Annales Universitatis Paedagogicae Cracoviensis
Studia Naturae, 10: 33–44, 2025
ISSN 2543-8832
DOI: 10.24917/25438832.10.3

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# Localities of protected plants within the Folusz Protection District (Magura National Park, Southern Poland) – floristic note

## Abstract

The work presents the results of field research carried out from March to November in the Folusz Protection District within the Magura National Park. The aim of this study was to compile a list of legally protected plants occurring there and their localities. The research confirmed the occurrence of 14 protected species in the Folusz Protection District, 4 of which are under strict protection and the other 10 are partially protected. The localities of the protected plant species recorded within the Folusz Protection District are situated mainly in scrub, forest and non-forest plant communities.

**Keywords:** Protection District, legally protected species, National Park

**Received:** [2025.07.05]

**Accepted:** [2025.07.28]

## Introduction

Magura National Park is one of the youngest national parks in Poland. It was established by the *Regulation of the Council of Ministers on November 24, 1994* (Journal of Laws No. 126, item 618), and it began operating on January 1, 1995. At that time, it was the 20th national park placed in Poland and the sixth situated within the Polish part of the Carpathians (Luboński et al., 2007; Różański et al., 2019). From an administrative standpoint, Magura National Park is situated within two provinces: Podkarpackie and Lesser Poland (Małopolskie). The majority of the area (90%) is situated within the Podkarpackie Province, while the remaining part (10%) lies within the borders of the Lesser Poland Province. The park covers an area of 194.39 km², with an additional buffer zone of 229.69 km².

The vast biodiversity of this area is evidenced, among other things, by the presence of approximately 800 species of vascular plants, including 64 that are legally protected. The Park is divided into two Protection Sections: Krempna and Żmigród. Each of these sections is further subdivided into six protection districts. The number and species

composition of legally protected plants vary across each of the 12 protection districts (Szafrański, 2009a; Różański et al., 2019).

Folusz Protection District is a part of the Żmigród Protective Section and is the third largest Protective District in the Park (Fig. 1).

