

NEW HABITAT DATA OF THE GREEN-WINGED ORCHID (*ANACAMPTIS MORIO* L.) LOCATED IN THE SURROUNDINGS OF EGER, HUNGARY. FURTHER DATA ON THIS PROTECTED SPECIES OF THE FOOTHILLS OF THE BÜKK MOUNTAINS

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Research article, received 9 May 2023, accepted 7 August 2023

Abstract

In 2022, we identified two new habitats of the protected green-winged orchid (*Anacamptis morio* L.) in the Bükk Mountains, in the surroundings of the city of Eger. One of the habitats is in the southwestern steppe meadow of the protected Nagy Eged Hill, while the other one is on a private plot near the village of Szarvaskő. A total of 18 blooming individuals were counted in the two sites. In the lower part of the steppe, at the foot of the protected Nagy-Eged Hill (47°97'56"N and 20°34'51"E), we found one well-developed green-winged orchid already in its flowering stage. It stood out with its smaller size and different flower colour from the lady orchids (*Orchis purpurea* HUDS.) widespread on the slopes of the mountain. Unfortunately, no other roots were found during our survey. The blooming flowers that make up the inflorescence were of the most common dark purple-red color. At the other site, further 17 individuals of the green-winged orchid were identified in a private garden (3,500 m²) in the outskirts of the village of Szarvaskő (47°92'02"N and 20°40'58"E). Most of the garden is covered by regularly mowed lawn. All of the detected orchids were in bloom and appeared scattered throughout the plot. Five larger plants grew at a great distance from one another, while 12 small ones (height: ≤10 cm) developed in a bunch. We had been aware of the presence of the protected orchid species on the plot since 2017, but before 2022 only a maximum of 3 flowering individuals appeared in one specific area of the plot each year. Floristic papers have not reported the occurrence of this species either in Nagy-Eged or in Szarvaskő so far.

Keywords: floristic data, Nagy Eged Hill, southwestern exposure, steppe meadow, Szarvaskő

INTRODUCTION

The green-winged orchid (*Anacamptis morio* L.; syn. *Orchis morio* L.; Bateman et al., 1997) is a spring-flowering bee-pollinated orchid (Johnson et al. 2003). It had been included in the *Orchis* genus until phylogenetic studies based on DNA sequences demonstrated a closer relationship with the *Anacamptis* genus (Bateman et al., 1997). As an element of the European flora, this species is widespread throughout Europe: its range covers Scandinavia, Central and Atlantic Europe and the Mediterranean Region (Evans, 2011; Gaponenko and Ivannikov, 2013; Stroh, 2007 Paušič and Kaligarič, 2015). However, during the last decades, in most European countries it has become a critically endangered species (Shevchyk et al., 2019). Populations of this orchid species have become almost extinct in several countries, for instance in Austria, in Romania, in Slovakia, in Slovenia, in Serbia, in Croatia, in Ukraine and in Hungary (Jacquemyn et al., 2005; Kull and Hutchings, 2006; El-Heliebi, 2015). The Euro+Med PlantBase shows that in Hungary, the foretype of the species can be found even today (Euro+Med, 2023). The green-winged orchid is listed as near threatened in the IUCN Red List of Threatened Species (Rankou, 2011).

The green-winged orchid is a species found primarily in open spaces, but it grows in various habitats. The species prefers damp and wet conditions in the habitats; however, it has also been found in dry soil. This orchid species prefers the following conditions: fresh, forest-meadow biotopes with moderately airy, dry clay or wet sandy soils, a great amount of wetness in the rhizosphere with acidic (pH=5.5-6.5) soils, a high concentration of salt (150-200 mg/l), an insignificant content of carbonates, soils that are relatively poor in mineral nitrogen (0.2-0.3 %); furthermore, it occurs from semi-shaded to fully sunlit sites and in general prefers subarid air and a semi-continental climate with moderate winters (Shevchyk et al., 2019).

In Hungary, the green-winged orchid is a widespread species, as several localities have been found both in the western and in the eastern parts of the country. In Hungary, it is a lowland and montane species, which, therefore, can be found most commonly in the lowlands, as well as in hilly and low mountainous areas. It grows in both acidic and basic soils, but generally avoids soils with neutral pH. It can also be found in pastures, mowed fields, mountainous areas, sandy and marshy meadows, saline and sandy steppes, dry grasslands, grassy slopes, and open

Scots pine forests. A Farkas (1999) mentioned several documented habitats of the species: the North Hungarian Mountains, the Transdanubian Mountains, the Mecsek, the Villány Mountains, the Zselic Hills, the Alpokalja region, the Dráva Plain, the Little Hungarian Plain and some parts of the Great Hungarian Plain. Therefore, one can say that this orchid is a common species in Hungary and is recorded also in all the floristic map grids around the city of Eger (Bartha et al., 2023). Consequently, currently it is not rare in Hungary, as its estimated population is over one million plants (Molnár, 2011).

