ПРИЛОЗИ, Одделение за природно-математички и биотехнички науки, МАНУ, том **44**, бр. 1–2, стр. xx–xx (2023)
CONTRIBUTIONS, Section of Natural, Mathematical and Biotechnical Sciences, MASA, Vol. **44,** No. 1–2, pp. xx–xx (2023)

Received: November 19, 2024
Accepted: December 28, 2024

ISSN 1857–9027
e-ISSN 1857–9949
UDC:
DOI: 10.20903/masa/nmbsci.2023.44.50

Original scientific paper

DIAMOND ORCHID, *OPHRYS REINHOLDII* SPRUNER EX FLEISCHM. (*ORCHIDACEAE*) IN THE FLORA OF THE REPUBLIC OF NORTH MACEDONIA

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Ophrys reinholdii subsp. *reinholdii* Spruner ex Fleischm. (commonly known as the Diamond Orchid or Reinhold's Bee-orchid) from the family *Orchidaceae* was observed on Galičica Mountain, near the town of Ohrid. This marks the first confirmed record of the species in the flora of North Macedonia. The article presents data on its distribution and habitat preferences.

Key words: *Ophrys reinholdii* subsp. *reinholdii* Spruner ex Fleischm. (Diamond Orchid); North Macedonia; habitat; distribution

INTRODUCTION

The genus *Ophrys* in the Republic of North Macedonia is represented by six confirmed taxa: *Ophrys insectifera* L., *Ophrys apifera* Huds., *Ophrys scolopax* subsp. *cornuta* (Steven) E. G. Camus, *Ophrys sphegodes* subsp. *sphegodes* Mill., *Ophrys sphegodes* subsp. *mammosa* (Desf.) Soó ex E. Nelson, and *Ophrys helenae* Renz (*Ophrys sphegodes* subsp. *helenae* (Renz) Soó & D. M. Moore) [1, 2]. *Ophrys reinholdii* Spruner ex Fleischm. was previously mentioned in reference to the southern parts of North Macedonia, but no precise data were provided [3].

Ophrys reinholdii belongs to the "reinholdii" species group [4]. According to POWO [4], this group comprises three species: *O. reinholdii* Spruner ex Fleischm., *O. cilicica* Schltr., and *O. cretica* (Vierh.) E. Nelson. Within this concept, *O. reinholdii* is represented by two subspecies: *Ophrys reinholdii* subsp. *reinholdii* Spruner ex Fleischm. and *O. reinholdii* subsp. *straussii* (H. Fleischm. & Bornm.) E. Nelson. Conversely, the "splitters" concept expands the group to include eight species [5], four of which are considered synonyms and one as a subspecies under POWO [4]. Notably, *Ophrys reinhardiorum* Paulus is regarded as a synonym of the nominal subspecies.
The nominal subspecies, *Ophrys reinholdii* subsp. *reinholdii*, is distributed in Albania, Greece, the Ionian and Aegean Islands, Bulgaria, and southwestern Turkey [5, 6]. Its counterpart, *O. reinholdii* subsp. *straussii*, is found from southern Turkey to Syria, Iraq, and Iran [6].

The karyotype of *O. reinholdii* consists of 36 chromosomes, 12 of which possess secondary constrictions [7].

In May 2024, the first confirmed locality of *Ophrys reinholdii* subsp. *reinholdii* was discovered on Galičica Mountain. Consequently, the aim of this paper is to present the first confirmed record of *Ophrys reinholdii* in North Macedonia and provide notes on its habitat and distribution.

MATERIALS AND METHODS

A single plant of *Ophrys reinholdii* subsp. *reinholdii* was discovered by Slobodan Hristovski during his regular visits to Galičica Mountain, aimed at searching for various orchid species in the

spring of 2024. The individual plant was found on May 9, 2024.

