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THE DISTRIBUTION, DEGREE OF THREAT TO AND CONSERVATION OF THE ORCHIDS OF ŽUMBERAK (CROATIA)*

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In the work details are given of the degree of threat, the habitats, sites and distribution of the orchids of Žumberak according to UTM maps (10 x 10 km quadrants). During ten years of research into the vegetation and flora, 35 species have been recorded, more than half of all the orchid species in Croatia. Of the 35 species recorded, 18 are on the Red List of Species of the Republic of Croatia, in the following categories: endangered, vulnerable and rare. Of these, six species are protected in the Nature Conservation Law.

The research has shown the great richness and diversity of the flora of the Žumberak Highlands, and since most of it is not assigned to any nature conservation category at all, certain legislative measures need to be carried out to ensure that the natural habitats in which orchids and other rare plants grow are conserved and not allowed to be changed.

Key words: orchids, distribution, the degree of threat, conservation, Žumberak, Croatia

Vrbek, M. & S. Fiedler: Rasprostranjenost, stupanj ugroženosti i zaštita orhideja Žumberka (Hrvatska), Nat. Croat., Vol. 7, No. 4., 291–305, 1998, Zagreb

U radu se iznose podaci o stupnju ugroženosti, staništima, nalazištima i rasprostranjenosti orhideja Žumberka prema UTM kartama (kvadranti 10 X 10 km). Tijekom desetogodišnjih florističkih i vegetacijskih istraživanja zabilježeno je 35 vrsta što je više od polovine ukupnog broja orhideja poznatih u Hrvatskoj. Od 35 zabilježenih vrsta 18 ih je uvršteno u Crvenu knjigu biljnih vrsta Republike Hrvatske u kategorijama: ugrožene, osjetljive i rijetke. Od toga ih je 6 zaštićeno Zakonom o zaštiti prirode.

Istraživanja su pokazala veliko bogatstvo i florističku raznolikost Žumberačkog Gorja a, kako ono najvećim dijelom nije uvršteno ni u kakvu kategoriju zaštite prirode, trebalo bi poduzeti određene zakonske mjere zaštite koje bi osigurale očuvanje i nepromjenjivost prirodnih staništa na kojima rastu orhideje i druge rijetke vrste biljaka.

Ključne riječi: orhideje, rasprostranjenost, stupanj ugroženosti, zaštita, Žumberak, Hrvatska

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INTRODUCTION

Žumberak is a mountainous region in the western part of Central Croatia and is dominated by the Žumberak Highlands, a dissected massif 40 km long, in which, because of the geographical features and the overlapping of Pannonian, Dinaric and pre-Alpine influences, a very interesting flora characterized by a great diversity of species has developed. The area between the Kupa River in the south west, the Slovenian frontier in the west and north, and the Bregana and Brebrovac brooks to the east (Fig. 1) has been investigated.

The flora and vegetation of Žumberak, with the exception of the Samobor Hills to the north east (ŠUGAR, 1971), have never been systematically researched. Currently available data are largely the result of old floristic research into the wider or narrower area: SCHLOSSER & VUKOTINOVIĆ (1869), HIRC (1903–1912), ROSSI (1924), HORVAT (1929, 1962). For this reason we set about a more systematic research into Žumberak.

From all the data that have derived from a ten year period of research, this work concentrates on those relating to orchids. Data are given about the degree of threat to, the habitats, sites and distribution of the orchids of Žumberak according to UTM maps (10 x 10 km quadrants).

MATERIALS AND METHODS

The species mentioned in the work were recorded during field research. Only ambiguous species that could not be determined in the field were picked. The



Fig. 1. Researched area

specimens are stored in the Herbarium of the Croatian Natural History Museum (CNHM). Habitats and individual species were photographed. UTM 1 : 500 000 maps and the Žumberak – Gorjanci 1 : 50 000 map were used for orientation in the field and for the determination of the distribution of the individual species. The finds of species were analysed according to the habitats, exposure and time of recording. These data were processed by the software Statistica 5.0 (StatSoft Inc., 1995). The threat (vulnerability) levels were determined according to the Red Book of Plant Species of the Republic of Croatia (ŠUGAR, 1994). Standard keys and iconographies were used to identify species and lower level taxa: BUTTLER (1991), DOMAC (1994), JAVORKA & CSAPODY (1991), PIGNATTI (1982), TUTIN *et al.* (1980). The nomenclature of species was correlated with that in the work Flora Europaea (TUTIN *et al.*, 1964–1980).

