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A REVISION OF DISTRIBUTION AND THE ECOLOGICAL DESCRIPTION OF *Orobanche picridis* (Orobanchaceae) AT THE NE LIMIT OF ITS GEOGRAPHICAL RANGE FROM POLAND AND UKRAINE

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Abstract

The paper presents the current distribution of *Orobanche picridis* in Poland and Ukraine, within the Polish borders in the interwar period, based on a critical revision of herbarium and literature data as well as the results of my field studies. The largest number of its localities is in S and SE Poland in the Wyżyna Śląsko-Krakowska, Wyżyna Małopolska, Wyżyna Lubelska uplands, Middle Roztocze, Small Polesie, the Pogórze Przemyskie foreland and in the former Tarnopol province (W Ukraine). These are the north-easternmost sites known for the species and extend its limit range. A map of its distribution in Poland and Ukraine is included. The taxonomy, biology, and ecology of *O. picridis* are also discussed.

Key words: *Orobanche picridis*, Orobanchaceae, distribution, phytocoenoses, Poland, Ukraine

INTRODUCTION

Orobanche picridis F. W. Schultz is a root holoparasite, belonging to the parasitic family Orobanchaceae. It is a Submediterranean-Subatlantic species. Its continuous range mostly covers south-western Europe, stretching from Portugal, Spain, across the Mediterranean region, France, southern Germany and Austria, to the Balkans. Individual localities occur in southern England and from northern France across the Czech Republic, Slovakia, southern Poland and Romania, Ukraine, Russia. It has been sporadically reported from Asia Minor, the Transcaucasian region and northern Africa (Beck, 1930; Uhlich et al. 1995; Tzvelev, 2006; Pusch and Günther, 2009). Localities in Poland and Ukraine are the north-eastern limit of its range. The north-easternmost isolated locality was reported from Bryansk village on the Desna in western Russia near the Ukraine/Belarus border (Tzvelev, 2006). The range of the species, especially in the Mediterranean region, is likely to be inaccurate as the taxon was often included in *O. loricata* agg. there (e.g. Domina and Arrigoni, 2007). The approach was similar in, e.g., Bulgaria (Delipavlov, 1995; Stoyanov, 2009). The species is threatened with extinction in Poland (Zarzycki, 2001; Piwowarczyk, 2012b) and in the neighbouring countries, i.e. Germany, the Czech Republic, Slovakia (Korneck et al. 1996; Feráková et al. 2001; Procházka, 2001).

The aim of my study was to identify the distribution of *Orobanche picridis* in Poland and western Ukraine (Polish territories in the interwar period) based on my investigations and verified herbarium and literature data. The preferred habitats, communities, hosts and taxonomic problems are also discussed below.

TAXONOMIC PROBLEMS

Orobanche picridis F. W. Schultz Bot. Literatur-Blätter, Regensburg, 5: 504, 1830. Syn.: *O. picris hieracioides* Schultz, 1830; *O. carotae* Desmoulins, 1835; *O. loricata* var. *picridis* (F.W. Schultz) Beck in Halácsy et Braun Nachtr. Fl. Nieder-Österr. 135, 1882; *O. artemisia-campestris* subsp. *picridis* (F.W. Schultz) O. Bolňs et al. Fl. Manual Paisos Catalans 1214, 1990.

Orobanche picridis belongs to the subsection *Minores* (Beck) Teryokhin. The species of this group require a taxonomic revision. *O. picridis* is not a highly variable taxon in comparison with other species of the genus. The height of the shoot and the number

of flowers in individuals often vary within one population. Two varieties: var. *typica* (plant glandular hairy, inflorescence having many flowers, flowers 15-20 mm long, calyx segments mostly yellowish-white) and var. *carotae* (plant less glandular hairy, corolla later almost glabrous, violet-veined also in dry, calyx segments dark-coloured), and three forms: f. *typica*, f. *albo-bracteata*, f. *parviflora* (Beck, 1930) have been described within the species. The typical variety var. *typica* dominates in Central Europe and is generally more common. The variety var. *carotae* has been observed in the Mediterranean region (Beck, 1930).

Orobanche picridis is morphologically very similar to *O. minor* and to *O. artemisiae-campestris*. Calyx segments are usually divided up to ½ into two similarly sized parts in *O. picridis,* while they are divided up to the base in *O. artemisiae-campestris*. Other characters are similar. The species is also similar to the *O. minor* agg. species complex, especially when dry. Determining the herbarium material is often complicated and information on the host is of considerable use. The hosts of the species in Central Europe are as follows: *O. picridis – Picris hieracioides*, *O. artemisiae-campestris – Artemisia campestris*, *O. minor – Trifolium pratense*, *T. repens*.

BIOLOGY AND PHYTOCOENOSES

Flowering period. It flowers from mid-June to the end of July (August), from April in southern Europe. It may flower later (X-XI) in unfavourable climatic conditions but such plants are often sterile (Zázvorka, 2000).

Seed productivity. *Orobanche picridis* produces between 450 and 3 250 seeds, 1 780 seeds per fruit on average. From 8 900 to 150 000, over 55 000 seeds on average, is recorded per shoot (Piwowarczyk, 2012c).

