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EXPLORING UPDATED ORCHIDACEAE DIVERSITY IN THE WILAYA OF SOUK AHRAS, NORTHEASTERN ALGERIA

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This study contributes to updating the orchid inventory in the wilaya of Souk Ahras, in the Tellian Atlas, detailing nine newly discovered orchid location and supporting biodiversity monitoring efforts in this province. Using subjective adaptative sampling between March and June 2021 across various plant formations, 23 species/subspecies and 1 hybrid from 6 genera were identified. *Ophrys funerea* and *Himantoglossum hircinum* were found, previously unreported in this wilaya. This survey highlights the regional potential as a natural orchid habitat. However, deeper habitat and population dynamic studies are imperative to develop better protection strategies due to ongoing anthropogenic threats.

Keywords: inventory, Tellian Atlas, biodiversity monitoring, protection strategies

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Ova studija doprinosi ažuriranju popisa orhideja u provinciji Souk Ahras u Telskom Atlasu, detaljno opisujući devet novootkrivenih lokacija orhideja i podržavajući napore praćenja bioraznolikosti u ovoj provinciji. Korištenjem subjektivnog adaptivnog uzorkovanja između ožujka i lipnja 2021., u različitim biljnim zajednicama identificirane su 23 vrste/podvrste i 1 hibrid iz 6 rodova. Posebno spominjemo vrste *Ophrys funerea* i *Himantoglossum hircinum*, koje prethodno nisu zabilježene u ovoj provinciji. Istraživanje ističe regionalni potencijal kraja kao prirodnog staništa orhideja. Međutim, neophodne su dublje studije staništa i populacijske dinamike za razvoj boljih strategija zaštite zbog stalnih antropogenih prijetnji.

Keywords: inventarizacija, Telski Atlas, monitoring bioraznolikosti, strategije zaštite

INTRODUCTION

Orchids stand out as priority taxa for conservation in the Mediterranean basin, which is globally recognized as a major biodiversity hotspot (MÉDAIL & QUEZEL, 1997). Across North

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Africa and Europe, orchids are exclusively terrestrial, occupying a wide spectrum of ecosystems that range from dense forests and scrublands to meadows, peat bogs, and marshes (WHIGHAM & WILLEMS, 2003; DJORDJEVIĆ *et al.*, 2020). Recent research within the North African context has underscored the exceptional richness of the Orchidaceae family, while concurrently emphasizing the pressing need for in situ conservation strategies (MARTIN *et al.*, 2015; MADOUÏ & VÉLA, 2015).

This family has long been of botanical importance in Algeria. DE BELAIR (2000), DE BELAIR & BOUSSOUAK (2002), DE BELAIR *et al.* (2005), REBBAS & VÉLA (2008, 2013), and HADJI & REBBAS (2013) contributed to the subsequent updated lists of 75 and 78 orchid species or subspecies described by DOBIGNARD & CHATELAIN (2010 AND 2013). Then, 81 orchid species or subspecies were identified for Algeria by MADOUÏ (2019), NEMER *et al.* (2019), BOUTABIA *et al.* (2019); BOUGAHAM *et al.* (2020), AIT MEDJBER *et al.* (2023); TEBANI *et al.* (2025). However, despite this progress, our knowledge remains spatially uneven, leaving significant knowledge gaps in several regions of North-Eastern Algeria.

The Wilaya of Souk Ahras is one such region. Characterized by a complex geomorphology and a wide range of climates, from sub-humid mountains to semi-arid plains, it represents a vital biogeographical crossroads (HAMAIDIA & BERCHI, 2018). While some sectors were initially explored, notably by BOUKEHILI *et al.* (2018), vast areas of this territory remain systematically unsurveyed. Despite their ecological importance, Orchidaceae and their habitats are threatened by several human activities, namely annual crops, fire, grazing, over-collection and recreational activities, and urbanization (DELFORGE, 2006; EL KARMOUDI *et al.*, 2025). In this study, we hypothesize that the environmental heterogeneity of Souk Ahras supports previously unrecorded orchid populations and that the dynamic nature of these metapopulations (TREMBLAY *et al.*, 2006; MAALOUF *et al.*, 2024) allows for the establishment of stable colonies in niches that were previously overlooked.

To address these knowledge gaps, this study aims to: (1) Provide an updated and intensive inventory of orchids in the Souk Ahras province, (2) Characterize the ecological preferences and regional distribution of each taxon, and (3) Assess their conservation status at the regional (Mediterranean) level in the face of local environmental pressures.

MATERIALS AND METHODS

Study Area

The study focused on the wilaya of Souk Ahras, located in the extreme northeast of Algeria. It shares borders with El Tarf to the northeast, Guelma to the northwest, Tebessa to the south, Oum El Bouaghi to the southwest and Tunisia to the east. Within this province, our study encompassed three communes: Hanancha, Sedrata, and Ain Soltane (Fig. 1). These areas were selected to complement the partial survey by BOUKEHILI *et al.* (2018) through an intensive, full-coverage sampling across their heterogeneous habitats, including pine forests, maquis, and scrublands.

The northern area, covering 12 communes across 1880 km² belonging to the Tellian Atlas, is characterized by mountains, forests, and a sub-humid bioclimate with siliceous or calcareous soils. In contrast, the southern area spans 14 communes over 2480 km², belonging to the Hautes Plaines and featuring pastures, a semi-arid bioclimate, and arable soils, predominantly brown with calcareous crusts (BOUDY, 1955).