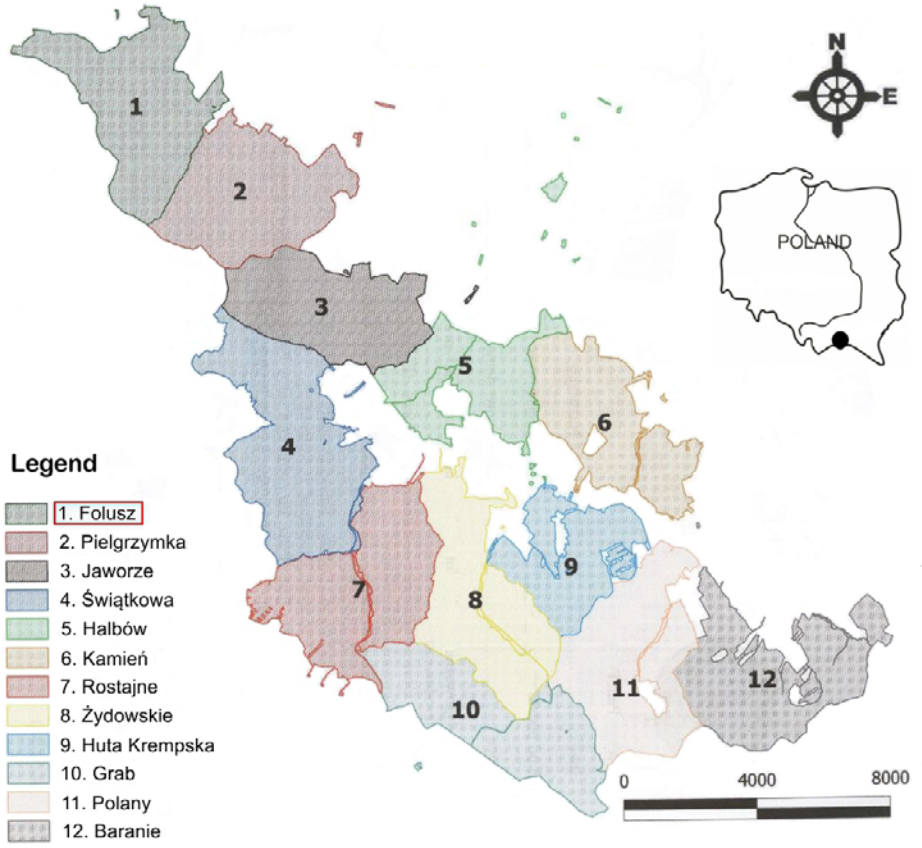



**Fig. 1.** Protective Districts of the Magura National Park; the Folusz Protective District is highlighted in the legend with a red frame

It occupies 9% of the Park's total area, specifically 1,767 hectares, and is situated in the northwestern part of the Magura National Park. The northern boundary of the district is marked by a section of the provincial road No. 993, while the southern boundary runs along the "Kornuty" nature reserve. The eastern boundary is defined by the main road in Folusz and the yellow tourist trail, whereas the western boundary coincides with the Park's border. The Folusz Protective District also includes a small area surrounding the forester's lodge in Cieklin. This district covers terrain situated within the foothill zone and the lower montane zone. The foothill zone encompasses the northern and eastern

parts of the district, while the central, southern, and western parts lie within the lower montane zone (Szafrański, 2009a; *Magura National Park – tourist map*, 2016).

All plants and animals living within the Magura National Park are protected as part of the Park's ecosystem. However, there are species among them that are also subject to legal protection throughout Poland. This study aimed to compile a list and indicate the distribution of legally protected species occurring within the Folusz Protective District in the Magura National Park.

## Research methodology

Fieldwork was conducted from March to November 2020. It included the inventory and photographic documentation of legally protected species in accordance with the *Regulation of the Minister of the Environment on species protection of plants dated October 9, 2014* (Journal of Laws 2014, item 1409), as well as the identification of habitats and the location of individual taxa sites.

To determine the position of the localities, the multifunctional application Locus Map 4 Outdoor Navigation (*Asamm Software*, s.r.o.) was used. This application enables the precise recording of geographic coordinates, elevation above sea level, and slope exposure for each site. In the systematically arranged list of protected plant species, the locality number corresponding to localities in the map (Fig. 2) is provided. The nomenclature and systematic classification of vascular plants follow Mirek et al. (2020), plant community names follow Matuszkiewicz (2022), and general distribution in Poland is based on Piękoś-Mirkowa and Mirek (2018).

## Results

Based on field research conducted in the Folusz Protective District, 14 legally protected plant species were recorded. Four of these species are fully protected (*Cephalanthera longifolia*, *Asplenium scolopendrium*, *Dactylorhiza fuchsii*, and *Gladiolus imbricatus*); the remaining 10 species are partially protected (*Allium ursinum*, *Aruncus sylvestris*, *Dactylorhiza majalis*, *Galanthus nivalis*, *Huperzia selago*, *Neottia nidus-avis*, *Platanthera bifolia*, *Primula elatior*, *Taxus baccata*, and *Veratrum lobelianum*). Among the protected species, there are three montane species – *Allium ursinum*, *Aruncus sylvestris*, and *Asplenium scolopendrium* – two widespread montane species – *Huperzia selago* and *Veratrum lobelianum* – and one xerothermic species – *Cephalanthera longifolia*.