The orchid under study typically produces one inflorescence with approximately 8-20 flowers, each with two stamens. The green-winged orchid is self-compatible, but depends on pollinators for fruit set (Nilsson, 1984). Plants grow to 40 cm in height; the average height is between 13 and 35 cm. The loose inflorescence is of various colours, mainly purple but ranging from snow white to pink and deep purple. In Hungary, the middle day of its flowering usually falls on May 8. The most effective pollinators of the species are the workers of the honey bee (*Apis mellifera* L.); however, in the Nyírség region it also reproduces vegetatively (Molnár, 2011).

The seedling establishment and seed germination in nature are limitedly known, but the green-winged orchid appears to be able to colonise new or recently disturbed grasslands (Stroh, 2007). Nowadays, intensive land use has a significant impact on the area of distribution of this taxon. With the decline of grazing and reaping, a further decrease in the number of stocks and the individual's density, already observed in the last two decades, is expected. So far, it has been found in a total of 777 floristic map grids in Hungary. It has been detected in 683 grids since 1990; the rate of the decline is 12 % (Molnár, 2011). The green-winged orchid is a protected species, with an ecological value of 10000 HUF (66/2015. (X. 26.) FM regulations) in Hungary.

The aim of this study are (1) to present new habitats of the protected orchid species, (2) and to verify the

existence of this species in a highly disturbed habitat and a private garden in the region.

METHODS

Field sampling was carried out in Hungary, in Heves County, in the Bükk Mountains in the surroundings of Eger and Szarvaskő village (Fig. 1). We used the latest version of Google Map to show the distribution of the new habitats of the green-winged orchid (GoogleEarth, 2023). The field survey was performed on 01 and 02 May 2022. On these days, a few individuals of the species were identified without a targeted search. We completed the enumeration with additional data from the literature and some herbaria.

The first plot, the Nagy Eged Hill (536 m) has protected status, and it is a famous wine producing site, with the highest altitude terroir. It is located on the southwestern edge of the Southern Bükk Mountains (Dobos et al., 2014).

The second plot is located in the outskirts of Szarvaskő called Nyugodó slope. The plot is a private garden with regular maintenance and most of the garden consists of regularly mowed lawn.

RESULTS

In total, 18 plants were recorded in the two different sites in 2022. At the foothills of the Nagy Eged Hill, in the lower part of a steppe meadow, right along a tourist route, a well-developed green-winged orchid (*Anacamptis morio* L.) individual in its flowering stage was identified (Fig. 2A). On the protected mountain, it stood out with its smaller size and different flower color from the lady orchids (*Orchis purpurea* HUDS.) more widespread in the area. No further individuals were found in the area. The GPS coordinates of the individual are: 47°97'56"N and 20°34'51"E. The flowers that make up the inflorescence were of the most common dark purple-red color.

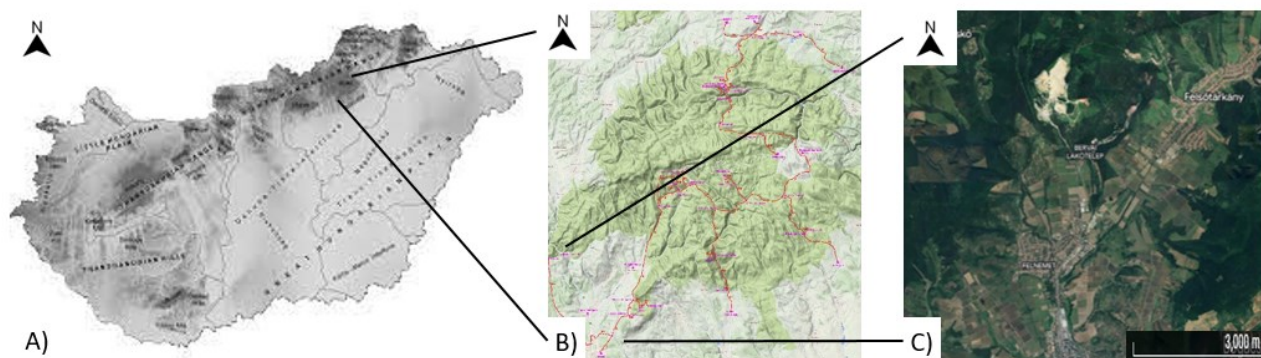


Fig. 1 (A) Map of the regions of Hungary 1:500000 (Kercsmár (ed.) 2015), (B) the Bükk Mountains 1:40000 (bukkhegyseg.hu 2015), and (C) the area of Szarvaskő and Nagy-Eged (GoogleEarth 2023)

