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RESEARCH ARTICLE

A recent find of *Ophrys insectifera* (*Orchidaceae*) in Ukraine – will it survive another 100 years?

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Abstract. Here I report the first find of *Ophrys insectifera* in Ukraine since 1920. A single individual was found at its last recorded site, Chortova Hora near Rohatyn (Ivano-Frankivsk Region). The species occurs in a steppe meadow habitat situated in the lower part of a steep northern slope. Local vegetation may be classified to a broadly circumscribed association *Brachypodio pinnati-Molinietum arundinaceae* from the alliance *Cirsio-Brachypodion pinnati* (class *Festuco-Brometea*). I discuss possible causes of the long-term neglect of *O. insectifera* at the site, its habitat conditions and suitable conservation management. To ensure the continued occurrence of this poor competitor and other rare species, it is necessary to prevent accumulation of litter and successional changes of the grassland. Mowing, low-intensity grazing, controlled early spring burning or their combination may be suitable ways to achieve this.

Keywords: controlled burning, endangered species, habitat management, Opillia, plant distribution, succession, threats

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Introduction

Ophrys insectifera L. (*Orchidaceae*) is the most northerly distributed *Ophrys* species, with the range centred in France, Germany, and Switzerland, and extending to the British Isles, Baltic region, and Fennoscandia. In the south it reaches the Iberian, Apennine and Balkan peninsulas (Meusel et al., 1965–1992). In Eastern Europe it is rare, but reaches up to the South Urals (Galeyeva, 2006). Across its distribution range it favours calcareous habitats of various kinds, mainly nutrient poor semi-dry and mesic grasslands, thermophilous scrub, and open and semi-open woodlands, often dominated by pine. It may tolerate deeper shade in calcicolous beech woodlands (Stroh, 2015), and towards the western, northern, and eastern periphery of its distribution range it increasingly occupies calcareous wetlands (Wolff, 1951; Galeyeva, 2006; Roze et al., 2011; Stroh, 2015). While it is classified as Least Concern in the *IUCN Red List* (Rankou, 2011), it has retreated in many parts of its distribution range and is evaluated, e.g., as Critically Endangered in Bulgaria (Petrova, Vladimirov, 2009) and Denmark (Wind, 2019), Endangered in the Czech Republic (Grulich, Chobot, 2017) and Finland (Hyvärinen et al., 2019), Vulnerable in Poland (Kaźmierczakowa et al., 2016), Germany (Metzing et al., 2018), and Switzerland (Bornand et al., 2016), Declining in Russia (Bardunov, Novikov, 2008), and Rare in Romania (Oltean et al., 1994).

In Ukraine the species has always been very rare and a single documented record comes from Chortova Hora near Rohatyn, Ivano-Frankivsk Region (Kagalo, 2009). The species was found there in May 1920 by a Polish botanist S. Wierdak and the corresponding specimens are deposited in the Herbarium of the Ivan Franko

National University of Lviv (Dmytrash-Vatseba, 2018; Shumska, Dmytrash-Vatseba, 2018) and the Herbarium of the W. Szafer Institute of Botany, Polish Academy of Sciences in Krakow (B. Paszko, in litt.). The occurrence was never confirmed and the species was considered probably extinct there (Dmytrash-Vatseba, 2018). Other records in Ukraine are even older and are based only on literature data. They all come from the western part of the country, including the Eastern Carpathians (Bukovynian Carpathians, Gorgany), Northern Podillia, Opillia, and Roztochia (Kagalo, 2009; Chorney et al., 2010). Thus, the species has not been recorded in the territory of Ukraine for a century and is included in the *Red Data Book of Ukraine* with the highest category of threat, as Disappearing (Kagalo, 2009).

Here we report a recent find of *O. insectifera* in Ukraine, describe its habitat conditions, discuss possible causes of its long-term neglect, and propose suitable conservation management.

Study area

Chortova Hora (333 m a.s.l.) is a famous hill and a natural site near the town of Rohatyn in the western part of Ukraine (Ivano-Frankivsk Region). It is an inselberg, rising above the plateau between the valleys of the Hnyla Lypa and Studenyi Potik rivers. Its bedrock is formed of calcareous marls to clayey limestones of the Cretaceous age, overlain by Neogene gypsum (Gerasimov et al., 2004). The site is protected since 1936 (Haydukevych, 2016), in the present form since 1975 as a Botanical Nature Monument of national importance with the area of 13 ha (Zamoroka et al., 2018).

The hill is a part of the physiographic region of Rohatyn Opillia, which belongs to a broader region of the Volyno-Podolian Upland. The surrounding landscape is hilly, with elevations between 250 and 430 m a.s.l. Mesophilous forests dominated by *Quercus robur*, *Carpinus betulus*, and *Fagus sylvatica* prevail in near-natural vegetation. Species-rich steppe grasslands and calcareous fens are scattered throughout the region, containing many habitat specialists and rare species, indicating a long history of open landscape.

Methods

Taxonomic concepts and nomenclature of vascular plant taxa mainly follow *Euro+Med PlantBase* (2006–onward). Syntaxonomic nomenclature follows Mucina et al. (2016) down to the alliance level and Willner et al. (2019) at the association level.