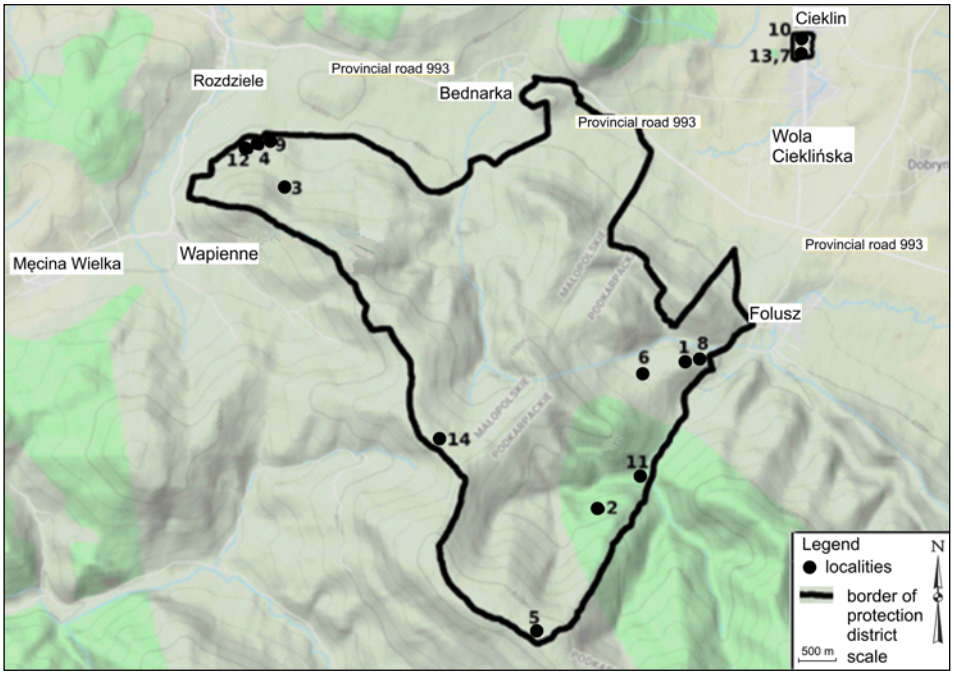



**Fig. 2.** Distribution of recorded localities of protected plants within the Folusz Protective District in Magura National Park; 1–14 – locality numbering

## Systematic list and localities of protected plants in the Folusz Protection District in the Magura National Park

*Species subject to full legal protection*

Division: Pteridophyta
Class: Polypodiopsida Cronquist, Takht. & W.Zimm.
Order: Polypodiales Link
Family: Aspleniaceae Newman

1) *Asplenium scolopendrium* L. (Fig. 3A – Appendix 1)
Habitat: *Phyllitido-Aceretum* Moor 1952.
Locality: N 49° 36.769', E 021° 22.299'; altitude 442 m above sea level; slope exposure NE (Fig. 2 – No. 2).
Occurrence in Poland: mainly in the south and southwest; especially in the Carpathians, the Kraków–Częstochowa Upland, as well as in the Sudeten Foothills and the Carpathian Foothills; it is less common in other parts of Poland, with the only larger concentration of sites found in the Kashubian Coast region.

Division: Spermatophyta
Class: Liliopsida Brongn.
Order: Iridales Raf.
Family: Iridaceae Juss.

2) *Gladiolus imbricatus* L. (Fig. 3B – Appendix 1)
Habitat: *Gladiolo-Agrostietum capillaris* (Br.-Bl. 1930) Pawł. et Wal. 194.
Locality: N 49° 38.199', E 021° 17.890'; altitude 421 m above sea level; slope exposure N (Fig. 2 – No. 4).
Occurrence in Poland: fairly common in lowlands and lower mountain elevations, mainly within the lower montane zone.

Order: Orchidales Raf.
Family: Orchidaceae Juss.

3) *Cephalanthera longifolia* (L.) Fritsch (Fig. 3C – Appendix 1)
Habitat: *Dentario glandulosae-Fagetum* Klika 1927 em. Mat. 1964.
Locality: N 49° 36.769', E 021° 22.299'; altitude 442 m above sea level; slope exposure NE (Fig. 2 – No. 1).
Occurrence in Poland: in the south and southwest; in the Carpathians, the Kraków–Częstochowa Upland, as well as in the Sudeten Foothills and the Carpathian Foothills; it is less commonly found in other parts of Poland, with the only larger concentration of sites placed in the Kashubian Coast region.