RESULTS

Thirty five species were recorded in the research area, more than half of the total number of orchids recorded for the Republic of Croatia as a whole (List of species). Eighteen of them are in the Red Book of Plant Species of the Republic of Croatia, in the categories of: endangered (*Cephalanthera damasonium*, *C. longifolia*, *C. rubra*, *Ophrys apifera*, *O. fuciflora*, *Orchis purpurea*, *Platanthera chlorantha*), vulnerable (*Ophrys insectifera*, *O. sphegodes*, *Orchis coriophora*, *O. mascula*, *O. militaris*, *O. morio*,



Fig. 2. *Anacamptis pyramidalis* (Photo: M. Vrbeč)

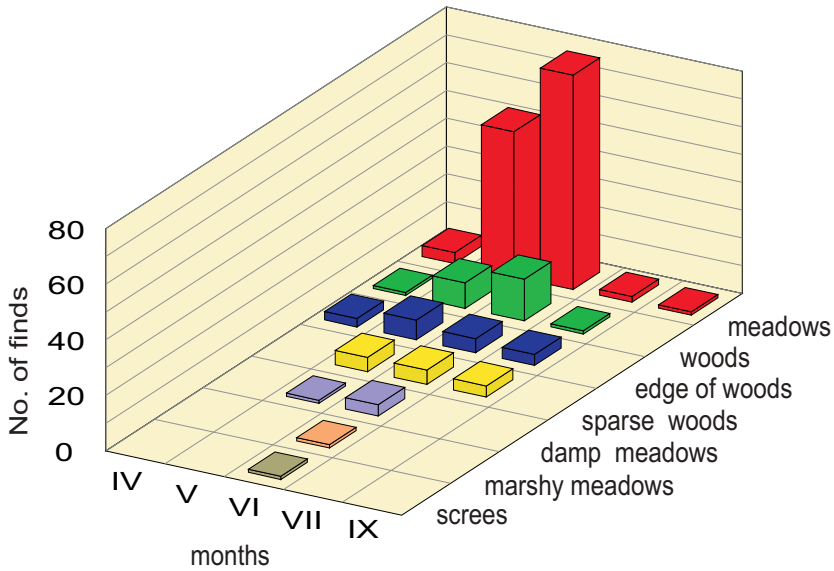


Fig. 3. No. of finds in relation to months and habitats

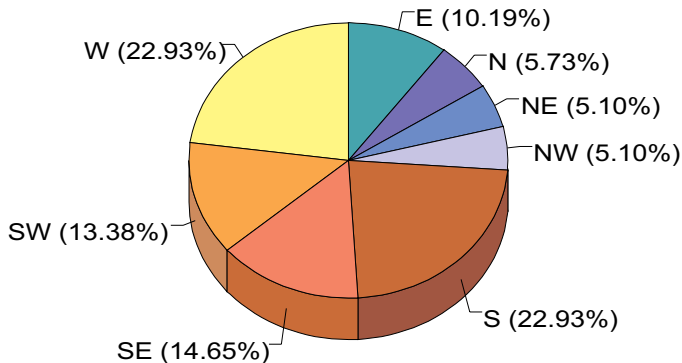


Fig. 4. The percentage of finds in relation to exposure

O. pallens, *O. tridentata*, *O. ustulata*, *Platanthera bifolia*) and rare (*Anacamptis pyramidalis*) (Fig. 2). Six of them are protected by the Nature Conservation Law (*Anacamptis pyramidalis*, *Cephalanthera damasonium*, *C. longifolia*, *C. rubra*, *Platanthera chlorantha*, and *P. bifolia*). The species: *Corallorhiza trifida* Chatel, *Orchis simia* Lam., *Serapias lingua* L., mentioned in the popular work Žumberak: Kalendar flore Žumberačke gore (FORENBACHER, 1995) were not recorded in our research.

Most species and finds were noted in May and June on meadow and forest habitats (Fig. 3) and on the slopes of the Žumberak Highlands with western, but mostly southern exposures (Fig. 4). Most widely distributed are *Gymnadenia conopsea*, *Lis-*

tera ovata and *Orchis morio*, which grow on various kinds of meadows, from the low-lying areas to the highest parts of the research area, while *Gymnadenia odoratissima*, *Pseudorchis albida* and *Spiranthes spiralis* were noted only in a very restricted area above 560 m a.s.l.

