kingdom and Luxembourg, Vulnerable in Switzerland, Near Threatened in Croatia and Last Concern in Spain and France (Kull et al., 2016). Monitoring of this species is needed to assess potential threats that may affect the species (e.g. road construction and habitat succession) and to monitor population dynamics.

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