4) *Dactylorhiza fuchsii* (Druce) Soó (Fig. 3D – Appendix 1)
Habitat: *Dentario glandulosae-Fagetum*
Locality: N 49° 37.869', E 021° 18.124'; altitude 471 m above sea level; slope exposure N (Fig. 2 – No. 3).
Occurrence in Poland: throughout the country, although it is a relatively rare species.

*Species subject to partial legal protection*

Division: Pteridophyta
Class: Lycopodiopsida Bartl.
Order: Lycopodiales DC. ex Bercht. & J. Presl
Family: Huperziaceae Rothm.

5) *Huperzia selago* (L.) Bernh. ex Schrank & Mart. (Fig. 4A – Appendix 1)
Habitat: *Dentario glandulosae-Fagetum*
Locality: N 49° 36.195', E 021° 19.666'; altitude 678 m above sea level, flat area (Fig. 2 – No. 14).
Occurrence in Poland: quite common in all mountain ranges; outside the mountains in scattered locations in the highlands and lowlands.

Division: Spermatophyta
Class: Pinopsida Burnett
Order: Taxales Knobl.
Family: Taxaceae Gray

6) *Taxus baccata* L.
Habitat: *Dentario glandulosae-Fagetum*.
Locality: N 49° 36.686', E 021° 21.668'; altitude 463 m above sea level; slope exposure N (Fig. 2 – No. 6).
Occurrence in Poland: often in the Carpathians, Sudetes, Pomerania, Silesia, the Lesser Poland Upland and Subcarpathia; in the mountains up to the lower montane zone, sometimes higher.

Class: Magnoliopsida Brongn.
Order: Primulales Juss. ex Bercht. & J. Presl
Family: Primulaceae Batsch ex Borkh.

7) *Primula elatior* (L.) Hill (Fig. 4B – Appendix 1)
Habitat: an overgrowing meadow near the tourist trail.
Locality: N 49° 36.022', E 021° 21.634'; altitude 445 m above sea level, slope exposure N (Fig. 2 – No. 11).
Occurrence in Poland: common across all ranges of the Sudetes and the Carpathians (from the foothills up to the alpine zone); numerous sites in areas adjacent to the mountains; found at scattered sites mainly in Greater Poland, the Lublin region, and Podlasie.

Order: Rosales Bercht. & J. Presl
Family: Rosaceae Juss.

8) *Aruncus sylvestris* Kostel. (Fig. 4C – Appendix 1)
Habitat: shrubs near the forester's lodge of the Folusz Protection District in Cieklin.
Locality: N 49° 38.802', E 021° 23.250'; altitude 319 m above sea level, slope exposure E (Fig. 2 – No. 10).
Occurrence in Poland: frequently found in the upland belt and in the mountains, mainly within the montane zones; less common in central Poland, and only sporadically in the northeastern part of the country.

Class: Liliopsida Brongn.
Order: Asparaginales Bromhead
Family: Alliaceae Borkh.

9) *Allium ursinum* L. (Fig. 4D – Appendix 1)
Habitat: shrubs near the forester's lodge of the Folusz Protection District in Cieklin.

Locality: N 49° 38.788', E 021° 23.240'; altitude 303 m above sea level; slope exposure E (Fig. 2 – No. 7).
Occurrence in Poland: fairly common in the Sudetes and the Carpathians (mainly within the lower montane zone); outside the mountains, it is frequent in the Sandomierz Basin, the uplands of southern Poland, and in the northern part of the country; in other regions, it occurs very rarely, at scattered sites.

Family: Amaryllidaceae J. St.-Hil.

10) *Galanthus nivalis* L. (Fig. 4E – Appendix 1)
Habitat: shrubs near the forester's lodge of the Folusz Protection District in Cieklin.
Locality: N 49° 38.788', E 021° 23.240'; altitude 303 m above sea level, slope exposure E (Fig. 2 – No. 13).
Occurrence in Poland: fairly common in the southern and central parts of the country, mainly at lower mountain elevations; in the northern part of the country, occurrences are of a synanthropic nature.