Results

Recent occurrence of *Ophrys insectifera* at Chortova Hora was recorded on 3 June 2019. A single individual was noticed in the steppe meadow situated in the lower part of a steep northern slope. Documentary photos of the plant were taken (Fig. 1) and geographical coordinates were recorded (49°24′11.0″ N, 24°39′53.8″ E). The site has not been thoroughly searched due to limited time, so the occurrence of more individuals cannot be ruled out.

The accompanying species included *Brachypodium pinnatum*, *Briza media*, *Cirsium pannonicum*, *Filipendula vulgaris*, *Galium boreale*, *Gymnadenia conopsea*, *Helictochloa hookeri* subsp. *schelliana*, *Hypochaeris maculata*, *Lembotropis nigricans* (*Cytisus nigricans*), *Peucedanum cervaria* (*Cervaria rivini*), *Polygala comosa*, *Ranunculus breyninus*, and *Thesium linophyllon*. The herb layer cover was relatively low as compared to the surrounding stands (about 65%). There was some litter accumulated on the ground as the vegetation was not burned that year.

Discussion

New find

The find reported here confirms the occurrence of *Ophrys insectifera* at Chortova Hora and whole Ukraine after 99 years. I assume the species was overlooked and was continuously present at the site, despite frequent visits by botanists. The small population size and perhaps also irregularity in flowering (Dorland, Willems, 2002) may have contributed to the neglect. Moreover, suitability of available habitats at Chortova Hora for the species is questionable. While steppe grasslands on the sun-exposed slopes may be too dry, grasslands on a shady slope may be too tall and closed, leaving little space for this low-growing species. Stands of the kind where *Ophrys* was found, with lower cover of herbs and grasses and high abundance of competitively inferior mesophilous species (e.g. *Gymnadenia conopsea* and *Ranunculus breyninus*), are less abundant on the shady slope and should preferably be explored when searching for the species.

Conservation management

The vegetation on the northern slope of Chortova Hora may be classified to a broadly circumscribed association *Brachypodio pinnati-Molinietum arundinaceae* from the alliance *Cirsio-Brachypodion pinnati* (class *Festuco-*

Fig. 1. *Ophrys insectifera* in steppe meadow at Chortova Hora near Rohatyn

Brometea) (Roleček et al., 2019; Willner et al., 2019). This type of dry-mesic steppe meadows is very species rich, but at the same highly productive, and thus preservation of its plant diversity requires regular biomass removal, which was historically done mainly through mowing (Roleček et al., 2014). Also, the grasslands at Chortova Hora used to be utilized for haymaking, probably combined with grazing (Haydukevych, 2016; Zamoroka et al., 2018). Recently, however, none of these management forms was applied and biomass removal was done through off-season grassland burning. During my last visits in 2019 and 2021, I have not observed any traces of burning, while litter accumulation was apparent.

To facilitate survival of *O. insectifera* and other poor competitors, it is necessary to continue some form of conservation management. If mowing and low-intensity grazing are not available, continuation of the previously practiced early spring burning may be an ecologically convenient and economically affordable option. According to recent studies, burning may prevent or slow down successional changes of forest-steppe habitats following their abandonment (Dmytrash-Vatseba, Shumska, 2020; Ónodi et al., 2021). This is in agreement with our observations from a number of steppe grasslands in Western Ukraine and Romania (Roleček et al., 2019, 2021). Although detrimental effects of burning have been reported too (Ruprecht et al., 2013; Polchaninova et al., 2019), I assume that positive effects prevail, as litter accumulation and woody species encroachment may be very harmful for the diversity of steppe species (Ruprecht et al., 2010; Kelemen et al., 2013; Boch et al., 2019). Despite recent efforts to eradicate spring burning of the grasslands in Ukraine (Burkovskyy et al., 2013; https://necu.org.ua/zupynymo-vogon-razom) controlled and properly timed burning of abandoned steppes may be viewed as an effective habitat management tool.

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Реферат. Повідомлення присвячене першій з 1920 року знахідці *Ophrys insectifera* в Україні. Одна особина виду була знайдена на місці його попередньої реєстрації, а саме на Чортовій горі поблизу Рогатина (Івано-Франківська обл.). Оселище виду – лучно-степова ділянка у нижній частині крутого північного схилу. Рослинність локалітету може бути віднесена до асоціації *Brachypodio pinnati-Molinietum arundinaceae* з союзу *Cirsio-Brachypodion pinnati* (клас *Festuco-Brometea*). У повідомленні обговорюються можливі причини тривалої відсутності знахідок *O. insectifera* на цій ділянці, умови її існування та належне природоохоронне управління. Для забезпечення подальшого існування цього виду, який має слабку конкурентну здатність, а також інших рідкісних видів, необхідно запобігати накопиченню опаду й підстилки та природній сукцесії – зміни трав'яної рослинності на деревно-чагарникову. Для досягнення цього може бути запропоноване скошування травостою, низькоінтенсивний регульований випас худоби, контрольоване ранньовесняне випалювання підстилки, або ж поєднання усіх цих заходів.

Ключові слова: загрози, зникаючі види, контрольоване випалювання, Опілля, поширення рослин, природоохоронне управління, сукцесія