CONCLUSIONS

The research showed Žumberak to have a great floristic richness and diversity, which is not surprising considering this is a sparsely inhabited area without a developed tourist industry that still abounds in natural habitats suitable for the growth of orchids and other wild flowers. Apart from this, the geographical features already mentioned, as well as the intermingling of flora from various regions that meet here, have a great influence on species diversity and abundance. Since most of Žumberak is not included in any protection category, certain legislative measures have to be undertaken to ensure the protection, preservation and integrity of the natural habitats in which orchids and other rare wild flowers grow.

LIST OF SPECIES

1. *Anacamptis pyramidalis* (L.) L.C.M. Richard

A **rare** species, **protected** pursuant to the Nature Protection Law, 1972, in all its natural sites. In these sites there are only few specimens, growing individually, mainly on dry meadows on limestone soils, facing south, west or south-west, at heights of between 200 and 650 m a.s.l.

WL46: Pavlanci, meadow, W, 10°, 650 m, 16.06.1988.

WL36: Gornji Oštrc, meadow, S, 10°, 400 m, 11.06.1991.

WL36: Slapnica – Vlašić brdo, sparse wood, W, 200 m, 18.06.1992.

WL47: Gojki, meadow, S, 10°, 400 m, 24.05.1994.

WL47: Stojdraga, meadow, SW, 30°, 470 m, 08.06.1995.

WL46: Žalčev Breg, meadow, SW, 10°, 240 m, 21.06.1995.

2. *Cephalanthera damasonium* (Miller) Druce

An **endangered** species, **protected** pursuant to the Nature Protection Law, 1972, in all its natural sites. In these sites there are only few specimens, growing individually, mainly in sparse woods, at heights of between 300 and 740 m a.s.l.

WL35: Sršići, meadow, W, 380 m, 27.05.1989.

WL46: Pavlanci, wood, W, 40°, 650 m, 16.06.1988.

WL26: Pliješ – Jarak, sparse wood, 720 m, 22.05.1990.

WL47: Štipkovo, wood, 300 m, 01.06.1990.

WL36: Hartje – Ilovice, sparse wood, SW, 470 m, 29.07.1992.

WL37: Novo selo, sparse wood, SE, 10°, 740 m, 13.06.1995.

3. *Cephalanthera longifolia* (L.) Fritsch

An **endangered** species, **protected** pursuant to the Nature Protection Law, 1972, in all its natural sites. In these sites there are only few specimens, growing individually, mainly in woods and meadows, at heights of between 280 and 960 m a.s.l.

WL47: Stojdraga, wood, 500 m, 11.05.1988.

WL26: Brezovica, wood, 400 m, 26.05.1988.

WL36: Šinkovići, meadow, S, 340 m, 12.05.1988.

WL36: Pliješ, meadow, S, 960 m, 720 m, 24.05.1990.

WL36: Čunkova draga, edge of wood, E, 280 m, 23.05.1991.

WL26: Pliješ – Jarak, meadow, W, 720 m, 31.05.1990.

4. *Cephalanthera rubra* (L.) L.C.M. Richard

An **endangered** species, **protected** pursuant to the Nature Protection Law, 1972, in all its natural sites. In the research area only a few individual specimens were noted, mainly on dry meadows, facing various directions, at heights of between 280 and 760 m a.s.l.

WL46: Pavlanci, meadow, W, 10, 40, 650 m, 16.06.1988.

WL36: Pliješ, meadow, 760 m, 24.06.1990.

WL36: Stanišići, wood, E, 280 m, 22.06.1990.

WL36: Đurići, scree, 340 m, 25.06.1992.

WL36: Gornji Oštrc, meadow, S, 10°, 400 m, 09.06.1993.

5. *Coeloglossum viride* (L.) Hartman

In the research area only a few specimens were noted, in three sites, on meadows facing various directions, at heights of between 660 and 1100 m a.s.l.

WL26: Kaštanice, meadow, SW, 20°, 1100 m, 09.06.1988.

WL47: Kumičevac, meadow, S, 15°, 780 m, 21.06.1989.

WL47: Poklek – Kičer, meadow, NE, 10°, 660 m, 08.06.1995.

6. *Dactylorhiza fuchsii* (Druce) Soó subsp. *fuchsii*

In these sites there are only a few specimens. Growing individually, mainly on meadows, at heights of between 620 and 730 m a.s.l.

WL47: Kičer – Kravljak, meadow, 650 m, 620 m, 21.06.1989.

WL47: Poklek, meadow, N, 620 m, 01.06.1990.

WL36: Pliješ, sparse wood, W, 720 m, 31.05.1990.

WL37: Budinjak, meadow, 730 m, 09.06.1988.