The same specimen was observed again on May 11, 2024, by Slavčo Hristovski, Slobodan Hristovski, and Marija Hristovska. On the same day, a list of plant species in the grassland community was compiled, and the number of different orchid species was recorded. Additionally, GPS coordinates, altitude, and photographs of the plant and its habitat were taken.

The study site is a calcareous grassland covering an area of 2,085 m².

RESULTS AND DISCUSSION

The individual of *Ophrys reinholdii* was observed at the following locality:

- **Galičica, Petrina Vršek**: N 41.1025633°, E 20.8224733°, 835 m a.s.l., calcareous xeric grassland, May 22, 2021; observed by Slobodan Hristovski, Marija Hristovska, and Slavčo Hristovski (photographed, not collected).

The specimen from Galičica had six flowers in the inflorescence, five of which were in the fruiting phase, while the most apical flower was in the blooming phase. The speculum exhibited two distinct basolateral areas on the lower lip, which were not connected. It formed an irregular pentagon with a brownish central area and a thick white border. The appendage of the lower lip was clearly visible and yellow-green. The petals were ovate, light pink with a greenish transverse line, while the sepals were triangular and olive-green. The pseudoeyes were pink.

As with most species of the genus *Ophrys*, the flowers of *Ophrys reinholdii* are pollinated through sexual deception, specifically by pseudocopulation. The primary pollinators are melectine bees. Delforge [5] identified *Melecta (Eupavlovskia) obscura* Friese, 1895, and *Melecta (Eupavlovskia) funeraria* Smith, 1854, as pollinators of *Ophrys reinholdii*, including late-flowering populations (referred to as *O. reinhardiorum*). Both bee species have been recorded in North Macedonia [8, 9].