Hosts. Numerous host species are reported in the literature: *Picris* sp., *P. hieracioides, P. laciniata, P. vulgaris, Crepis diffusa, C. vesicaria, Tragopogon campestris, Cirsium* sp., *Inula graveolens, I. revoluta, Hypochoeris infesta, Centaurea* sp., *Daucus carota, Orlaya grandiflora, Salsola vermiculata, Ornithopus compressus* (Beck, 1930). Plants occurring closest to the parasite that may not have been its hosts were often noted, which may explain the number of erroneous host species belonging to several genera. Fully accurate data can only be collected after the plant has been dug up. *Picris hieracioides* is usually listed as its host in the majority of studies. *Daucus carota* reported considerably less frequently as its host is unclear and doubtful. *D. carota* and *P. hieracioides* often occur near each other in communities preferred by *O. picridis* (Dauco-Picridetum hieracioidis), which may cause mistakes. Morphologically similar *O. minor* subsp. *maritima* (*O. maritima*) also parasitizes *Daucus carota* subsp. *gummifer* (Rumsey, 2007).

Phytocoenoses and habitat conditions. *Orobanche picridis* has been noted in calcareous and gypsum wastelands in Dauco-Picridetum hieracioidis, Arrhenatherion elatioris, Sisymbrion, Dauco-carotae--Melilotion albi communities (Oberdorfer, 1983; Uhlich et al. 1995; Heseler, 2006; Rothmaler et al. 2002; Pusch and Günther, 2009). In the Czech Republic and Slovakia, it prefers young and slightly older fallows, fluvial terraces and margins of vineyards and gardens on acidic or neutral soils, limestone, marl, conglomerates, loess or basalt. It also occurs on permanently eroded open areas or on steep slopes with fresh landslides in the initial phase of Dauco-Melilotion and Dauco-Picridetum communities (Holub and Zázvorka, 1999; Zázvorka, 1997; Zázvorka, 2000). In Germany plant communities with broomrape also include calcareous wastelands, orchards, fallows, semiruderal grasslands, roadsides, meadows in the Dauco-Picridetum hieracioidis community (Heseler, 2006). In Eastern Europe it has been reported from unweeded meadows, forest glades, forest margins, steppe slopes, roadsides and field margins (Kotov, 1999; Tzvelev, 2006).

MATERIALS AND METHODS

I reviewed all the herbarium materials of *Orobanche picridis* available in Poland. The materials of *O. picridis* examined by me were deposited in the herbaria LOD, KTC, KRA, KRAM, OPOL. Herbarium acronyms are given after Mirek et al. (1997). The nomenclature of vascular plants follows Mirek et al. (2002). The nomenclature of syntaxa is based on Matuszkiewicz (2006). Field studies were conducted between 1999-2011 and intensified from 2005 to 2011. The localities are listed in ATPOL cartogram units, 10 x 10 km Zając (1978). Units are listed in alphabetical order. Only localities recorded in my observations and identified or confirmed, as well as verified herbarium data are listed below. Published data not confirmed by me in the field or undocumented by the herbarium material are not included due to frequent determination errors. The localities are described as follows: ATPOL grid unit, location, habitat description, abundance (in brackets). The following information is also given for most localities: geographic co-ordinates and altitude (above sea level), revised exsiccata: the collector and collection date, the herbarium acronym and exsiccata number. Names of the sites in Ukraine are given according to the

herbarium label and the current English name is provided in brackets.

RESULTS

Distribution at NE limit

In Poland *Orobanche picridis* has been reported from 34 localities. Nearly all of them have been discovered in the last ten years. In Poland it mostly occurs in the south, in the Wyżyna Śląsko-Krakowska and Wyżyna Małopolska uplands, and in the south-east, in the Wyżyna Lubelska upland, Middle Roztocze, Small Polesie, and the Pogórze Przemyskie foreland (Kotula, 1881; Szeląg, 1996; Bróż et al. 2001; Kucharczyk, 2001; Piwowarczyk, 2010, 2012a, b, c; Piwowarczyk and Przemyski, 2009, 2010; Piwowarczyk et al. 2011; Zając and Zając, 2001) (Figs. 1, 2). A few general reports on the occurrence in Ukraine are available: the area of Lviv (Szafer et al. 1924; Tzvelev, 1981; Kotov, 1999) and Pasieczna (Szafer et al. 1924), Roztocze, Miodobory, western and southern Podolia (Mądalski, 1967). The north-easternmost isolated locality has been reported from Bryansk village on the Desna river in western Russia near the Ukraine/Belarus border (Tzvelev, 2006) (Fig. 2).