Order: Liliales Perleb
Family: Melanthiaceae Batsch

11) *Veratrum lobelianum* Bernh.
Habitat: *Dentario glandulosae-Fagetum*.
Locality: N 49° 34.970', E 021° 20.596'; altitude 830 m above sea level; flat area (Fig. 2 – No. 5).
Occurrence in Poland: fairly common across all mountain ranges (from the foothills up to the alpine zone); outside the mountains, found at scattered sites in southern Poland.

Order: Orchidales Raf.
Family: Orchidaceae Juss.

12) *Dactylorhiza majalis* (Rcheb.) P.F.Hunt & Summerh. (Fig. 4F – Appendix 1)
Habitat: *Gladiolo-Agrostietum capillaris*.
Locality: N 49° 38.202', E 021° 17.898'; altitude 409 m above sea level, slope exposure N (Fig. 2 – No. 9).
Occurrence in Poland: common throughout the entire country; found in lowlands and in the mountains up to the upper montane zone.

13) *Neottia nidus-avis* (L.) Rich.
Habitat: *Dentario glandulosae-Fagetum*.
Locality: N 49° 36.776', E 021° 22.383'; altitude 405 m above sea level, slope exposure NE (Fig. 2 – No. 8).
Occurrence in Poland: fairly common throughout the entire territory of Poland; in the mountains, it occurs up to the upper montane zone.

14) *Platanthera bifolia* (L.) Rich.

Habitat: border of *Gladiolo-Agrostietum capillaris* and birch-oak-beech forest.

Locality: N 49° 38.195', E 021° 17.887'; altitude 412 m above sea level, slope exposure N (Fig. 2 – No. 12).

Occurrence in Poland: fairly common throughout the entire country; in the mountains, it occurs up to the upper montane zone, occasionally even higher.

## Summary and conclusions

The localities of registered protected plants are placed in shrub, forest and non-forest communities. *Dentario glandulosae-Fagetum* serves as a habitat for *Cephalanthera longifolia*, *Dactylorhiza fuchsii*, *Huperzia selago*, *Neottia nidus-avis*, *Taxus baccata*, and *Veratrum lobelianum*. The forest community also hosts *Asplenium scolopendrium*, characteristic of the *Phyllitido-Aceretum* association. The remaining seven species occur in shrub or non-forest communities: *Primula elatior* on a succession meadow near the tourist trail, *Allium ursinum* and *Galanthus nivalis* in shrubs near the forester's lodge in Cieklin, *Dactylorhiza majalis* and *Gladiolus imbricatus* in the montane meadow community *Gladiolo-Agrostietum capillaris*, and *Platanthera bifolia* at the boundary of the *Gladiolo-Agrostietum capillaris* and the birch-oak-beech forest.

The localities of seven species (*Asplenium scolopendrium*, *Dactylorhiza fuchsii*, *D. majalis*, *Gladiolus imbricatus*, *Platanthera bifolia*, *Primula elatior*, and *Taxus baccata*) are placed on north-facing slopes. The localities of *Allium ursinum*, *Aruncus sylvestris*, and *Galanthus nivalis* are situated on east-facing slopes, while *Cephalanthera longifolia* and *Neottia nidus-avis* occur on northeast-facing slopes. The localities of *Huperzia selago* and *Veratrum lobelianum* were recorded in flat areas within the studied district. All recorded localities are situated at elevations ranging from 303 to 830 meters above sea level, corresponding to the foothill and lower montane zones.

It is worth emphasising that four of the species recorded here are listed in the "*Polish Red List of Ferns and Flowering Plants*" (Kaźmierczakowa et al., 2016). *Dactylorhiza majalis*, *Gladiolus imbricatus*, and *Huperzia selago* are classified as Near Threatened (NT), while *Cephalanthera longifolia* is categorised as Vulnerable (VU).