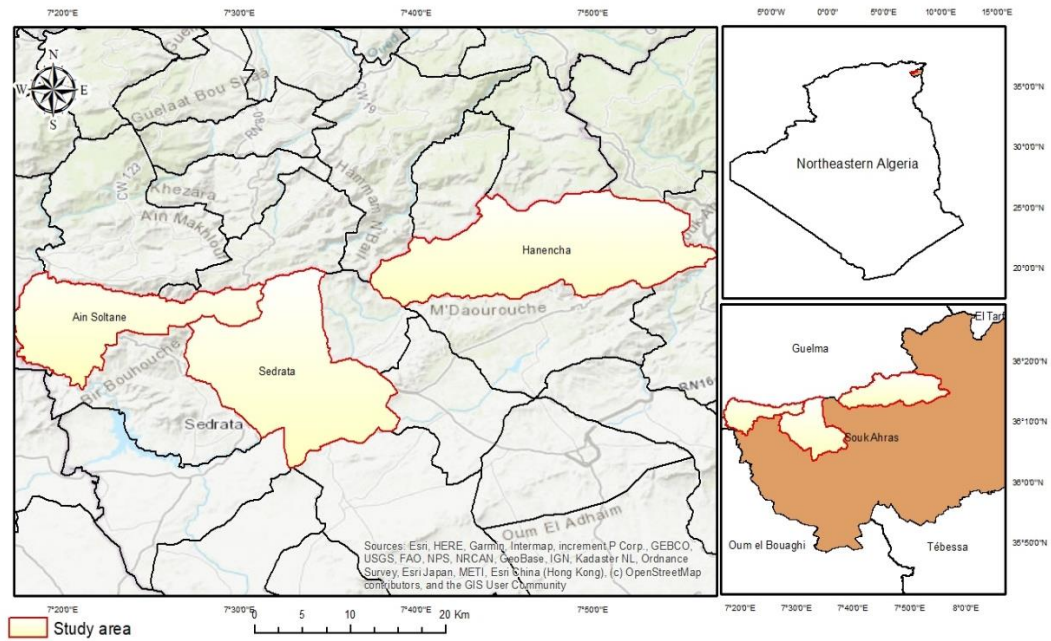


Fig. 1. Geographic location of the study area.

Data Collection

Inventory and Surveys

We conducted orchid surveys using first subjective sampling, targeting locations with potential orchid habitats and then after each positive contact an adaptative walk-through sampling strategy (GOUNOT, 1969). Field surveys were carried out regularly throughout the flowering period between March and June 2021.

Parameters Studied

At each location surveyed, we investigated ecological parameters, including orchid species richness (number of species per location), orchid abundance (count of individuals per species per location), environmental parameters (e.g., vegetation type, soil type, altitude), and geographical coordinates.

Taxonomic Identification and Nomenclature

The identification of orchid taxa was conducted in the field based on morphometric characteristics and high-resolution photography. For the determination process, we consulted the classical floras of MAIRE (1960) and QUÉZEL & SANTA (1962-1963), alongside the specialized work by MARTIN *et al.* (2015). Additional photographic guides and distribution maps by MARTIN *et al.* (2020) were used for visual comparison. To ensure the highest taxonomic rigor, specimens were uploaded to the iNaturalist platform (www.inaturalist.org) for expert peer-validation, where they were reviewed and confirmed by recognized specialists in Mediterranean Orchidaceae.

Regarding nomenclature, we followed the synonymy index of DOBIGNARD & CHATELAIN (2010) and its updated online version, the African Plant Database (v.4.0.0), to define and justify the scientific names adopted. This choice is justified by the need for a consistent and updated regional framework that aligns with contemporary botanical standards for North Africa.

RESULTS

The orchid inventory across 9 monitoring location within 3 communes of the Souk Ahras province revealed 24 species/subspecies, encompassing 23 distinct species and one hybrid, belonging to 6 genera. Notably, the genus *Ophrys* dominates with 15 species/subspecies. The botanical study led to the discovery of 2 new species for the wilaya: *Ophrys funerea* and *Himantoglossum hircinum* (Tab. 1).

Tab.1. Orchids recorded in the Wilaya of Souk Ahras (2011-2021) (Presence +, Absence -).

