

Discovery of new stations of *Ophrys omegaifera* subsp. *Hayekii* and *Orchis purpurea* in the harbil region (Setif, Algeria)

Descoberta de novas estações da *Ophrys omegaifera* SUBSP. HAYEKII e *Orchis purpurea* na região de harbil (Setif, Argélia)

Descubrimiento de nuevas estaciones de *Ophrys omegaifera* subsp. *hayekii* y *Orchis purpurea* en la región de harbil (Setif, Argelia)

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ABSTRACT

Botanical surveys conducted in the spring of 2024 in the Setif province in northeastern Algeria led to the rediscovery of *Ophrys omegaifera* subsp. *hayekii* (H. Fleischm. & Soó) Kreutz and *Orchis purpurea* Huds. in the Harbil region. Ecological assessments of these species are also provided. This rediscovery enriches the Algerian orchid flora, particularly in the Setif region.

Keywords: *Orchidaceae*, *Ophrys omegaifera* subsp. *hayekii*, *Orchis purpurea*, north Africa, Algeria.

RESUMO

Pesquisas botânicas realizadas na primavera de 2024 na província de Setif, no nordeste da Argélia, levaram à redescoberta de *Ophrys omegaifera* subsp. *hayekii* (H. Fleischm. & Soó) Kreutz e *Orchis purpurea* Huds. na região de Harbil. Avaliações ecológicas destas espécies também são fornecidas. Esta redescoberta enriquece a flora de orquídeas argelina, particularmente na região de Setif.

Palavras-chave: *Orchidaceae*, *Ophrys omegaifera* subsp. *hayekii*, *Orchis purpurea*, norte da África, Argélia.

RESUMEN

Los estudios botánicos realizados en la primavera de 2024 en la provincia de Sétif, en el noreste de Argelia, llevaron al redescubrimiento de *Ophrys omegaifera* subsp. *hayekii* (H. Fleischm. & Soó) Kreutz y *Orchis purpurea* Huds. en la región de Harbil. También se proporcionan evaluaciones ecológicas de estas especies. Este redescubrimiento enriquece la flora de orquídeas argelina, especialmente en la región de Sétif.

Palabras clave: Orchidaceae, *Ophrys omegaifera* subsp. *hayekii*, *Orchis purpurea*, norte de África, Argelia.

1 INTRODUCTION

The Orchidaceae family is one of the most diverse families of seed plants, comprising approximately 880 genera and over 25,000 species worldwide (Cribb *et al.*, 2003). *Ophrys omegaifera* subsp. *hayekii*, also known as *Ophrys admirable* de Monsieur Von Hayek, was first described by (Geniez and Melki, 1991) in Sicily, Italy. This species is sometimes associated with the Tunisian taxon *Ophrys hayekii* H. Fleischm & Soó and can be considered either Sicilian-Tunisian, possibly extinct in Tunisia for over 100 years, or strictly endemic to Sicily (Rebbas and Vela, 2008).

In Algeria, *Ophrys omegaifera* subsp. *hayekii* was first discovered in Little Kabylia Chemini, Bejaia by (Rebbas and Vela, 2008). Subsequent research has led to the discovery and rediscovery of several new stations in Algeria over the past few years (Rebbas and Vela, 2013; Kreutz *et al.*, 2013-2014; Rebbas and Bounar, 2014; Boukehili *et al.*, 2018; Babali *et al.*, 2018; Hamel *et al.*, 2018; Madoui *et al.*, 2017; Boutabia *et al.*, 2019; Martin *et al.*, 2020; Madoui and Vela, 2020; Rebbas *et al.*, 2021; Haddad *et al.*, 2021; Ben Si Said and Rebbas, 2022). In Tunisia, this beautiful *Ophrys* was originally found at Djebel Bou Kornine (Baumann *et al.*, 2006) and has often been compared to *Ophrys atlantica* Munby, even being classified as a subspecies: *O. atlantica* subsp. *hayekii* H. Fleischm. & Soó. This taxon was discovered in 2008 south of Nefza (northwestern Tunisia) (Martin, 2008; Martin *et al.*, 2015).

Maire (1960) reported that *Orchis purpurea* is found under the cedar forests of Djebel S'gag in the Aurès. Quezel and Santa (1962-1963) noted it as rare in the Aures. Recently, this orchid has been observed east of the S'gag forest at Tafrent in Djebel Chelia (Beghami *et al.*, 2015) and north of Setif (Madoui *et al.*, 2017; Madoui and Vela, 2020). It has also been reported in Ain Bessem (Bouira), southwest of Djurdjura (Diab Djeflal and Douar 2019).