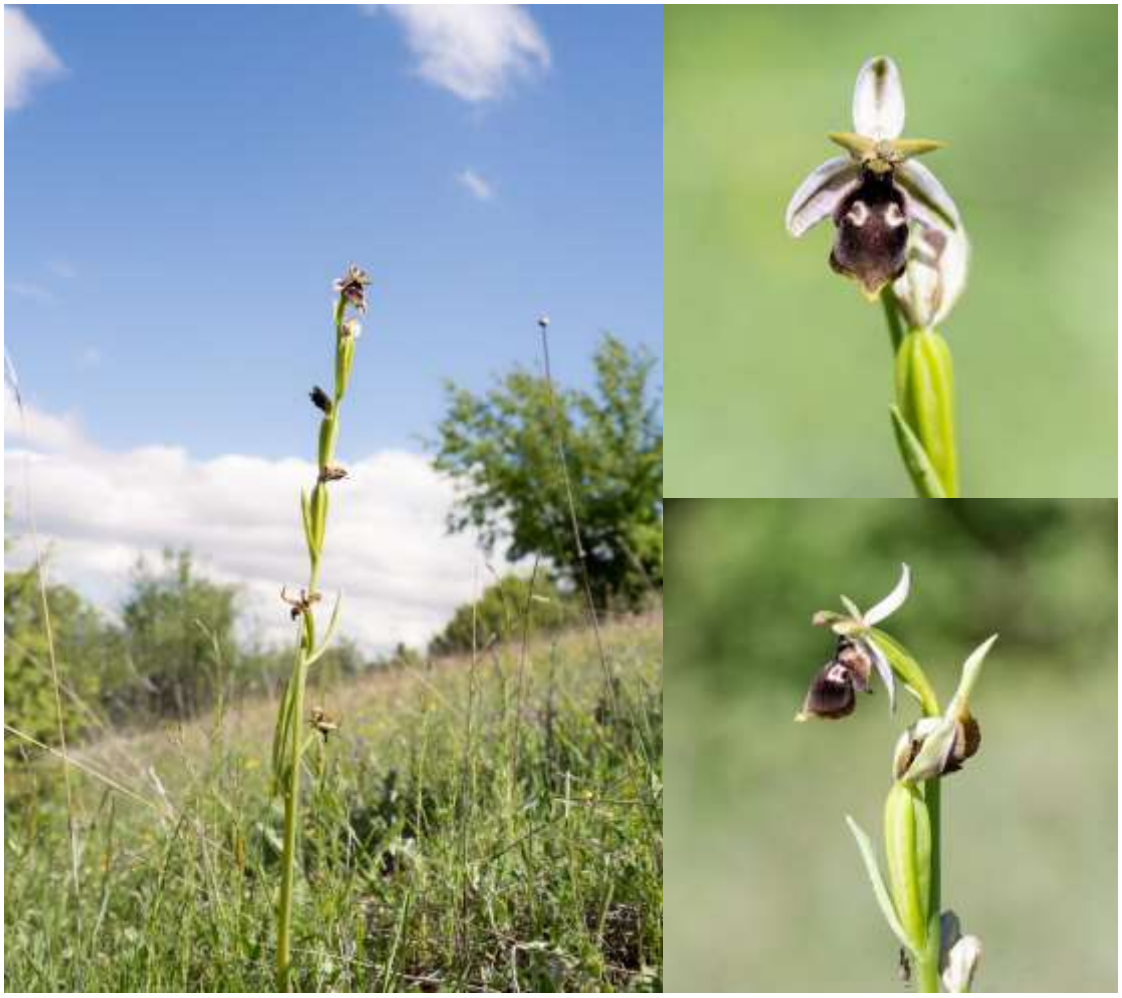

Figure 1. Diamond Orchid, *Ophrys reinholdii* Spruner ex Fleischm., Galičica, 11.05.2024 (photo: S. Hristovski)

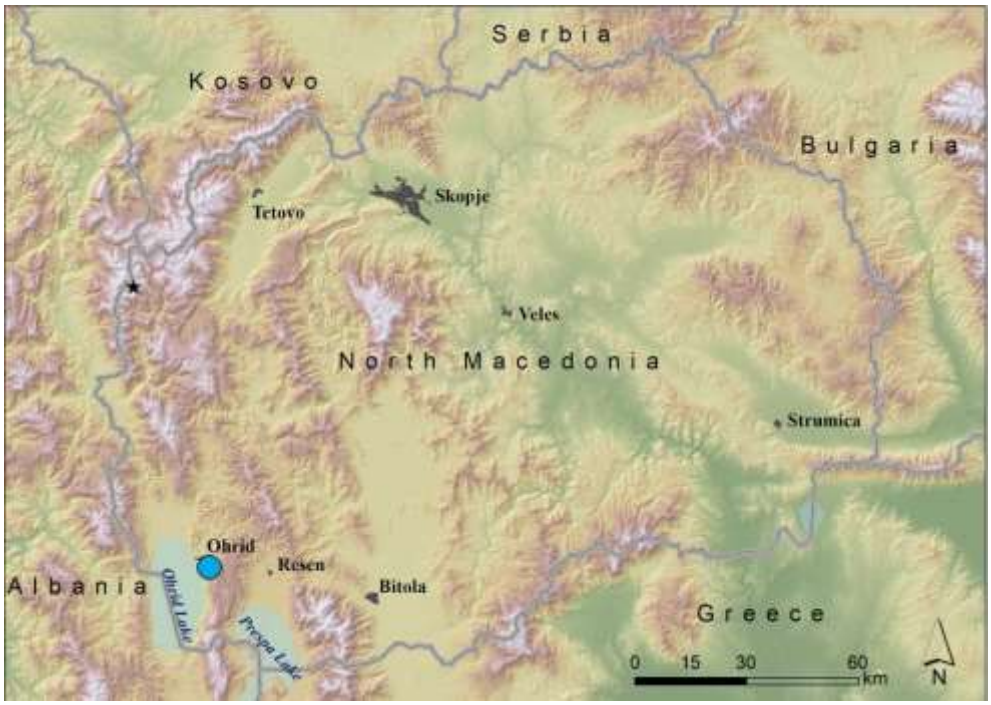

Figure 2. Distribution of *Ophrys reinholdii* Spruner ex Fleischm. in the Republic of North Macedonia

HABITAT

Garigue, open pine, oak, and hornbeam forests, olive groves, roadsides, and banks on dry to moist calcareous soils in full sun to light shade are the preferred habitats of the species, ranging from sea level to 1,000 m a.s.l. [3, 10].