Species	Present work	BOUKEHILI <i>et al.</i> (2018)	Altitude (m)
<i>Ophrys tenthredinifera</i> Willd. subsp. <i>tenthredinifera</i>	+	+	499 – 1403
<i>Ophrys tenthredinifera</i> Willd. subsp. <i>ficalhoana</i> (J.A.Guim.) M.R.Lowe & D.Tyteca	+	+	559 – 1403
<i>Ophrys fusca</i> Link subsp. <i>fusca</i>	+	+	486 – 930
<i>Ophrys funerea</i> Viv.	+	-	747 – 759
<i>Ophrys atlantica</i> Munby	+	+	762 – 1280
<i>Ophrys apifera</i> Huds.	+	+	499 – 885
<i>Ophrys bombyliflora</i> Link	+	+	499 – 1210
<i>Ophrys lutea</i> Cav. subsp. <i>lutea</i>	+	+	499 – 1160
<i>Ophrys omegaifera</i> subsp. <i>hayekii</i> (H;Fleischm; & Soó)	+	+	743 – 1055
<i>Ophrys numida</i> Devillers-Tersch. & Devillers	+	+	499 – 1160
<i>Ophrys speculum</i> Link subsp. <i>speculum</i>	+	+	438 – 1403
<i>Ophrys battandieri</i> E.G. Camus, P. Bergon & A. Camus	+	+	654 – 765
<i>Ophrys scolopax</i> Cav. subsp. <i>apiformis</i> (Desf.) Maire & Weiller	+	+	499 – 1160
<i>Ophrys marmorata</i> subsp. <i>caesiella</i> (P. Delforge) E. Véla & R. Martin	+	+	697 – 738
<i>Ophrys</i> x <i>joannae</i> Maire (<i>O. atlantica</i> x <i>O. omegaifera hayekii</i>)	+	+	704 – 833
<i>Ophrys iricolor</i> Desf. subsp. <i>iricolor</i>	-	+	738 – 859
<i>Androrchis pauciflora</i> subsp. <i>laeta</i> (Steinh.) Véla, Rebbas & R.Martin	+	+	720 – 930
<i>Orchis italica</i> Poir	-	+	499 – 930
<i>Neotinea lactea</i> (Poir.) R. M. Bateman, A. M. Pridgeon & M. W. Chase	+	+	748 – 994
<i>Androrchis patens</i> (Desf.) D.Tyteca & E.Klein subsp. <i>patens</i>	-	+	833
<i>Orchis anthropophora</i> (L.) All.	+	+	559 – 994
<i>Anacamptis papilionacea</i> subsp. <i>expansa</i> (Ten.) Amard. & Dusak	+	+	559 – 1403
<i>Anacamptis coriophora</i> subsp. <i>fragrans</i> (Pollini) Bateman, Pridgeon & Chase	+	+	670 – 1080
<i>Serapias parviflora</i> Parl.	+	+	545 – 1403
<i>Serapias strictiflora</i> Welw. ex Da Veiga	+	+	702 – 1343
<i>Serapias lingua</i> subsp. <i>stenopetala</i> (Maire & Stephenson) Maire & Weiller	-	+	833
<i>Dactylorhiza elata</i> (Poir.) Soó subsp. <i>elata</i>	+	+	1100
<i>Himantoglossum hircinum</i> (L.) Spreng	+	-	709 – 1110
<i>Himantoglossum robertianum</i> (Loisel.) P. Delforge	-	+	499
<i>Spiranthes spiralis</i> (L.) Chevall	-	+	769 – 861
Total number	24	28	/
Total Souk Ahras province		30	

Distribution and richness

The 24 taxa were observed across 9 monitoring location within 3 communes of the Souk Ahras province (Hanancha, Sedrata, and Ain Soltane) (Tab. 2). Location varied in their diversity, with some hosting a single species while others exhibited more coexistence (e.g., the Draa Massal location in Hanancha with 22 species) (Fig. 2).

Tab. 2. The ecological and environmental characteristics of the various orchid location.

Location	Latitude	Longitude	Altitude	Habitat	Climate
Draa Massal	36.258033°	7.782217°	755 m	Grassland	Sub-humid
El Madjen	36.233217°	7.667933°	1010 m	Pine forest, grassland	Sub-humid
El Margeb	36.266933°	7.758633°	909 m	Undergrowth	Sub-humid
El Sarsoufe	36.265750°	7.796950°	759 m	Grassland	Sub-humid
Ain Kbira	36.193783°	7.498200°	1110 m	Holm oak maquis	Semi-arid
Kef Laboid	36.190217°	7.435217°	1080 m	Holm oak maquis	Semi-arid
Kef Lahmar	36.198656°	7.415524°	975 m	Holm oak maquis	Semi-arid
Oued El Aar	36.203583°	7.413333°	873 m	Holm oak maquis	Semi-arid
El Meida	36.191650°	7.527150°	1290 m	Grassland, pine forest	Semi-arid

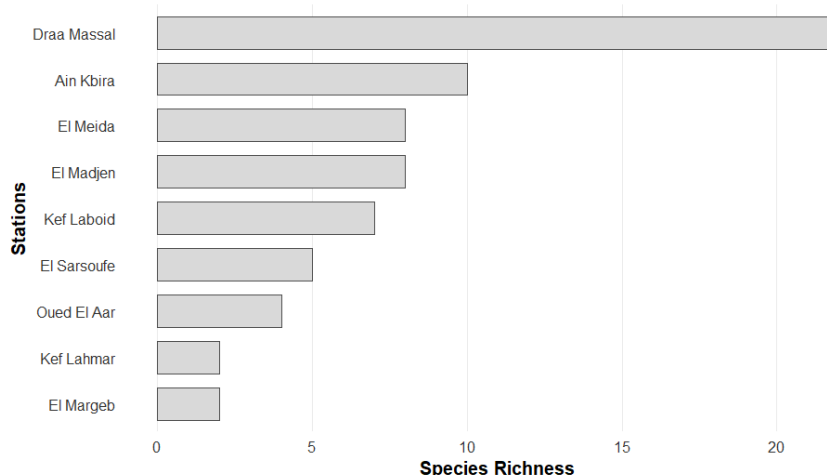


Fig. 2. Specific richness of orchids of all location visited in the wilaya of Souk Ahras.