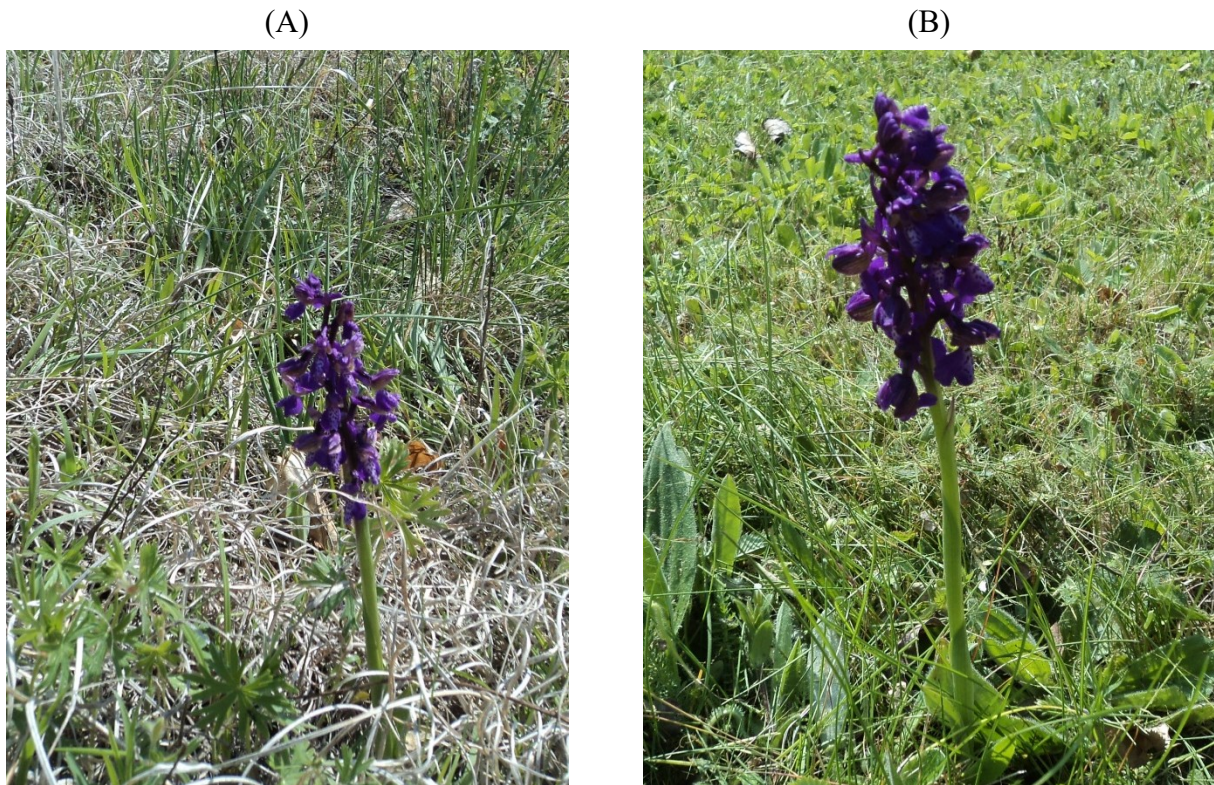


Fig.2 (A) The green-winged orchid on the Nagy Eged Hill on 05.01.2022 and (B) the green-winged orchid in Szarvaskő on 05.02.2022

In the outskirts of Szarvaskő called Nyugodó slope, in a private garden (3,500 m²), located in Nyírfá Street, we discovered 17 flower stems of the green-winged orchid (Fig. 2B). The GPS coordinates of this habitat are: 47°92'02"N and 20°40'58"E. The plot has a southeast exposure and it is sloping towards north. All of the identified orchid plants were in bloom and appeared scattered throughout the central part of the plot. As for the specimens, 5 larger plants grew at a great distance from one another, while 12 small ones (height: ≤ 10 cm), developed in a bunch. We had been aware of the presence of the protected orchid species on the plot since 2017, but before 2022 only a maximum of three flowering individuals appeared in a specific, central area of the plot each year.