7. *Dactylorhiza incarnata* (L.) Soó subsp. *incarnata*

Where it was found, only a few specimens were present, growing on damp meadows, at heights of between 190 and 900 m a.s.l.

WL36: Kupčina Žumberačka, damp meadow, 260 m, 23.05.1990.

WL47: Koretića mlin, damp meadow, 330 m, 11.06.1991.

WL37: Pečurka – Pogane jame, damp meadow, S, 15°, 900 m, 22.06.1988.

WL36: Kostanjevac, marshy meadow, 190 m, 05.06.1996.

8. *Dactylorhiza maculata* (L.) Soó subsp. *maculata*

In these sites only a few individual specimens were noted, growing on meadows, at heights of between 290 and 780 m a.s.l.

WL47: Tušćak, damp meadow, 290 m, 11.06.1991.

WL47: Selce Žumberačko, meadow, N, 540 m, 01.06.1990.

WL47: Poklek, meadow, NE, 10°, 660 m, 01.06.1990.

WL37: Bratelji, meadow, 780 m, 13.06.1995.

subsp. *transsilvanica* (Schur) Soó

WL37: Pečurka – Pogane jame, meadow, S, 15°, 900 m, 22.06.1988.

9. *Dactylorhiza sambucina* (L.) Soó subsp. *sambucina*

In these sites, it was present in a large number of specimens. It grows individually or in small groups, on meadows facing various directions, at heights of between 580 and 1100 m a.s.l.

WL26: Kaštanice, meadow, SW, 20°, 1100 m, 19.05.1988.

WL37: Gornja Vas – Dimnica, meadow, W, 730 m, 26.04.1989.

WL37: Ječmište, meadow, SE, 15°, 940 m, 19.05.1988.

WL26: Doljani, meadow, 580 m, 06.06.1990.

WL37: Osunja, edge of wood, NW, 600 m, 12.04.1989.

WL47: Kumičevac, meadow, S, 700 m, 12.04.1989.

10. *Epipactis atrorubens* (Hoffm.) Besser

In the research area, only a few specimens were noted, in three sites, mainly at the edge of woods, at heights of between 660 and 1100 m a.s.l.

WL36: Pliješ, edge of wood, W, 780 m, 22.06.1990.

WL37: Ječmište, sparse wood, 860 m, 20.07.1994.

WL36: Talani – Kekić draga, edge of wood, 300 m, 21.07.1989.

11. *Epipactis helleborine* (L.) Crantz

In these sites, only a few individual specimens were noted, mainly at the edge of woods, at heights of between 420 and 800 m a.s.l.

WL26: Doljani, sparse wood, SE, 600 m, 25.07.1990.

WL47: Gabrovica, wood, S, 420 m, 20.07.1989.

WL26: Boljara, edge of wood, 800 m, 29.07.1992.

WL47: Stojdraga, edge of wood, 460 m, 24.06.1990.

12. *Epipactis palustris* (L.) Crantz

It was noted in two sites, only a few individual specimens being found on wet habitats near a brook.

WL46: Orto – Lipovac, edge of wood, 420 m, 10.07.1992.

WL26: Pliješ – Jarak, edge of wood, 750 m, 13.07.1988.

13. *Gymnadenia conopsea* (L.) R. Br.

In the research area it was noted in many sites. It grows individually, mainly on various meadow habitats facing various directions, at heights of between 200 and 1100 m a.s.l.

WL36: Višči vrh – Kremenjak, meadow, E, 500 m, 25.06.1992.

WL36: Pliješ, meadow, S, 960 m, 24.05.1990.

WL36: Cernik – Izvori Kupčine, meadow, SW, 400 m, 23.05.1990.

WL47: Poklek, meadow, N, 620 m, 21.06.1989.

WL47: Drmiči, meadow, SE, 520 m, 21.06.1989.

WL26: Kaštanice, meadow, SW, 20°, 1100 m, 09.06.1988.

WL37: Opatova gora, meadow, E, 15°, 940 m, 10.06.1988.

WL46: Pavlanci, meadow, W, 10°, 650 m, 16.06.1988.

WL26: Šiljki, meadow, W, 15°, 600 m, 02.06.1988.

WL37: Budinjak, meadow, S, 730 m, 09.06.1988.

WL36: Slapnica – Vlašič brdo, sparse wood, W, 200 m, 18.06.1992.

WL47: Stojdraga, meadow, SE, 40°, 400 m, 24.05.1994.

WL46: Orto – Lipovac, meadow, 410 m, 10.07.1992.