To ensure the continuity of existence and biodiversity of species within Magura National Park, numerous conservation measures are systematically implemented to protect habitats. In non-forest areas, mowing is carried out – mechanical mowing of dry and fresh meadows regularly once every two years, and heathlands once every five years. Manual mowing of wet meadows and marshes takes place once every three to five years. Another conservation activity within the Park involves the removal of young trees every three to five years, which prevents forest species from displacing meadow and grassland plants. Other measures include stabilising water conditions and

selectively clearing heavily shaded or overgrown sites where other plants encroach and hinder the development of valuable forest species such as *Asplenium scolopendrium* and forest orchids. Monitoring plays a significant role in conservation efforts. Twenty-three species of "special concern" are monitored within the Park, including *Asplenium scolopendrium*, *Cephalanthera longifolia*, *Galanthus nivalis*, and *Gladiolus imbricatus*. These are rare and endangered species. Monitoring allows for the control of site conditions and population numbers of these taxa. Additionally, it facilitates the discovery of new sites and new species within the Park. The implementation of these tasks enables the achievement of the priority objectives of Magura National Park, which include the protection of habitats and population sizes of threatened and rare plant species as well as the conservation of biodiversity (Czaderna, 2009; Szafrański, 2009b; Zemanek, 2009).

**Conflict of interest**

The authors declare no conflict of interest related to this article.

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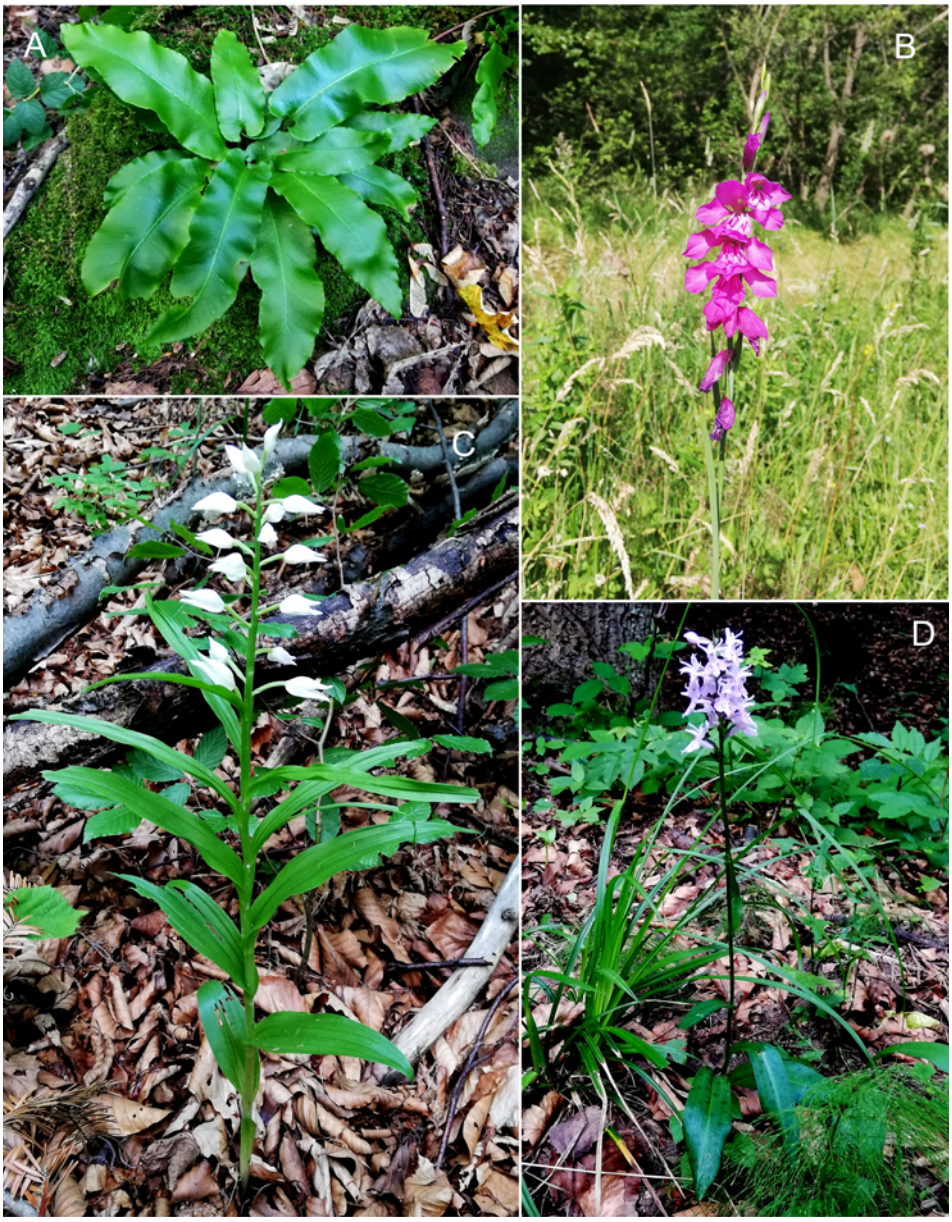