Abundance Variation

Abundance across location shows significant variation. Some species, like *Ophrys numida* (845 mature individuals), *Ophrys speculum* (294 mature individuals), *Ophrys bombyliflora* (224 mature individuals), and *Anacamptis papilionacea* subsp. *expansa* (200 mature individuals), exhibit high abundance. Contrastingly, species such as *Serapias strictiflora* (3 individuals), *Androrchis pauciflora* subsp. *laeta* (4 mature individuals), *Himantoglossum hircinum*, *Ophrys battandieri*, and *Ophrys funerea* (7 mature individuals each) display notably lower abundance (Fig. 3).

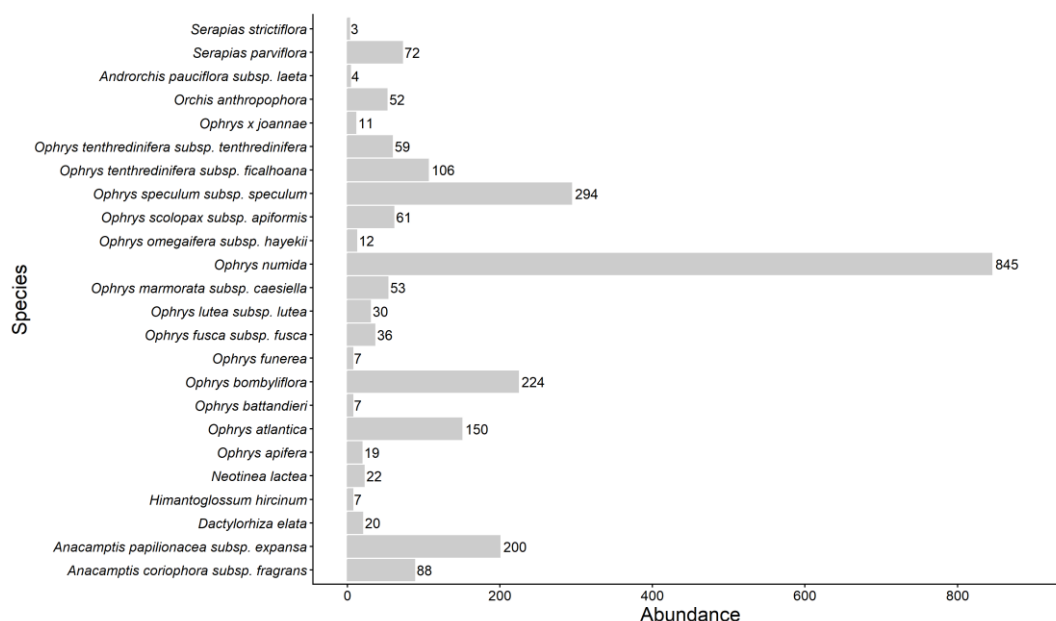


Fig. 3. Total number of mature individuals per taxon.

DISCUSSION

Diversity and distribution

Most inventoried species thrive in open environments like lawns and degraded forests (e.g., pine or holm oak maquis) within altitudes ranging from 486 to 1403 m, experiencing a semi-arid to sub-humid bioclimate.

Our findings highlight the northern Souk Ahras province as the primary habitat for orchid development. This area, characterized by a manro-calcaire substrate and a humid to sub-humid bioclimate with woody cover, exhibited notably higher abundances compared to the other two communes situated in a semi-arid bioclimatic area with sandstone substrate. Similar observations were made by DE BELAIR *et al.* (2005), affirming the impact of varied climatic and edaphic factors on orchid distribution and abundance. This aligns with studies by BROWN (1984), SAGARIN & GAINES (2002), and SOBERON & NAKAMURA (2009).

Our field survey identified 24 taxa, introducing *Ophrys funerea* and *Himantoglossum hircinum* as new records for the wilaya of Souk Ahras. While *O. funerea* was previously mapped by MARTIN & *al.* (2020) but without any more precision and data sourcing, doing our observation the first documented observation. *H. hircinum* has been recently rediscovered around Constantine (cf. BATTANDIER, in MAIRE: 1960) by amateur observers (<https://www.inaturalist.org/taxa/147182> *Himantoglossum-hircinum*, consulted 26/03/2024) but even further east only once in the Guelma's province (MARTIN *et al.*, 2020), doing this new record the most eastern from Algeria until now.

Conversely, six previously reported taxa by BOUKEHILI *et al.* (2018): *Ophrys iricolor*, *Orchis italica*, *Androrchis patens* subsp. *patens*, *Serapias lingua* subsp. *stenopetala*, *Himantoglossum robertianum*, and *Spiranthes spiralis* were absent in our surveyed area. This discrepancy, along with the fact that our study captures 37.5% of the orchid diversity recorded across the Kabylie, Numidie, and Aurès regions (MARTIN *et al.*, 2020), underscores the significant impact of local environmental heterogeneity.

- *Ophrys funerea* Viv.

This species was observed in a sunlit meadow at 759 m altitude on March 13, April 18, and April 21, 2021, at a single location in Hanancha commune (Fig. 4; Fig. 8), with only 7 mature individuals present. This specific occurrence is closely related to the local ecological conditions of the station. The species increases under a humide frais bioclimate on a marno-calcaire substrate, because this type of soil offers the moisture and chemical characteristics that this taxon prefers. The surrounding flora predominantly comprises *Ampelodesmos mauritanicus* and *Calicotome spinosa*, with a high cover, while *Asphodelus microcarpus* was also notable in the vicinity.