WL37: Ječmište, meadow, E, 5°, 860 m, 24.05.1994.

WL36: Grič, meadow, 840 m, 18.06.1994.

WL26: Badovinci, meadow, 690 m, 20.06.1995.

WL26: Magovci, meadow, NW, 10°, 660 m, 20.06.1995.

WL46: Delivuki, meadow, SE, 5°, 530 m, 27.06.1995.

14. *Gymnadenia odoratissima* (L.) L.C.M. Richard

In the research area it was noted in one site, only a few specimens being found.

WL46: Pavlanci, meadow, W, 10°, 650 m, 16.06.1988.

15. *Himantoglossum hircinum* (L.) Sprengel subsp. *hircinum*

In these sites, a few individual specimens were present, mainly on dry meadows facing various directions, at heights of between 220 and 500 m a.s.l.

WL36: Medven draga, wood, 220 m, 22.05.1990.

WL36: Cernik, sparse wood, W, 500 m, 31.05.1990.

WL36: Gornji Oštrc, meadow, S, 10°, 400 m, 09.06.1993.

WL36: Slobodnjaki, meadow, W, 5°, 500 m, 15.06.1995.

WL26: Dragoševci, meadow, N, 10°, 500 m, 20.06.1995.

16. *Limodorum abortivum* (L.) Schwartz

In the research area it grows in small groups or individually, mainly on dry meadows facing various directions, at heights of between 450 and 690 m a.s.l.

WL46: Pavlanci, meadow, W, 10°, 650 m, 16.06.1988.

WL46: Stakiči – Rudarica, meadow, NW, 500 m, 04.05.1989.

WL37: Glušinja, meadow, S, 690 m, 18.16.1992.

WL47: Poklek – Kičer, meadow, NE, 10°, 660 m, 08.06.1995.

WL36: Hartje, edge of wood, S, 20°, 450 m, 07.06.1997.

17. *Listera ovata* (L.) R.Br.

It was noted in many sites. It grows individually on meadows, in woods and at wood edges, facing various directions, at heights of between 250 and 940 m a.s.l.

WL36: Žumberak, edge of wood, NE, 300 m, 15.05.1990.

WL47: Tisovac, wood, E, 40°, 390 m, 11.05.1988.

WL26: Jezernice, edge of wood, SW, 15°, 680 m, 25.05.1988.

WL26: Sekulići, meadow, SE, 30°, 750 m, 26.05.1988.

WL37: Opatova gora, meadow, E, 15°, 940 m, 10.06.1988.

WL46: Pavlanci, wood, W, 40°, 650 m, 16.06.1988.

WL36: Rude Pribičke – Breznik, wood, SW, 35°, 400 m, 21.04.1988.

WL36: Čunkova draga, meadow, W, 250 m, 23.05.1991.

WL26: Malinci, meadow, E, 15°, 650 m, 02.06.1988.

WL26: Pliješ – Jarak, meadow, W, 720 m, 31.05.1990.

WL37: Ječmište, meadow, E, 5°, 860 m, 24.05.1994.

WL26: Oštrc, meadow, SW, 20°, 900 m, 06.06.1995.

WL37: Prisjeka – Križevina, edge of wood, W, 10°, 750 m, 13.06.1995.

WL37: Budinjak, meadow, 740 m, 13.06.1995.

WL37: Bratelji, meadow, 780 m, 13.06.1995.

WL36: Drašći vrh, meadow, N, 10°, 440 m, 14.06.1995.

18. *Neottia nidus – avis* (L.) L.C.M. Richard

In the research area it was noted mainly in woods, where it grows individually, at heights of between 650 and 970 m a.s.l.

WL47: Kičer – Kravljak, wood, 650 m, 21.06.1989.

WL46: Pavlanci, wood, W, 40°, 650 m, 16.06.1988.

WL36: Pliješ, sparse wood, 970 m, 24.05.1990.

WL37: Budinjak, wood, S, 730 m, 09.06.1988.

19. *Ophrys apifera* Hudson

An **endangered** species. In the research area it was noted on dry meadows. It grows individually or in small groups, at heights of between 245 and 735 m a.s.l.

WL37: Novo selo, meadow, SE, 10°, 735 m, 13.06.1995.

WL36: Reliči, meadow, E, 280 m, 31.05.1995.

WL36: Šinkovići, meadow, S, 340 m, 14.06.1995.

WL46: Žalčev Breg, meadow, SW, 10°, 245 m, 21.06.1995.