**Fig. 3.** Species under full protection recorded in the Folusz Protective District in Magura National Park (Southern Poland): *Asplenium scolopendrium* L. (A), *Gladiolus imbricatus* L. (B), *Cephalanthera longifolia* (L.) Fritsch (C), *Dactylorhiza fuchsii* (Druce) Soó (D) (Photo: Ewelina Żegleń)




**Fig. 4.** Selected partially protected species recorded in the Folusz Protective District in Magura National Park (Southern Poland): *Huperzia selago* (L.) Bernh. ex Schrank & Mart. (A), *Primula elatior* (L.) Hill (B), *Aruncus sylvestris* Kostel (C), *Allium ursinum* L. (D), *Galanthus nivalis* L. (E), *Dactylorhiza majalis* (Rchb.) P.F. Hunt & Summerh. (F) (Photo. Ewelina Żegleń)

## Stanowiska roślin chronionych na terenie Obrębu Ochronnego Folusz (Magurski Park Narodowy, Polska Południowa) – notatka florystyczna

**Streszczenie**

Praca zawiera wyniki badań terenowych, prowadzonych od marca do listopada 2020 roku na terenie Obwodu Ochronnego Folusz, w obrębie Magurskiego Parku Narodowego. Celem badań było opracowanie wykazu oraz lokalizacji stanowisk występujących tu roślin prawnie chronionych. Na badanym obszarze stwierdzono występowanie 14 gatunków, wśród których 4 podlegają ochronie ścisłej, a pozostałe 10 ochronie częściowej. Gatunki podlegające ochronie ścisłej to: *Asplenium scolopendrium*, *Cephalanthera longifolia*, *Dactylorhiza fuchsii* i *Gladiolus imbricatus*. Gatunkami podlegającymi ochronie częściowej są tu: *Allium ursinum*, *Aruncus sylvestris*, *Dactylorhiza majalis*, *Galanthus nivalis*, *Huperzia selago*, *Neottia nidus-avis*, *Platanthera biforia*, *Primula elatior*, *Taxus baccata* i *Veratrum lobelianum*. Wśród odnotowanych gatunków trzy są taksonami reglowymi (*Allium ursinum*, *Aruncus sylvestris*, *Asplenium scolopendrium*), dwa to rośliny ogólnogórskie (*Huperzia selago*, *Veratrum lobelianum*), a *Cephalanthera longifolia* jest gatunkiem kserotermicznym. Stanowiska roślin chronionych, odnotowane na obszarze Obwodu Ochronnego Folusz, znajdują się w zbiorowiskach zaroślowych, leśnych (buczynie karpackiej, jaworzynie górskiej) i nieleśnych (na łąkach, głównie górskiej łące mieczykowo-mietlicowej), na stokach o ekspozycji N, rzadziej N-E lub E.

**Słowa kluczowe:** Obwód Ochronny, gatunki prawnie chronione, Park Narodowy

## Information on the authors

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A biology graduate, her research interests include nature conservation, with particular emphasis on rare and endangered plants.

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Her main research interests include lichens occurring in industrially degraded areas, as well as broadly understood botany and herbal medicine.