The specimen on Galičica Mountain was found in the community *Siderito montonae-Trifolietum dalmaticae* Ćušterevska, 2016, belonging to the alliance *Saturejo-Thymion* Micevski 1971, order *Astragalo onobrychidis-Potentilletalia* Micevski 1971, and class *Festuco-Brometea* Br.-Bl. et Tx. ex Soó 1947 [11]. Dominant plant species in this community included *Clinopodium acinos*, *Helianthemum nummularium*, *Medicago rigidula*, *Crepis rubra*, *Euphorbia myrsinites*, *Potentilla* sp., and *Convolvulus althaeoides* subsp. *elegantissimus*. Additional accompanying species were: *Ajuga chamaepytis*, *Asphodeline lutea*, *Erysimum diffusum*, *Cerastium brachypetalum* subsp. *roeseri*, *Juniperus oxycedrus*, *Prunus webbii*, *Verbascum* sp., *Pilosella piloselloides*, *Lathyrus cicera*, *Clematis flammula*, *Myosotis arvensis*, *Poa pratensis*, *Poa bulbosa*, *Phleum montanum*, *Iris attica*, *Onobrychis alba*.

Several orchid taxa were also present at the same locality, including:

- *Himantoglossum calcaratum* subsp. *rumelicum* (H. Baumann & R. Lorenz) R. Lorenz (5 specimens),
- *Ophrys sphegodes* subsp. *sphegodes* Mill. (54 specimens),
- *Anacamptis morio* (L.) R. M. Bateman, Pridgeon & M.W. Chase (2 specimens), and
- *Orchis purpurea* Huds. (20 specimens).

The number of specimens was calculated across the total surface area of the studied grassland, measuring 2,085 m².

The habitat is classified as *E1.2 - Perennial calcareous grassland and basic steppes* according to the EUNIS classification [12]. The corresponding habitat under the EU Habitats Directive [13] is *Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)*. This habitat is considered a priority due to its importance as an orchid site, hosting several orchid species, including the single known locality of *Ophrys reinholdii* subsp. *reinholdii* in North Macedonia.