Poland

List of localities: CF: 27 – Leśnica, cfr., leg. Dziatzko, 28.06.1897 (OPOL, P/3465); **DE: 69** – Murawy Dobromierskie reserve near Dobromierz, wasteland on the margin of a pine forest and xerothermic grassland (>1000), 51°00'29,7"N, 19°54'52,1"E, 303 m, leg. P. Niedźwiedzki, 09.07.2006 (LOD, 154348), leg. R. Piwowarczyk, 04.06.2008 (KTC), (Piwowarczyk, 2012 a,b,c); **85** – Małusy Małe, xerothermic grassland in the SSW part of Wzgórze Bożykowskie hill (<200), 50°47'41,6"N, 19°18'28,5"E, 298 m, leg. J. Błaszczyk, 28.07.1948 (KRA, 900124), leg. prof. Pogan, 02.08.1948 (KRA, 0299230); Błaszczyk 1949, leg. J. Kołodziejek, 07.07.1982 (LOD, 084146), leg. R. Piwowarczyk, 04.06.2008 (KTC), (Piwowarczyk, 2012 a,b,c); **DF: 26** – Zawiercie-Bzów SE, hill 445 m, NW slopes, wastelands/initial xerothermic grassland (>250), 50°28'08"N, 19°31'32"E, 435 m, leg. Ł. Krajewski, 15.07.2010 (KTC); **34** – Będzin-Warpie, lawn on the roadside (3), 50°18'59"N, 19°09'19"E, 295 m, (Ł. Krajewski, 28.07.2009, unpbl); **35** – Dąbrowa Górnicza-Strzemieszyce Małe E, hill 335, E slopes, wastelands (200, >450, 1), 50°19'16"N, 19°19'48"E, 320-335 m, leg. Ł. Krajewski, 07.10.2009, 16.07.2010 (KTC), (Ł. Krajewski, 2009-2011, unpbl.); Sławków NW, Góra Wielka Mt (>150), 50°19'12,8"N, 19°21'07,2"E, 348 m, leg. R. Piwowarczyk, 12.07.2007 (KTC); Sławków NW, Góra Tomanówka Mt NE, wasteland/initial xerothermic grassland (20), 50°19'27"N, 19°21'20"E, 335-340 m, leg. Ł. Krajewski, 09.08.2009 (KTC); Sławków-Kozioł NW, wastelands with *Libanotis* and *Solidago* (250), 50°18'35"N, 19°21'41"E, 325 m, leg. Ł. Krajewski, 07.09.2009 (KTC); Sławków N, E part of hill 345 m, N slopes of summit (15), 50°18'45"N, 19°22'50"E, 325 m, leg. Ł. Krajewski, 07.09.2009 (KTC); Dąbrowa Górnicza-Zakawie SW, wastelands (20, 6), 50°18'37"N, 19°19'59"E, leg. Ł. Krajewski 03.09.2009 (KTC), (Krajewski 2009-2010, unpbl.); **58** – Wąwóz Bolechowicki gorge (150) (Szeląg, 1996); **EF: 13** – Góry Pińczowskie Mts: between Skowronno and Pińczów, ecotone zone of xerothermic grasslands and fallows, wastelands on slopes, two abundant populations (>150, <200), 50°32'08,3"N, 20°30'55,6"E, 247 m, leg. R. Piwowarczyk, A. Przemyski, 04.07.2006 (KTC), (Piwowarczyk, 2012 a,b,c); **14** – between Pińczów and Pasturka, xerothermic grassland, ecotone zones of a grassland and an arable field, S and SSW-facing; scattered locality (>50), 50°30'35,45"N, 20°33'35"E, 219 m, 50°30'26,45"N, 20°33'57"E, 228 m, 50°30'38,52"N, 20°33'36"E, 232 m, leg. R. Piwowarczyk, 25.06.2007 (KTC); Nowy Folwark, a fallow in the NW part of a forest complex (>50), 50°30'04"N, 20°41'20,8"E, 250 m, vid. P. Cieślak, 2009, (Piwowarczyk, 2012 a,b,c); **22** – Słaboszów (Binkiewicz B. unpbl 2010); **23** – Wola Chroberska, E part, xerothermic grassland on a steep slope, E side of a dirt road (>10), 50°23'57,3"N, 20°31'16"E, 230 m, leg. R. Piwowarczyk, A. Przemyski, 19.07.2006 (KTC), (Piwowarczyk, 2012 a,b,c), (Piwowarczyk, 2012 a,b,c); **25** – xerothermic grassland E of the dirt road to Żerniki Górne (>15), 50°27'29"N, 20°47'28"E, 260 m, leg. M. Nobis, 2009 (KRA), (Nobis and Nobis 2010); Ostra Góra ecological site, S of Pęczelice, S-facing wastelands and field margins (>100), 50°26'34"N, 20°47'05"E, 239 m, vid. A. Przemyski, 2010, leg. R. Piwowarczyk, 13.07.2010 (KTC), (Piwowarczyk, 2012a,b,c); Przęślin reserve near Chotel Czerwony, S- and SW-facing xerothermic grassland, partly grazed (>30), 50°22'40,6"N, 20°42'59"E, 197 m, leg. R. Piwowarczyk, A. Przemyski, 05.07.2006 (KTC), (Piwowarczyk, 2012 a,b,c); **30** – Szczepanowice, S-facing xerothermic grassland on Kaczorowe Doły hills (2 shoots), 50°18'25,5"N, 20°03'28,4"E, 260 m, vid. R. Piwowarczyk, 2009, (Piwowarczyk, 2012 a,b,c); **31** – vicinity of Miechów, NW part, warm hill, post-agricultural meadow, leg. M. Szewczyk, 09.07.2002 (KRAM, 527156); the forest complex in the N of the Opalonki reserve, near the forest path (1 shoot), 50°21'02,49"N, 20°10'30,36"E, vid. K. Ciesielski, 07.2011; **50** – Wiktorowice near