20. *Ophrys fuciflora* (F.W. Schmidt) Moench subsp. *fuciflora*

An **endangered** species. In the research area only a few specimens were noted, in three sites.

WL36: Reliči, meadow, E, 10°, 280 m, 31.05.1995.

WL36: Slapnica – Vlašić brdo, sparse wood, W, 200 m, 18.06.1992.

WL47: Osredak, meadow, 220 m, 25.05.1995.

21. *Ophrys insectifera* L.

A **vulnerable** species. In the four sites where it was found, it grows in various habitats, at heights of between 400 and 780 m a.s.l.

WL36: Pliješ, edge of wood, S, 780 m, 31.05.1990.

WL26: Pliješ – Jarak, damp meadow, 710 m, 09.06.1993.

WL36: Gornji Oštrc, sparse wood, S, 10°, 400 m, 22.05.1990.

WL36: Draga, meadow, SW, 580 m, 18.05.1988.

22. *Ophrys sphegodes* Miller subsp. *sphgodes*

A **vulnerable** species. A few individual specimens were noted, in only two sites on dry meadow habitats.

WL36: Reliči, meadow, E, 10°, 280 m, 31.05.1995.

WL36: Šinkovići, meadow, S, 340 m, 14.06.1995.

23. *Orchis coriophora* L. subsp. *fragrans* (Pollini) Sudre

A **vulnerable** species. It was noted in two sites, where it grows in small groups on dry meadow habitats facing south-east.

WL47: Drmići, meadow, SE, 520 m, 21.06.1989.

WL47: Stojdraga, meadow, SE, 40°, 400 m, 24.05.1994.

24. *Orchis mascula* (L.) L. subsp. *mascula*

A **vulnerable** species. In these sites, only a few specimens were noted, growing individually on meadows, in sparse woods and at wood edges, at heights of between 660 and 1100 m a.s.l.

WL47: Kumičevac, meadow, S, 20°, 700 m, 13.05.1997.

WL26: Pliješ, sparse wood, W, 720 m, 31.05.1990.

WL26: Kaštanice, meadow, SW, 20°, 1100 m, 09.06.1988.

WL36: Sopote – Sopotski slap, edge of wood, 590 m, 18.05.1988.

WL47: Poklek, meadow, SE, 10°, 660 m, 08.06.1995.

25. *Orchis militaris* L.

A **vulnerable** species. In the research area a few individual specimens were noted, mainly on meadows, at heights of between 300 and 660 m a.s.l.

WL36: Žumberak – Sv. Nikola, edge of wood, S, 300 m, 15.05.1990.

WL47: Tisovac, wood, E, 40°, 390 m, 11.05.1988.

WL36: Sošice, meadow, SW, 10°, 480 m, 23.05.1994.

WL47: Stojdraga, meadow, SE, 15°, 460 m, 24.05.1994.

WL47: Poklek – Kičer, meadow, NE, 10°, 660 m, 08.06.1995.

26. *Orchis morio* L. subsp. *morio*

A **vulnerable** species. In the research area it was noted in many sites. It grows individually, or in small groups on meadow habitats, at heights of between 200 and 750 m a.s.l.

WL36: Šinkovići, meadow, S, 340 m, 12.05.1988.

WL46: Rude Pribičke, meadow, W, 400 m, 21.04.1988.

WL46: Žalčev breg, meadow, NW, 250 m, 04.05.1989.

WL37: Budinjak, meadow, S, 735 m, 19.05.1988.

WL36: Gornji Oštrc, meadow, W, 400 m, 23.05.1991.

WL47: Kumičevac, meadow, S, 20°, 700 m, 12.04.1989.

WL36: Čunkova draga, meadow, 200 m, 23.05.1991

WL47: Delivuki, meadow, E, 620 m, 11.06.1991.

WL36: Reliči, meadow, E, 10°, 280 m, 23.05.1994.

WL47: Stojdraga, meadow, SE, 40°, 400 m, 24.05.1994.

WL47: Poklek, meadow, N, 30°, 620 m, 24.05.1994.

WL37: Novo selo – Ravnice, meadow, SE, 5°, 740 m, 13.06.1995.

WL37: Prisjeka – Križevina, meadow, W, 10°, 750 m, 13.06.1995.

WL26: Dragoševci, meadow, N, 10°, 500 m, 20.06.1995.

27. *Orchis pallens* L.

A **vulnerable** species. A few individual specimens were noted in only two sites.

WL36: Željezno Žumberačko, edge of wood, SW, 250 m, 07.04.1991.