Fig. 4. *Ophrys funerea* (A - Observed on March 13, 2021, B - Observed on April 18, 2021, C - Observed on April 21, 2021, D - Location of Draa Messal, Hanancha).

- *Himantoglossum hircinum* (L.) Spreng.

This orchid, never previously recorded in this wilaya, was found in our study area (Fig. 5). Six mature individuals were observed at Draa Messal location in Hanancha commune at 709 m altitude. Additionally, a single mature individual was spotted in the Ain Soltane commune at Ain El Kbira location at 1110 m altitude (Fig. 8). *H. hircinum*'s occurrence in such diverse environments from semi-arid sandstone maquis to humid marno-calcaire meadows, shows its wide ecological diversity in the region and its remarkable adaptability to different soils through the colonization of diverse substrates. The surrounding vegetation includes more prevalent holm oak (*Quercus ilex*) along with a few Mauritania grass *Ampelodesmos mauritanicus* and Spiny Calicotome (*Calicotome spinosa*).

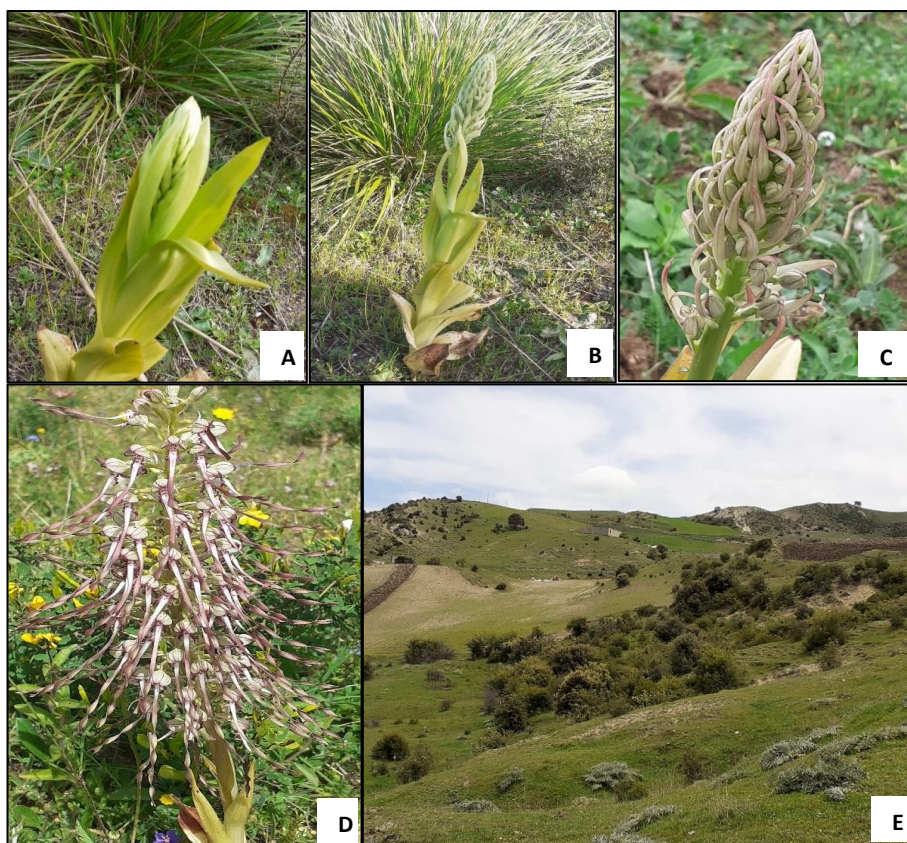


Fig. 5. *Himantoglossum hircinum* (L.) Spreng. (A - Observed on April 21, 2021, B - Observed on April 29, 2021, C - Observed on May 3, 2021, D - Observed on May 18, 2021, E - Location of Ain Kbir, Ain Soltane.

New orchid location discovery

Numerous new orchid location were identified for various species, notably rediscovering species previously reported at only one location.

- *Ophrys atlantica*

Despite its rarity according to multiple authors, our surveys revealed its presence in the majority of location across the three communes, with notably high abundances (up to 150 mature individuals in 5 new location) (Fig. 6; Fig. 8). It confirms the presumed abundance and stability of its populations at least through its NE-Algerian area, implying it to be a not yet threatened species at global level (VÉLA *et al.*, 2018).

Interestingly, its occurrence in semi-arid locations at high altitudes (1110 m) suggests that altitude acts as a compensatory factor for aridity, which higher elevations provide cooler micro-climates and reduced evapotranspiration, allowing drought-sensitive species to persist in otherwise challenging bioclimates (MA *et al.*, 2019; FEKETE *et al.*, 2020).