Raciborowice, xerothermic grassland (>10), leg. K. Towpasz, 17.06.1995 (KRA); **FE: 51** – Pętkowice, xerothermic grassland and wasteland at the foot of the left slope of the Kamienna river valley (>100) (Bróż et al. 2001; Piwowarczyk, 2010 b, 2012 a,b,c), FE5121, 51°01'03,1"N, 21°34'53,2"E, 140 m, leg. R. Piwowarczyk, 04.07.2004, 21.06.2005 (KTC); **52** – S and SE of Dorotka village, xerothermic grassland (>20) (Piwowarczyk, 2010 b, 2012 a,b,c, Piwowarczyk et al. 2011), 50°59'56,33"N, 21°47'11,46"E, 166 m, vid. R. Piwowarczyk, 2001-2006, leg. R. Piwowarczyk, 05.2001 (KRA, 0267164); 01.06.2002, (KTC); Kucharczyk (2001) also reports the species from Dorotka; **62** – Wesołówka near Tarłów, fallows, baulks, field margins and initial xerothermic grassland, on chalky rendzinas, scattered locality (<600) (Bróż et al. 2001; Piwowarczyk, 2006, 2010, 2012 a,b,c, Piwowarczyk et al. 2011), 50°58'36,7"N, 21°47'40,8"E, 178 m, vid. R. Piwowarczyk, 1999-2010, leg. R. Piwowarczyk, 07.1999, 13.07.2004, 01.08.2010 (KTC); **68** – Nowy Dwór, fallow fields, roadsides, in fringe communities and fragmentary patches of xerothermic grasslands on the slopes of the „Biała Góra" hill, (>500), 50°53'07"N, 22°40'11"E, 205 m, leg. P. Chmielewski, R. Piwowarczyk, 11.07.2008 (KTC), (Piwowarczyk et al. 2011, Piwowarczyk, 2012 b); **FF: 98** – Brzuska, formerly arable land, leg. M. Wolanin, 11.07.2008 (KRA); **GE: 91** – Żurawnica near Zwierzyniec – fallow fields and roadsides on hillsides, (>500), 50°38'27"N, 22°58'56"E, 215 m, leg. P. Chmielewski, R. Piwowarczyk, 25.06.2008 (KTC), (Piwowarczyk et al. 2011, Piwowarczyk, 2012 b); **92** – Bliżów, fallow fields and fragments of mesoxerothermic grasslands, (>50), 50°36'23"N, 23°07'37"E, 215 m, leg. W. Michalczuk, R. Piwowarczyk, 16.07.2006 (KTC), (Piwowarczyk et al. 2011, Piwowarczyk, 2012b); **GF: 15** – initial xerothermic grasslands on the slope of the Sołokija valley in the „Żurawce" ecological site (>300), 50°23'37"N, 23°33'24"E, 228 m, leg. P. Chmielewski, R. Piwowarczyk, 09.06.2007 (KTC), (Piwowarczyk et al. 2011, Piwowarczyk, 2012 b); **25** – Machnów Stary, fallow fields and initial xerothermic grasslands in the „Machnowska Góra" reserve (>500), 50°22'23"N, 23°34'51"E, 230 m, leg. P. Chmielewski, R. Piwowarczyk, 09.06.2007 (KTC), (Piwowarczyk et al. 2011, Piwowarczyk, 2012 b); **80** – Winna Góra Mt near Przemyśl (Kotula, 1881).

Remark: The herbarium material (KRAM) documenting the location in the vicinity of Jaksice near Miechów and Szczotkowice near Działoszyce (Kozłowska, 1923; Tacik, 1959) concerns *Orobanche lutea* and *O. kochii.* Mądalski (1973) reports *O. loricata* based on the specimen collected by J. Krupa in Karniowice, Chrzanów district, 14.07.18.... Figures were also made based on this specimen. The note in the study on the presumptive host *Artemisia campestris* indicates that this information was not provided with the herbarium specimen. I could not verify the determination because the herbarium documentation is missing in the available Polish herbaria. It is possible it could have been *O. picridis*.

Ukraine

Specimens documenting a few localities of *Orobanche picridis* within the present Ukraine borders (the former Tarnopol province in Poland in the interwar period) were found in Polish herbaria. They were collected mostly in the Lviv, Zolochiv and Buczacz districts (Fig. 2).

List of localities: 1. on the margin of a forest planted with pine SW of Trościaniec Mały village (Trostyanets) near Złoczów (Zolochiv), leg. J. Mądalski, 08.08.1938 (KRAM, 494833); 2. in a glade with thickets over a rocky wall on the left edge of the Dniester ravine, SW of Dźwinogród village (Dzvenyhorod) near Mielnica (Mel'nytsya), leg. J. Mądalski, 18.08.1936 (KRAM, 494831) (specimen attached to *Picris hieracioides*); 3. near a small steppe patch by the Las Oszowica forest on the "Szepeta" hill, Kruhów near Sassów (Sasiv), leg. J. Mądalski, 08.07.1936 (KRAM, 494838, 494837); 4. on a sunny chalky slope NE of the Łysówka hill arm, Winniki (Vynnyky) near Lviv, leg. J. Mądalski, 25.07.1938 (KRAM, 494836, 12051).