Until now, these two species had not been reported in the northwestern part of Setif due to a lack of exploration and botanical inventory (Fig. 1). A comprehensive orchid inventory along the M'sila - Bordj Bou Arreridj - Setif transect is needed. This study aims to document the rediscovery of *Ophrys omegaifera* subsp. *hayekii* and *Orchis purpurea* in the Harbil region (northwest of the Setif province)

2 MATERIAL AND METHODS

To inventory endemic orchid species along the transect from M'sila to Setif, we conducted botanical field surveys using a random sampling approach. This method allowed to discover new orchid stations in the region.

Orchids were identified based on classical morphological characteristics as described by (Maire, 1960; Quezel and Santa 1962). These identifications were further verified and updated using the works of (De Belair *et al.*, 2005; Rebbas and Vela, 2008-2013; Dobignard and Chatelain, 2010; El Mokni *et al.*, 2012; Kreutz *et al.*, 2013-2014; Martin *et al.*, 2015; Hamel *et al.*, 2017; Boukehili *et al.*, 2018; Miara *et al.*, 2018; Rebbas and Vela, 2018; Martin *et al.*, 2020; Rebbas *et al.*, 2021-2023; Aouadj *et al.*, 2023; Ait Medjber *et al.*, 2023; Nouar *et al.*, 2023).

Given the limited information on orchid distribution in the northwestern part of the Setif province, we employed a random sampling method to target potential orchid habitats. This approach was similar to those used by (De Belair *et al.*, 2005) for Numidia and by (Rebbas *et al.*, 2021-2023) for the Bejaia province and the Djurdjura National Park. Our field surveys took place in April 2024.

During the surveys, we collected data on ecological parameters such as the abundance of the two-orchid species (number of individuals recorded), altitude, and exposure. We also used GPS to map the stations, enabling us to create detailed cartographic representations of their locations.

Figure 1. Geographical Location of the observation area of *Ophrys omegaifera* subsp. *hayekii* and *Orchis purpurea* dans la region de Harbil (Google Maps, 2024; Wikimedia, 2024 modified)



3 RESULTS AND DISCUSSION

3.1 *OPHRYS OMEGAIFERA* SUBSP. *HAYEKII* (H. FLEISCHM. & SOÓ) KREUTZ

Ophrys omegaifera subsp. *hayekii* is a plant ranging from 15 to 30 cm in height, characterized by a loose spike inflorescence bearing 1 to 4, rarely 5, flowers. The lateral lobes of the labellum are longer and narrower, oblong, rounded at the tip, entire, and directed forward, separated from the median lobe by a deep sinus. The median lobe is narrowed at the base, broadly obcordate, with a smooth margin. The labellum, 15 to 19 mm long, has a prominent fold along the midline (Maire, 1960) and is bordered by a narrow, glabrous yellowish margin with a faint groove at the base. The petals are relatively long, reaching up to three-quarters of the sepals, and are wavy. The underside of the labellum is shaded in dark brown-red and dark green, lightening towards the base (Rebbas and Vela, 2008).

This species, with a South Mediterranean distribution, was first observed in Algeria by (Rebbas and Vela, 2008) in Bejaia. Subsequently, additional stations have been discovered in both western and eastern Algeria in recent years (Rebbas and Vela, 2013; Rebbas and Bounar, 2014; Madoui *et al.*, 2017; Boukehili *et al.*, 2018; Babali *et al.*, 2018; Hamel *et al.*, 2018). In Tunisia, this taxon was discovered in 2008 south of Nefza (northwestern Tunisia), although it was photographed as early as 1973 (Baumann, 1975) in Bou Kornine, where it has not been seen again (Martin *et al.*, 2015). One of the authors (KR) discovered two stations of this *Ophrys* in the M'sila region in 2018.

Populations of 10 to 20 individuals of *Ophrys omegaifera* subsp. *hayekii* were recorded in three stations in the village of Mouriana (Commune of Harbil) at altitudes ranging from 361 to 964 meters, with flowering occurring in late April (Fig. 2). This species was found in pre-forest areas, scrublands, olive groves, pine forests, and green oak woods.

The global population of *Ophrys omegaifera* subsp. *hayekii* is considered stable, although its abundance and rarity vary between countries. It is considered abundant in Italy (Romolini and Souche, 2012) but very rare and localized in Tunisia (Martin *et al.*, 2015), where only a few individuals are known from a single recorded site. In Algeria, it is estimated that each station hosts between 10 and 20 individuals (Hadji and Rebbas, 2014; Rebbas and Vela, 2018).