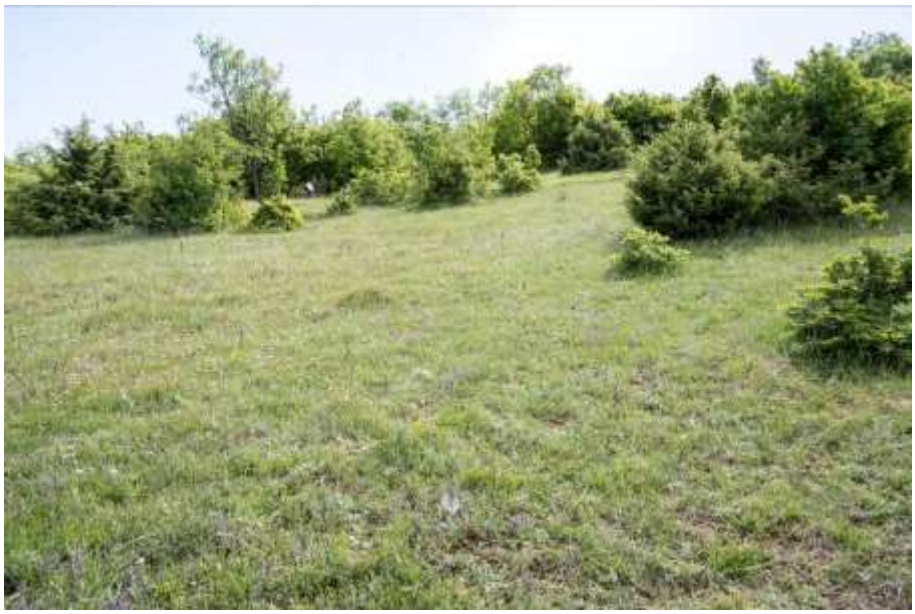

Figure 3. Habitat of *Ophrys reinholdii* Spruner ex Fleischm., Galičica, 11.05.2024 (photo: S. Hristovski)

DISTRIBUTION AND THREAT STATUS

Ophrys reinholdii subsp. *reinholdii* is distributed across the southern Balkans (Albania, Greece, Bulgaria, North Macedonia) and southwestern Turkey [10]. Its primary distribution area is in Greece, where it is recorded throughout the mainland, extending to the border with North Macedonia, as well as on numerous Ionian and Aegean islands [14, 15]. In Albania, it is found in the southernmost regions, at altitudes ranging between 50 and 500 m [16]. In Bulgaria, it is known from Strandzha Nature Park, in southeastern Bulgaria [3].

The species is listed in Appendix II of the CITES Convention, which includes species not necessarily threatened with extinction but for which trade must be controlled to prevent exploitation incompatible with their survival [17].

Globally, *Ophrys reinholdii* is assessed as *Least Concern* on the IUCN Red List of Threatened Species [18]. However, its status varies across regions. In Bulgaria, it is documented from three locations, each containing 20–60 individuals over an area of less than 0.2 ha, leading to its classification as *Endangered* (EN C2a(i); D) [19]. In Greece, the species is not considered threatened [20]. In Albania, while *Ophrys reinholdii* subsp. *reinholdii* is not separately assessed, all *Ophrys* species are collectively categorized as *Vulnerable* (VU A1b) [21].

In North Macedonia, *Ophrys reinholdii* subsp. *reinholdii* is confined to a single locality within Galičica National Park, specifically in the zone designated for sustainable use. Only one individual has been recorded to date. Due to the lack of targeted research and reliable data, an accurate assessment of its conservation status in North Macedonia is currently not possible. Nevertheless, the species can be considered extremely rare, with only a single incidental record.

Further research is necessary to locate additional individuals or populations on Galičica Mountain and in the southern regions of North Macedonia. This would provide a better understanding of the species' distribution and conservation requirements.

Acknowledgments. I would like to express my heartfelt gratitude to my father, Slobodan Hristovski, for discovering this remarkable species, driven by his love for nature and curiosity. I also extend my thanks to my sister, Marija Hristovska, for her invaluable assistance during the field research. Additionally, I am grateful to the reviewers of this manuscript, Mitko Kostadinovski and Spyros Tsiftsis, for their valuable suggestions and insights.

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ДИЈАМАНТСКА ОРХИДЕЈА, *OPHRYS REINHOLDII* SPRUNER EX FLEISCHM. (*ORCHIDACEAE*) ВО ФЛОРАТА НА РЕПУБЛИКА СЕВЕРНА МАКЕДОНИЈА

Славчо Христовски

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Ophrys reinholdii subsp. *reinholdii* Spruner ex Fleischm. (Diamond Orchid) од фамилијата *Orchidaceae* беше забележан на планината Галичица, над градот Охрид. Ова е прв потврден податок за присуството на дијамантската пчеличка во флората на Северна Македонија. Во трудот е прикажано распространувањето на видот, како и податоци за неговото живеалиште.

Клучни зборови: *Ophrys reinholdii* subsp. *reinholdii* Spruner ex Fleischm. (дијамантска пчеличка или рајнхолдова пчеличка); Северна Македонија; живеалиште; распространување