Preferred habitats and phytocoenoses in Poland

In Poland *Orobanche picridis* prefers weakly established habitats, strongly sun-exposed, on heavy chalky rendzina, mostly S, SW and SE-facing. These are wastelands, mid-field fallows, field margins, abandoned fields, orchards (it often occurs in cherry orchards or on their margins at the localities in Wesołówka or Pęczelice) and pastures, xerothermic grasslands, located on flat or hilly terrains, hillsides and river valley slopes. These are usually transitional communities within semiruderal pioneer xerothermic communities of the class Artemisietea vulgaris (the optimum in Dauco-Picridetum hieracioidis) with an admixture of species belonging to Agropyretea intermedio-repentis or less frequently in xeric meadow communities (Arrhenatherion elatioris); with a high contribution of xerothermic species of the Festuco-Brometea and Trifolio-Geranietea sanguinei classes, as well as segetal species of the Stellarietea mediae class (Table 1). It is recorded less frequently in typical xerothermic grasslands, usually initial, low-cover or ecotone grassland/wasteland systems, of the Cirsio-Brachypodion pinnati alliance (Piwowarczyk, 2010, 2011, 2012 a,b;

Piwowarczyk et al. 2011) (Table 1). In Poland it is recorded between an altitude of 140 and 435 m.

Threats and conservation recommendations

Orobanche picridis is listed as an endangered species (EN) in the Red Book (Zarzycki, 2001; Piwowarczyk, 2012 b), as a rare and endangered species (R) on the Polish Red List (Zarzycki and Szeląg, 2006), endangered (EN) in Silesian voivodeship (Urbisz and Parusel, 2012) and endangered (EN) in the Wyżyna Małopolska upland (Bróż and Przemyski, 2009). It is strictly protected. Secondary plant succession as well as unstable, pioneer and often synanthropic habitats it invades are the main threats to the species. Protection of *O. picridis* must aim to conserve its habitats. This is often difficult, as *O. picridis* frequently grows at privately-owned sites, in abandoned fields or in the ecotone between managed fields. Wastelands can be easily transformed or forested. Herbicides also pose an important threat. Its localities are rarely found in legally protected areas, and even in those active methods are not used to protect the species. As these sites are not extensively managed, the abundance of the herb layer increases, especially by expansive species, i.e. *Arrhenatherum elatius* and *Solidago* species, and thickets and the host, together with the broomrape, are displaced. Due to the small size of areas occupied by the species and necessary active protection, ecological sites where extensive management methods are used (controlling grassland cover increases due to mowing and periodical soil scarifying) should be established. Sowing the host and controlling the localities may be recommended. Periodic soil disturbance is especially useful in seed penetration near the host's roots. The abundance of *O. picridis* in Wesołówka gradually decreased in wastelands as the vegetation cover increased, whereas it occurred exceptionally numerously in sites rooted by boars. A similar effect were observed in Sławków-Kozioł (Ł. Krajewski, 2009, unpbl.).