Figure 2. *Ophrys omegaifera* subsp. *hayekii*, a specimen of the species for the herbarium and the habitat of the species, Harbil (northwestern of Setif), 26.04.2024, pictures K. Rebbas.



3.2 ORCHIS PURPUREA HUDS

Orchis purpurea is a robust plant, ranging from 30 to 80 cm in height. It features a dense inflorescence that transitions from conical to cylindrical, with large flowers. The helmet is livid, streaked, and spotted with dark purple, while the labellum is spread out, white to pink, and dotted with purple. The median lobes are 4-5 times wider than the lateral lobes, giving the flower a highly contrasting appearance with a dark helmet and a pale labellum (Tison *et al.*, 2014).

Orchis purpurea has been the subject of taxonomic controversies. Some regard it as an endemic subspecies (subsp. *lokiana*), while others see it as a disjunct population of the European subspecies (subsp. *purpurea*). Regardless, its rarity and isolation make it a subpopulation of significant biogeographical and conservation interest. It is currently protected under Algerian law (J.O.R.A., 2012).

This species was rediscovered on April 26, 2024, in three stations within the Commune of Harbil, in north-facing fragments of green oak forest mixed with Aleppo pine. The stations host a population of over twenty individuals, located at altitudes between 973 and 1256 meters (Fig. 3).

Samples of both orchid species will be deposited in the official herbarium of the National Higher School of Agronomy (ENSA) in Algiers, which has been listed in the Index Herbariorum of NYBG since 2016. Table 1 presents a list of orchids inventoried at the stations of *Ophrys omegaifera* subsp. *hayekii* and *Orchis purpurea*.

Table 1 : List of orchids inventoried in the stations of *Ophrys omegaifera* subsp. *hayekii* and *Orchis purpurea*.

Nom scientifique	
<i>Cephalanthera longifolia</i> (L.) Fritsch	<i>Ophrys numida</i> Devillers-Tersch. & Devillers
<i>Epipactis helleborine</i> (L.) Crantz (with leaf)	<i>Ophrys scolopax</i> Cav. subsp. <i>apiformis</i> (Desf.) Maire & Weiller
<i>Himantoglossum hircinum</i> (L.) Spreng. subsp. <i>hircinum</i> (Beginning of flowering)	<i>Ophrys speculum</i> Link subsp. <i>Speculum</i>
<i>Himantoglossum robertianum</i> (Loisel.) P.Delforge (with fruit)	<i>Ophrys tenthredinifera</i> subsp. <i>ficalhoana</i> (J.A.Guim.) M.R.Lowe & D.Tyteca
<i>Neotinea maculata</i> (Desf.) Stearn	<i>Orchis italica</i> Poir. (with fruit)
<i>Ophrys battandieri</i> E.G.Camus, P.Bergon & A.Camus	<i>Orchis simia</i> Lam. (with fruit)
<i>Ophrys lutea</i> Cavanilles subsp. <i>lutea</i>	<i>Serapias parviflora</i> Parl. (Beginning of flowering)
<i>Ophrys marmorata</i> G. Foelsche & W. Foelsche (end of flowering)	

Figure. 3. *Orchis purpurea*, a specimen of the species for the herbarium and the habitat of the species, Harbil (northwestern of Setif), 26.04.2024, photos K. Rebbas



4 CONCLUSION

This study has successfully rediscovered orchid stations previously unreported in the western region of Setif, highlighting the area's rich biodiversity. The findings underscore the importance of further exploration to comprehensively survey the diverse ecosystems within the Setif province, including forests, high-altitude grasslands, scrublands, springs, and olive groves.

To ensure the protection and conservation of *Ophrys omegaifera* subsp. *hayekii* and *Orchis purpurea*, the following measures are recommended:

1. Habitat Protection: Safeguard habitats from agricultural use and land improvement activities;
2. Site Fencing: Fence vulnerable sites to protect them from trampling and other disturbances;

3. Orchid Management: Implement control and management practices for orchid production from tubers;
4. Public Awareness: Increase public awareness about the significance of orchid conservation;
5. Legal Protection: Enforce legislation to protect living orchids by prohibiting their picking or uprooting;
6. Ex-Situ Conservation: Adopt ex-situ conservation methods, including artificial propagation, reintroduction, and seed collection;
7. Monitoring: Conduct regular monitoring and surveillance of existing populations and sites;
8. Population Studies: Estimate population sizes and study their dynamics to understand and manage their conservation status effectively (Rankou, 2011).

By implementing these measures, we can enhance the conservation efforts for these orchid species and preserve the unique biodiversity of the Setif region.

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