- *Orchis anthropophora*

Rediscovered at Hanancha with 52 mature individuals (Fig. 6; Fig. 8). While many authors pointed out that this species occurs on calcareous substrates, in full sun to mid-shade conditions, in xerophilous short grasslands, garrigue, scrub and forest edges (DELFORGE, 2006; KRETZSCHMAR *et al.*, 2007; FAY & TAYLOR, 2015), its presence under a sub-humid cool bioclimate demonstrates its broad ecological valence and adaptability to prevailing conditions (EL BOUHISSI *et al.*, 2024; EL KARMOUDI *et al.*, 2025)

- *Dactylorhiza elata*

Originally discovered by BOUKEHILI in 2015 at Mechroha, we found it again at Ain Soltane with 20 mature individuals (Fig. 6; Fig. 8). This emphasizes the significance of preserving diverse habitats for these species. This new record of a reproductive population is a good news for a species assessed near threatened at global level mainly by the habitat destruction (VÉLA *et al.*, 2017).

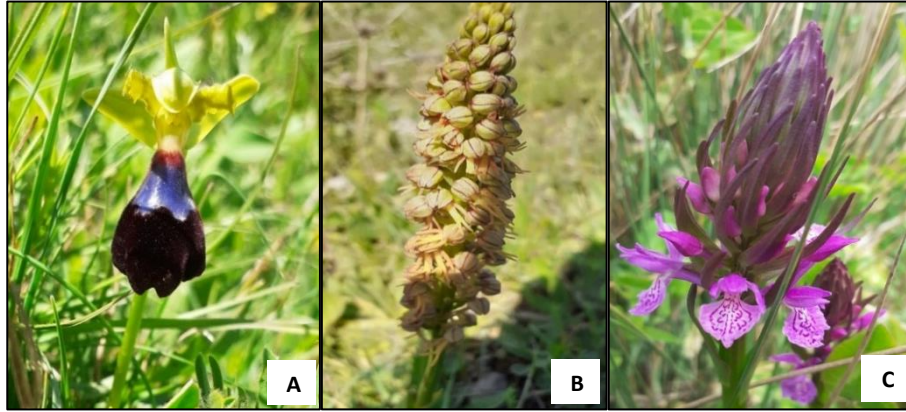


Fig. 6. A - *Ophrys atlantica*, April 21, 2021, in Hanancha, B - *Orchis anthropophora*, April 21, 2021, in Hanancha, B - *Dactylorhiza elata*, April 24, 2021, in Ain Soltane.

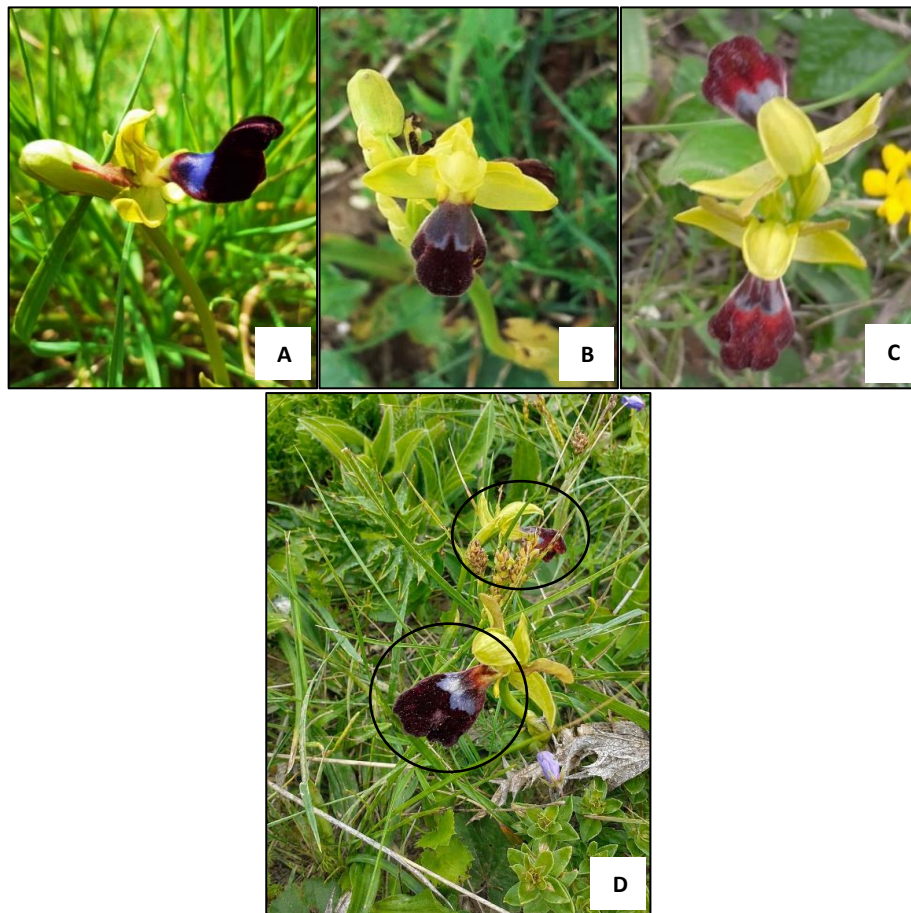


Fig. 7. A - *Ophrys atlantica*, B - *Ophrys omegaifera* subsp. *hayekii*, C - *Ophrys x joannae*, D - *Ophrys atlantica* + *Ophrys x joannae*.

- *Ophrys x joannae*

The *Ophrys x joannae* hybrid, previously documented in Tlemcen and Mechroha by BABALI *et al.* (2018) and BOUKEHILI *et al.* (2018) respectively, was rediscovered in a new location (Draa Messal). In this location, we observed 11 mature individuals associated with both parent species: 14 individuals of *Ophrys atlantica* and 12 individuals of *Ophrys omegaifera* subsp. *hayekii* (Fig.7; Fig. 8).