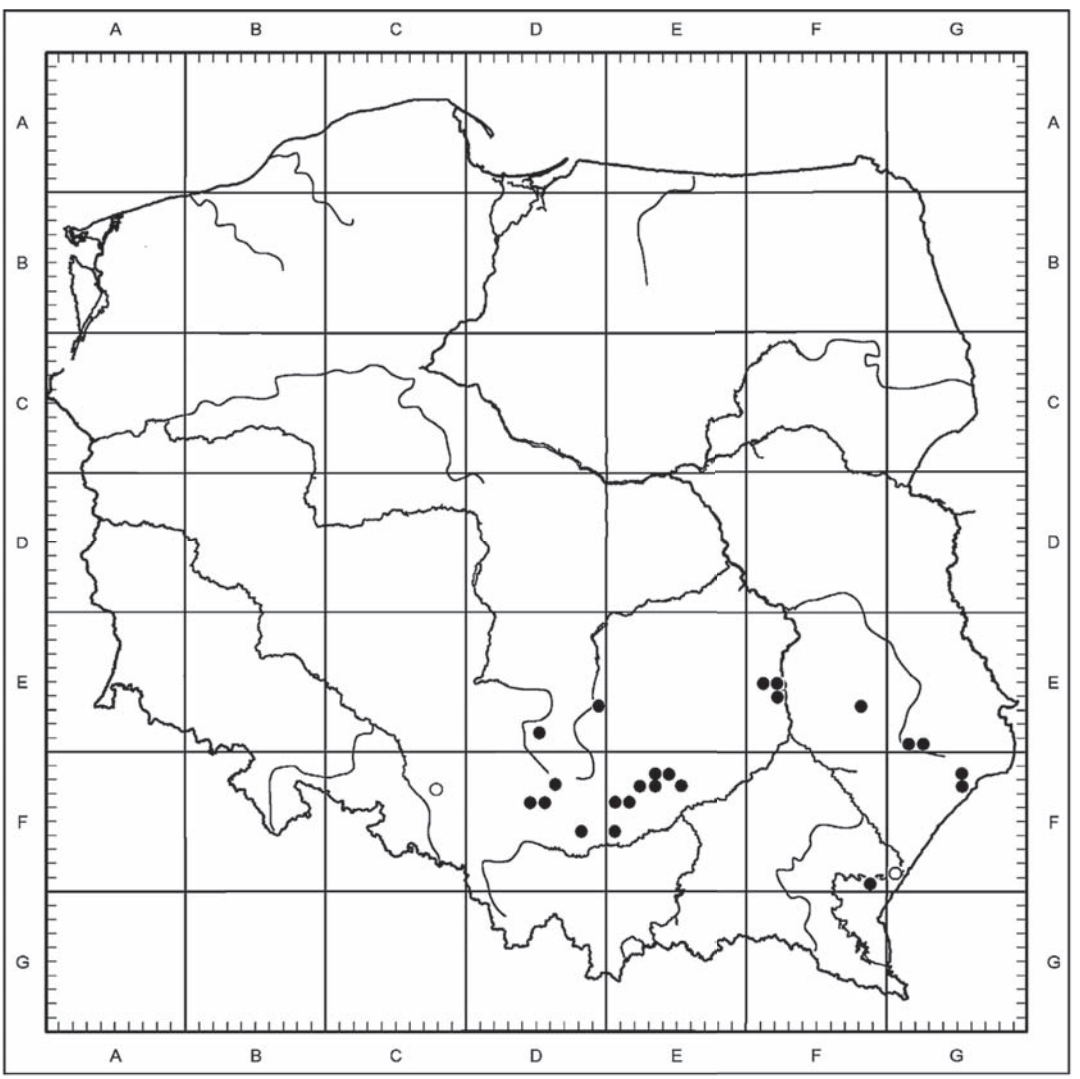

Fig. 1. The distribution of *Orobanche picridis* in Poland (● – new or confirmed locality, ○ – unconfirmed locality).

Table 1.
Plant communities with *Orobanche picridis* in Poland

No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Location	Pińczowskie Mts	Skowronno	Pasturka	Pęczelice	Wola Chroberska	Chotel Czerwony	Dobromierz	Weso-łówka1	Weso-łówka2	Weso-łówka3	Nowy Dwór1	Nowy Dwór2	Machnowska Mt1	Machnowska Mt2	Żurawce	Żurawnica	Małusy Małe	Wielka Mt	
Date	31.07.2009	31.07.2009	20.07.2010	13.07.2010	19.07.2009	18.09.2009	15.07.2009	01.08.2010	01.08.2010	01.08.2010	11.07.2008	11.07.2008	09.06.2007	09.06.2007	09.06.2007	25.06.2008	05.07.2008	12.07.2007	
Latitude [N]	50°32'08,3"	50°32'16,3"	50°30'34,6"	50°26'33,5"	50°23'57,3"	50°22'35,3"	51°00'29,7"	50°58'43"	50°58'37,5"	50°58'43,9"	50°53'07"	50°53'07"	50°22'23"	50°22'23"	50°23'37"	50°38'27"	50°47'41,6"	50°19'12,8"	
Longitude [E]	20°30'55,6"	20°30'37,4"	20°33'35,8"	20°47'05,8"	20°31'16"	20°43'25,5"	19°54'52,1"	21°47'50,2"	21°47'39,6"	21°47'40,2"	22°40'11"	22°40'11"	23°34'51"	23°34'51"	23°33'24"	22°58'56"	19°18'28,5"	19°21'07,2"	
Altitude a.s.l. [m]	247	245	214	242	230	198	303	179	182	183	205	205	230	230	228	213	298	348	Constancy
Area of relevé (m^2)	100	100	50	50	50	50	50	25	25	25	25	25	50	50	50	50	25	100	
Exposure	SW	SW	S	S	SW	SW	S	SSW	SSW	SSW	SSE	SSE	SW	SWW	S	SWW	SSW	S	
Inclination [°]	10	10	5	5	30	10	5	5	5	5	5	5	5	5	15	-	30	-	
Cover of tree layer A (%)	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	
Cover of shrub layer B (%)	10	-	-	-	25	-	5	50	25	20	-	-	30	-	10	-	25	-	
Cover of herbaceus layer C (%)	80	80	80	85	70	80	50	90	85	90	65	70	75	95	75	80	65	80	
Cover of moss layer D (%)	30	10	>5	>5	30	10	>5	>5	>5	>5	>5	>5	>15	>5	>5	>5	>5	>5	
Number of species	90	65	41	32	51	48	45	42	32	30	28	33	41	27	44	41	31	55	
Orobanche picridis	1	1	+	1	+	+	1	+	+	1	1	+	+	2	1	1	+	+	V
Trees and shrubs				.															
Cerasus vulgaris subsp. *vulgaris* B	.	.	.	.	.	.	.	.	3	1	.	.	.	.	.	.	.	.	I
Cerasus vulgaris subsp. *vulgaris* C	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	I
Cornus sanguinea C	.	+	+	.	.	.	.	1	+	.	.	.	+	.	.	.	.	.	II
Cornus sanguinea B	.	.	.	.	.	.	.	3	.	.	.	.	+	.	.	.	.	.	I
Crataegus monogyna B	+	.	.		.	.	.	.	.	.	.	.	.	.	+	.	2	.	I
Crataegus monogyna C	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	.	I
Juniperus communis subsp. *communis* B	.	.	.	.	.	.	.	1	.	.	.	.	2	.	.	.	.	.	I
Pinus sylvestris B	.	.	.	.	1	.	+	.	.	1	.	.	1	.	.	.	.	.	II