WL37: Ječmište, meadow, E, 5°, 860 m, 24.05.1994.

28. *Orchis purpurea* Hudson

An **endangered** species. Where it was found, it was present individually, mainly in woods facing various directions, at heights of between 200 and 870 m a.s.l.

WL36: Pliješ – Vodice, wood, SE, 870 m, 22.05.1990.

WL26: Pliješ – Jarak, wood, NE, 30°, 700 m, 23.05.1994.

WL36: Željezno Žumberačko, edge of wood, SW, 250 m, 07.04.1991.

WL47: Kumičevac, wood, S, 20°, 700 m, 18.05.1988.

WL37: Budinjak, wood, S, 730 m, 09.06.1988.

WL36: Slapnica – Vlašić brdo, sparse wood, W, 200 m, 18.06.1992.

WL36: Hartje – Ilovice, sparse wood, SW, 470 m, 29.07.1992.

29. *Orchis tridentata* Scop. subsp. *tridentata*

A **vulnerable** species. In the research area it was noted in many sites. It grows individually, on dry meadows facing various directions, at heights of between 220 and 1100 m a.s.l.

WL47: Kumičevac, meadow, S, 20°, 700 m, 24.05.1994.

WL26: Pliješ, meadow, NW, 30°, 730 m, 24.05.1990.

WL26: Sekulići, meadow, SE, 30°, 750 m, 26.05.1988.

WL36: Šinkovići, meadow, S, 340 m, 12.05.1988.

WL36: Gornji Oštrc, meadow, W, 400 m, 23.05.1991.

WL46: Žalčev Breg, meadow, NW, 250 m, 04.05.1989.

WL26: Kaštanice, meadow, SW, 20°, 1100 m, 09.06.1989.

WL47: Osredak, meadow, 220 m, 25.05.1995.

WL47: Tuščak, meadow, 280 m, 25.05.1995.

WL36: Stari grad Žumberački, meadow, NW, 10°, 600 m, 06.06.1995.

WL36: Reliči, meadow, E, 10°, 280 m, 31.05.1995.

WL47: Poklek – Kičer, meadow, NE, 10°, 660 m, 08.06.1995.

WL37: Novo selo – Ravnice, meadow, SE, 5°, 740 m, 13.06.1995.

WL37: Prisjeka – Križevina, meadow, W, 10°, 750 m, 13.06.1995.

WL37: Bratelji, meadow, 780 m, 13.06.1995.

subsp. *commutata* (Tod.) Nyman

WL36: Draga, meadow, SW, 580 m, 18.05.1988.

WL26: Malinci, meadow, E, 15°, 650 m, 02.06.1988.

WL36: Šinkovići, meadow, S, 340 m, 12.05.1988.

30. *Orchis ustulata* L.

A **vulnerable** species. In these sites, there are only a few specimens noted, growing in meadow habitats facing various directions, at heights of between 280 and 1100 m a.s.l.

WL47: Tuščak, meadow, 280 m, 25.05.1995.

WL26: Kaštanice, meadow, SW, 20°, 1100 m, 22.06.1988.

WL37: Ječmište, meadow, SE, 15°, 940 m, 10.06.1988.

WL35: Lović Prekriški, meadow, SE, 400 m, 25.05.1990.

WL26: Pliješ, meadow, NW, 30°, 730 m, 24.05.1990.

WL26: Doljani – Kula, meadow, SE, 720 m, 26.07.1990.

WL26: Pilatovci, meadow, W, 5°, 450 m, 07.06.1995.

31. *Platanthera bifolia* (L.) L.C.M. Richard

A **vulnerable** species, **protected** pursuant to the Nature Protection Law, 1972, in all its natural sites. In these sites a large number of specimens were noted, growing

individually, in woods, at wood edges and on meadows, at heights of between 120 and 820 m a.s.l.

- WL46: Pavlanci, wood, W, 40°, 650 m, 16.06.1988.
WL37: Pečurka – Pogane jame, wood, W, 15, 900 m, 22.06.1988.
WL26: Boljara, wood, E, 820 m, 09.06.1989.
WL47: Kičer – Kravljak, edge of wood, NE, 720 m, 21.06.1989.
WL37: Ječmište, meadow, SE, 15°, 860 m, 940 m, 10.06.1988.
WL45: Mirkopolje, wood, 120 m, 06.06.1990.
WL35: Lović Prekriški, edge of wood, SE, 420 m, 23.05.1990.
WL37: Opatova gora, meadow, 920 m, 11.06.1991.
WL47: Štipkovo, wood, 300 m, 01.06.1990.
WL36: Kremenjak, wood, SW, 500 m, 18.06.1992.
WL47: Poklek, meadow, N, 30°, 620 m, 24.05.1994.
WL37: Bratelji, meadow, 780 m, 13.06.1995.