Notably, these three taxa *Ophrys x joannae*; *Ophrys atlantica* and *Ophrys omegaifera* subsp. *hayekii* are not protected in Algeria, by the decree no. 12/03 of January 4, 2012, establishing the list of non-cultivated plant species. This lack of legal protection is a common issue for many orchids across Algeria due to historical taxonomic changes or their recent description as new taxa. These data are in conformity with the non-threatened status given by the IUCN Redlist for both parent (REBBAS & VÉLA, 2018; VÉLA *et al.*, 2018) despite their subendemic range, respectively Andalucian-Maghrebian and Maghrebian-Sicilian. As for their occasional hybrid, it cannot be assessed according the IUCN Redlist guidelines (IUCN, 2025).

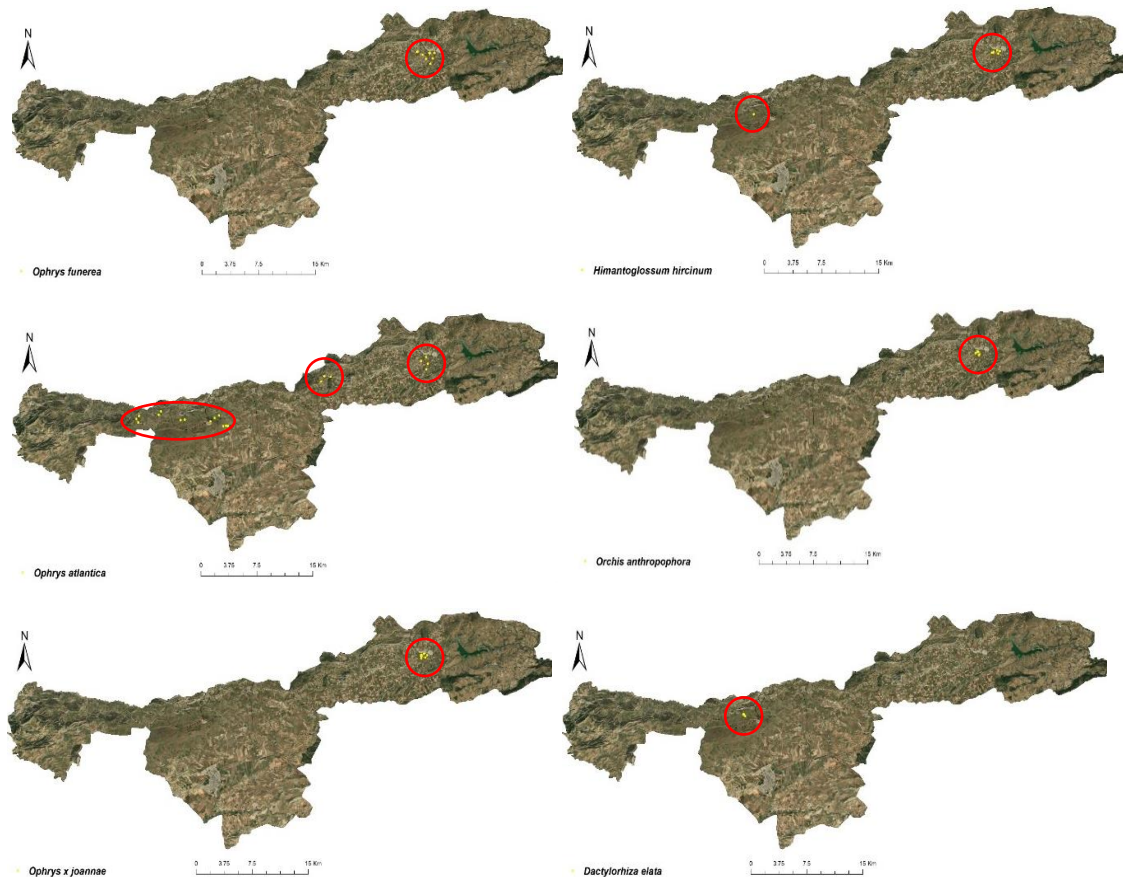


Fig. 8. Distribution map of the newly recorded orchid taxa in the Souk Ahras province.

Taxonomic considerations and nomenclature

The nomenclature of the section *Pseudophrys* remains controversial due to the limited resolution of classic molecular markers (SCHLÜTER *et al.*, 2007; DEVEY *et al.*, 2008) and to the significant morphological similarity between taxa (BERNARDOS *et al.*, 2005). According to

JOFFARD *et al.* (2022) genetic data alone can be too conservative, often not identifying genuine species boundaries that are otherwise supported by phenotypic traits. Because morphometric characteristics are directly selected by pollinators, their integrative analysis shows that they change more quickly than neutral genetic markers and are as informative as flower odors (SEDEEK *et al.*, 2014; VÉLA *et al.*, 2015). As a result, our research indicates that species boundaries are still theories that need to be verified with various kinds of data. This explains our dependence on morphological field data to precisely represent the orchid diversity of Souk Ahras, ensuring that conservation priorities are defined based on a reliable representation of local biodiversity.