DISCUSSION

We collected and analyzed the data found in the literature and data from various herbaria to find relevant information on the habitats occupied by the green-winged orchid. We focused on the settlements of Eger and Szarvaskő, in the Bükk Mountains (Fig. 3). Vojtkó (2001) listed several habitats of the species around Eger and Felnémet; for instance, near the city of Eger at the Rókafarm, Cakó Top, Cigléd Side and Kerek Hill. Vojtkó (2001) mentioned the following places in Felnémet: Gazsi Bog, Ostoros Valley and Pásztor Valley. However, he did not connect this species to Szarvaskő.

Pifkó and Barina (2004) reported the presence of the plant in 5 different points of Eger. They are the following: Cakó Land, Mész Hill, Nyerges Hill, the bog of the Nyerges Hill and the Tó Bog. The settlement of Szarvaskő does not belong to the Foothills of the Bükk Mountains, so naturally, the floristic data on the village were not part of this botanical collection.

Schmotzer's (1997) floristic data on the Southern and Northern Bükk Mountains did not contain data on the distribution of the green-winged orchid. The same paper mentioned Agárdi [Vrabélyi (ap. Kerner 1875)] and Huta Meadow [Máthé (ap. Soó 1943)], both of which are located near Eger, as documented habitats of the plant species; as well as collected relevant data from herbaria on the city of Eger, at Agárdi [Vrabélyi 1868.5.6. (EGR = the Herbarium of Eszterházy Károly Catholic University in Eger)] and the Pap Mountain (Vrabélyi 1870.5.18.). Schmotzer's (2015) description on the flora of the Foothills of the Bükk Mountains included 5470 botanical data and described a few habitats, such as Agyagos, the Császár Hill and the top of the Kertész Valley, as sites featuring the orchid in the vicinity of Eger. The publication, which is relevant in several respects, notes that the species appears also in cemeteries in Egerszalók and Demjén villages, close to Eger. Also, data on the distribution of the forest, forest-steppe and steppe species of the flora of the Heves Borsodi Plain contained relevant data only regarding the Lógó Bank near Kerecsend (Schmotzer, 2019).

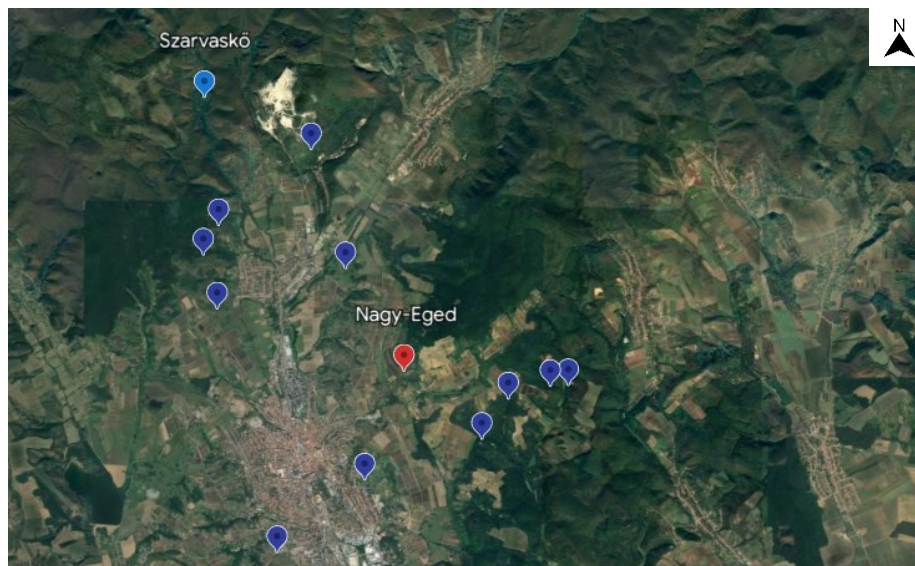


Fig.3 The identified new habitats (with names and light blue and red placemarks), and data from literature and herbaria (with blue placemarks) of the green-winged orchid (*Anacamptis morio* L.) in the surroundings of Eger, Hungary (background: GoogleEarth, 2023).

CONCLUSIONS

In 2022, two new habitats of the protected green-winged orchid were identified in the surroundings of the city of Eger. One of them is the southwestern steppe meadow of the protected Nagy Eged Hill, while the other is a private plot towards the village of Szarvaskő. The stems were all in bloom and appeared scattered throughout the plot. Floristic works on Nagy-Eged and on the southern part of Szarvaskő – especially on managed private plot – have not reported the occurrence of this species so far.

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