No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Pinus sylvestris C	.	+	.	.	+	.	+	.	+	+	.	.	.	.	.	+	.	.	II
Prunus spinosa B	1	.	.	.	.	.	.	2	.	+	.	.	.	.	.	.	.	.	I
Prunus spinosa C	+	+	.	.	.	.	+	.	+	.	+	1	.	.	+	+	+	.	III
Pyrus pyraster C	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	I
Quercus robur C	.	.	.	.	+	.	.	.	.	.	+	+	.	.	.	.	.	.	I
Quercus robur C	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	I
Rhamnus cathartica B	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Rosa canina B	+	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	I
Rosa canina C	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	I
Ch. Dauco-Picridetum hieracioidis																			
Picris hieracioides	3	3	2	4	1	2	3	3	4	3	4	3	2	4	2	4	2	2	V
Daucus carota	2	1	+	1	+	2	+	2	2	4	1	1	.	.	.	+	+	+	V
Hypericum perforatum	.	1	1	+	+	.	+	+	+	+	+	+	+	.	.	+	+	+	IV
Cichorium intybus subsp. *intybus*	.	.	.	+	.	2	.	.	+	+	+	.	+	.	+	.	.	.	II
Ch. Artemisietea vulgaris																			
Melilotus officinalis	1	.	+	3	.	.	+	+	.	.	.	.	.	.	.	.	+	+	II
Melilotus alba	+	+	+	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	II
Artemisia vulgaris	+	.	.	.	.	.	.	+	1	+	.	+	.	.	.	+	.	1	II
Echium vulgare	+	+	.	.	.	1	+	.	.	.	.	.	+	.	+	.	.	.	II
Cirsium arvense	.	.	+	.	.	+	+	.	.	+	.	.	.	+	.	.	.	+	II
Cirsium vulgare	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	+	.	+	II
Linaria vulgaris	.	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Glechoma hederacea	.	+	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	I
Carduus acanthoides	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	I
Solidago gigantea	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	+	.	3	I
Conyza canadensis	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	I

No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Melandrium album	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	I
Tragopogon dubius	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Galium aparine	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	I
Ch. Molinio-Arrhenatheretea																			
Achillea millefolium s.l.	1	1	.	+	+	2	+	1	1	3	1	.	+	1	+	.	.	1	IV
Arrhenatherum elatius	+	.	.	.	.	3	+	.	.	1	1	+	+	1	+	4	3	2	IV
Taraxacum officinale s.l.	.	+	+	+	+	+	.	.	+	.	+	2	.	.	.	+	.	1	III
Vicia cracca	.	+	+	+	+	+	.	.	.	.	.	+	.	1	+	.	.	+	III
Galium mollugo s.l.	+	+	+	.	.	.	.	+	.	.	.	.	+	+	2	2	.	+	III
Dactylis glomerata subsp. *glomerata*	+	.	.	.	.	+	+	.	.	.	.	.	+	2	+	.	+	1	III
Crepis biennis	1	.	+	1	.	+	+	.	.	.	.	.	.	.	.	.	+	1	II
Knautia arvensis	1	+	.	.	2	.	1	+	.	.	.	.	.	.	.	.	+	.	II
Festuca rubra s.l.	.	.	.	.	.	.	+	1	.	2	.	.	.	.	.	.	.	1	II
Trifolium pratense	.	.	.	.	+	+	.	.	.	+	+	.	.	.	.	.	.	.	II
Pastinaca sativa	.	.	+	.	.	.	.	.	+	.	+	+	.	.	.	1	.	1	II
Plantago lanceolata	+	.	.	.	.	+	.	.	.	.	.	.	1	.	1	.	.	.	II
Leucanthemum vulgare	.	.	.	.	.	+	.	.	.	.	.	.	1	.	+	+	.	.	II
Leontodon hispidus subsp. *hispidus*	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Prunella vulgaris	.	.	.	.	+	+	.	.	+	.	.	.	.	.	.	.	.	.	I
Leontodon autumnalis subsp. *autumnalis*	+	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	I
Trifolium repens	.	.	.	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	I
Poa pratensis	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	I
Rumex crispus	.	.	+	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	I
Centaurea jacea	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	I

No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Cerastium holosteoides	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	I
Festuca pratensis	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	I
Phleum pratense	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	I
Ranunculus acer	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	I
Tragopogon pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	I
Ch. Festuco--Brometea																			
Salvia verticillata	.	+	.	+	1	+	.	+	.	.	+	+	+	+	1	+	1	.	IV
Centaurea scabiosa	1	1	.	+	.	1	+	1	.	.	.	+	+	.	+	.	+	.	III
Brachypodium pinnatum	+	+	.	.	1	+	.	3	.	.	.	+	+	.	.	.	2	.	III
Melampyrum arvense	.	+	+	+	.	.	+	.	.	.	+	.	2	.	+	+	2	.	III
Euphorbia cyparissias	+	.	.	.	+	+	.	.	.	.	.	1	+	.	+	+	1	.	III
Aster amellus	+	+	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	II
Campanula sibirica	+	.	.	.	+	.	+	.	.	.	.	.	.	.	+	.	.	.	II
Anthemis tinctoria	.	.	.	.	.	.	+	+	.	.	+	+	.	.	+	+	.	.	II
Asperula tinctoria	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Carlina vulgaris	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Plantago media	+	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	I
Potentilla arenaria	1	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	I
Thymus kosteleckyanus	1	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Linum hirsutum	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Carex humilis	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Hieracium bauhinii	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	I
Allium oleraceum	.	+	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	I
Achillea pannonica	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Inula ensifolia	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I