Rhizomatous genera absence

Notably absent from our inventory are certain rhizomatous genera like *Cephalanthera*, *Epipactis*, or *Limodorum*, which are typically linked to forest environments rich in humus. Given their historical presence in the Algerian-Constantinian Tell (MAIRE, 1960; QUÉZEL & SANTA, 1962), their absence in our area can be explained by the severe overgrazing and the destruction of the shrub stratum (DE BELAIR, 2005), which make the forest undergrowth unsuitable for forest orchids. In areas like Souk Ahras, where forest ecosystems are undergoing rapid transformation into pastureland, these specialized orchids face a high risk of local extinction. Consequently, targeted searches are crucial to assess their protection status or even to confirm their eventual local extinction.

Orchid conservation and protection

In the wilaya of Souk Ahras, 24 orchid species, subspecies or hybrid are now recorded, with at least 2 endemics to Algeria-Tunisia (*Ophrys numida* and *Ophrys x joannae*), as well as the Maghrebian endemic *Ophrys battandieri* (MARTIN & *al.*, 2015; HAMEL & *al.*, 2018). Among these, based on QUÉZEL & SANTA'S work (1962) completed by recent works, 4 are more or less rare in Algeria, constituting 15% of all Souk-Ahras orchids (*Ophrys battandieri*; *Ophrys omegaifera* subsp. *hayekii*; *Ophrys numida*, and *Neotinea lactea*), with *Ophrys x joannae* being exceptionally rare due to its occasional hybrid status.

Algerian legislation (Administrative Decree 12/03 of January 4, 2012) designates five protected taxa: *Anacamptis coriophora* subsp. *fragrans*; *Anacamptis papilionacea* subsp. *expansa*, and *Dactylorhiza elata*, *Neotinea lactea*, *Androrchis pauciflora* subsp. *laeta*.

According to the current IUCN Red List (2025-1) global (Mediterranean) status, only *Dactylorhiza elata* is classified as near-threatened, but some species remain unassessed (Tab. 3).

Tab. 3. List of Orchid taxa reported to date in the wilaya of Souk Ahras, and their official status (Protection (J.O.RA. 2012), IUCN 2025-1 global (Mediterranean) status. (NA: not applicable, NE: not evaluated, LC: least concern, NT: near threatened), (UP: unprotected, P: protected)

Species	Protection (J.O.RA. 2012)	IUCN 2025-1 global (Mediterranean status)
<i>Ophrys tenthredinifera</i> Willd. subsp. <i>tenthredinifera</i>	UP	NE
<i>Ophrys tenthredinifera</i> Willd. subsp. <i>ficalhoana</i> (J.A.Guim.) M.R.Lowe & D.Tyteca	UP	NE
<i>Ophrys fusca</i> Link subsp. <i>fusca</i>	UP	NE
<i>Ophrys funerea</i> Viv.	UP	NE
<i>Ophrys atlantica</i> Munby	UP	LC
<i>Ophrys apifera</i> Huds.	UP	NE

Species	Protection (J.O.R.A. 2012)	IUCN 2025-1 global (Mediterranean status)
<i>Ophrys bombyliflora</i> Link	UP	LC
<i>Ophrys lutea</i> Cav. subsp. <i>lutea</i>	UP	NE
<i>Ophrys omegaifera</i> subsp. <i>hayekii</i> (H;Fleischm; & Soó)	UP	LC
<i>Ophrys numida</i> Devillers-Tersch. & Devillers	UP	NE
<i>Ophrys speculum</i> Link subsp. <i>speculum</i>	UP	NE
<i>Ophrys battandieri</i> E.G. Camus, P. Bergon & A. Camus	UP	NE
<i>Ophrys scolopax</i> subsp. <i>apiformis</i> (Desf.) Maire & Weiller	UP	NE
<i>Ophrys marmorata</i> subsp. <i>caesiella</i> (P. Dleforge) E. Véla & R. Martin	UP	NE
<i>Ophrys x joannae</i> Maire (<i>O. atlantica</i> x <i>O. omegaifera hayekii</i>)	UP	NA
<i>Androrchis pauciflora</i> subsp. <i>laeta</i> (Steinh.) Véla, Rebbas & R. Martin	P	NE
<i>Neotinea lactea</i> (Poir.) R. M. Bateman, A. M. Pridgeon & M. W. Chase	P	LC
<i>Orchis anthropophora</i> (L.) All.	UP	NE
<i>Anacamptis papilionacea</i> subsp. <i>expansa</i> (Ten.) Amard. & Dusak	P	NE
<i>Anacamptis coriophora</i> subsp. <i>fragrans</i> (Pollini) Bateman, Pridgeon & Chase	P	NE
<i>Serapias parviflora</i> Parl.	UP	NE
<i>Serapias strictiflora</i> Welw. ex Da Veiga	UP	NE
<i>Dactylorhiza elata</i> (Poir.) Soó subsp. <i>elata</i>	P	NT
<i>Himantoglossum hircinum</i> (L.) Spreng	UP	NE

Orchid habitats face degradation and transformation by overgrazing (sheep, goats and cattles), trampling (livestock and tourists), picking for traditional use (including medicinal preparations, fooding like salep), and land conversion (forest clearing, urbanization and infrastructures), endangering their diversity. Inversely, grazing land abandonment could shrink orchid-friendly sites. Urgent steps are needed for species protection, revising protected species lists to include newly described taxa that might already be endangered or threatened.

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