32. *Platanthera chlorantha* (Custer) Reichenb.

An **endangered** species, **protected** pursuant to the Nature Protection Law, 1972, in all its natural sites. It was noted in two sites, only a few individual specimens.

- WL46: Pavlanci, wood, W, 40°, 650 m, 16.06.1988.
WL47: Kumičevac, meadow, S, 20°, 700 m, 08.06.1995.

33. *Pseudorchis albida* (L.) Á. & D. Löwe subsp. *albida*

In the research area it was noted in one site, only two specimens.

- WL37: Pečurka – Pogane jame, meadow, S, 15°, 900 m, 22.06.1988.

34. *Spiranthes spiralis* (L.) Chevall

In the research area fifteen specimens were noted, in one site.

- WL36: Reštovo Žumberačko, meadow, W, 560 m, 23.09.1993.

35. *Traunsteinera globosa* (L.) Reichenb.

Where it was found, it was present in a large number of specimens. It grows individually on meadows facing various directions, at heights of between 340 and 1030 m a.s.l.

- WL47: Selce Žumberačko, meadow, N, 560 m, 01.06.1990.
WL26: Kaštanice, meadow, SE, 10°, 1030 m, 28.06.1995.
WL26: Pliješ – Jarak, meadow, W, 720 m, 31.05.1990.
WL36: Šinkovići, meadow, S, 340 m, 14.06.1995.
WL37: Bratelji, meadow, 780 m, 13.06.1995.
WL37: Budinjak, meadow, S, 735 m, 19.05.1988.

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SAŽETAK

Rasprostranjenost, stupanj ugroženosti i zaštita orhideja
Žumberka (Hrvatska)

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U radu se iznose podaci o stupnju ugroženosti, staništima, nalazištima i rasprostranjenosti orhideja Žumberka prema UTM kartama (kvadranti 10 X 10 km). Tijekom desetgodišnjih florističkih i vegetacijskih istraživanja zabilježeno je 35 vrsta što je više od polovine ukupnog broja orhideja poznatih u Hrvatskoj. Takvo bogatstvo na relativno malom području uvjetovano je različitim utjecajima i geografskim osobitostima Žumberka. To je planinski kraj zapadnog dijela Središnje Hrvatske kojim dominira Žumberačko Gorje, razveden masiv dužine 40 km u kojem se prepleću panonski, dinarski i predalpski utjecaji.

Od 35 zabilježenih vrsta 18 ih je uvršteno u Crvenu knjigu biljnih vrsta Republike Hrvatske u kategorijama: ugrožene (*Cephalanthera damasonium*, *C. longifolia*, *C. rubra*, *Ophrys apifera*, *Ophrys fuciflora*, *Orchis purpurea*, *Platanthera chlorantha*), osjetlji-

ve (*Ophrys insectifera*, *O. sphegodes*, *Orchis coriophora*, *O. mascula*, *O. militaris*, *O. morio*, *O. pallens*, *O. tridentata*, *O. ustulata*, *Platanthera bifolia*) i rijetke (*Anacamptis pyramidalis*). Od toga ih je 6 zaštićeno Zakonom o zaštiti prirode (*Anacamptis pyramidalis*, *Cephalanthera damasonium*, *C. longifolia*, *C. rubra*, *Platanthera chlorantha*, i *P. bifolia*).

Najveći broj vrsta i nalaza zabilježen je na južno i zapadno eksponiranim livadnim i šumskim staništima Žumberačkog Gorja. Najšire rasprostranjenje imaju *Gymnadenia conopsea*, *Listera ovata* i *Orchis morio* koje rastu na različitim tipovima livada, od nizina do najviših dijelova istraživanog područja, dok *Gymnadenia odoratissima*, *Pseudorchis albida* i *Spiranthes spiralis* rastu samo na vrlo ograničenom području iznad 560 m nadmorske visine.

Istraživanja su pokazala veliko bogatstvo i florističku raznolikost Žumberačkog Gorja, a kako ono najvećim dijelom nije uvršteno ni u kakvu kategoriju zaštite prirode trebalo bi poduzeti određene zakonske mjere zaštite koje bi osigurale očuvanje i postojanost prirodnih staništa na kojima rastu orhideje i druge rijetke vrste biljaka.