No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Seseli annuum	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	I
Scabiosa ochroleuca	+	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	I
Centaurea stoebe	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	I
Gentiana cruciata	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	I
Onobrychis vicifolia	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	I
Teucrium chamaedrys	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.	I
Ch. Trifolio--Geranietea sanguinei																			
Coronilla varia	+	+	+	+	1	.	.	+	+	1	+	+	.	1	+	.	.	+	IV
Agrimonia eupatoria	+	+	+	+	.	.	+	+	+	+	.	+	+	.	+	.	1	1	IV
Fragaria viridis	1	+	.	.	.	1	+		+	1	.	.	.	.	.	.	1	+	III
Medicago falcata	+	+	+	.	.	.	.	1	1	+	.	+	.	+	+	.	.	.	III
Galium verum	1	+	.	.	+	+	+	.	.	.	.	.	+	.	.	.	.	.	II
Origanum vulgare	.	+	1	.	.	.	.	.	+	.	.	.	.	.	.	1	.	+	II
Campanula rapunculoides	1	+	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	II
Clinopodium vulgare	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	I
Peucedanum cervaria	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	I
Verbascum lychnitis	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Trifolium alpestre	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	I
Ch. Stellarietea mediae																			
Lathyrus tuberosus	1	+	+	2	.	.	.	.	.	.	.	.	.	+	.	+	.	1	II
Vicia hirsuta	.	.	.	2	.	.	+	.	.	+	.	.	.	.	.	1	.	+	II
Myosotis arvensis	+	.	.	.	.	.	+	.	+	.	+	.	.	.	.	+	.	.	II
Consolida regalis	.	.	.	.	.	.	+	+	.	.	+	.	.	.	.	.	+	+	II
Chenopodium album	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	I
Galeopsis tetrahit	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	I

No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Papaver rhoeas	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	I
Sonchus arvensis	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	I
Vicia angustifolia	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	+	I
Vicia tetrasperma	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	I
Ch. Agropyretea intermedio-repentis																			
Falcaria vulgaris	+	+	+	+	.	+	+	.	+	+	+	+	.	+	+	.	.	.	IV
Convolvulus arvensis	+	+	1	.	1	+	+	.	.	.	+	+	.	+	+	.	.	+	IV
Elymus hispidus	+	+	.	.	1	.	.	+	.	.	.	.	.	.	.	.	.	.	II
Elymus repens	1	1	3	.	.	.	.	.	.	.	.	+	.	+	.	+	.	.	II
Poa compressa	1	+	.	.	+	.	.	.	.	.	+	+	.	.	.	.	.	.	II
Others																			
Senecio jacobaea	1	+	+	1	.	+	+	+	2	+	.	.	.	.	.	.	+	+	IV
Rubus caesius	.	1	+	+	.	+	+	+	.	.	.	+	.	+	.	.	.	2	III
Sanguisorba minor	1	+	.	.	+	.	+	+	.	.	.	.	+	.	1	.	+	.	III
Pimpinella saxifraga	+	.	.	.	+	1	.	+	.	+	+	+	.	.	.	1	.	.	III
Medicago lupulina	+	.	.	+	+	1	.	.	+	.	+	+	.	+	+	.	.	+	III
Cerinthe minor	+	.	.	.	.	+	.	+	.	.	+	+	.	+	+	+	.	+	III
Abietinella abietina D	.	.	.	.	1	1	.	+	+	+	.	.	.	.	.	.	.	.	II
Homalothecium lutescens D	+	.	.	.	1	.	.	+	+	+	.	.	.	.	.	.	.	.	II
Ononis spinosa	2	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	II
Hieracium pilosella	1	.	.	.	.	1	.	.	.	.	.	.	+	.	+	+	.	.	II
Calamagrostis epigejos	.	+	+	.	2	.	.	.	.	.	.	.	.	.	+	.	.	2	II
Anthyllis vulneraria	+	.	.	.	+	+	.	.	.	.	.	.	+	+	+	.	.	.	II
Carlina intermedia	+	.	.	.	.	.	.	.	+	+	.	.	+	.	+	.	.	.	II
Erigeron acer	.	+	.	.	+	.	+	.	.	.	.	.	+	+	.	+	.	.	II
Linum catharticum	+	.	.	.	+	.	.	.	.	.	.	.	+	.	+	.	+	.	II

No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Salvia pratensis	+	+	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	II
Bryum sp. *D*	1	+	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Euphorbia esula	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Festuca rupicola	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Pohlia nutans D	+	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	I
Trifolium arvense	.	.	.	.	.	.	+	.	.	1	.	.	.	.	.	+	.	.	I
Orobanche kochii	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	I
Orobanche lutea	.	.	.	.	.	.	.	.	.	.	r	.	.	.	+	.	.	.	I
Amblystegium serpens D	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Brachythecium rutabulum D	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Campyliadelphus chrysophyllus D	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	I
Eryngium planum	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	I
Hypnum cupressiforme D	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Medicago x*varia*	+	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	I
Polygala vulgaris	.	.	.	.	+	.	+	.	.	.		.	+	.	.	.	.	.	I
Campanula trachelium	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	I
Erigeron annuus	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	I
Muscari comosum	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	I
Senecio vulgaris	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	I
Tussilago farfara	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	I
Cerastium arvense	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	I

Sporadic: Ch. Festuco-Brometea: *Acinos arvensis* 12; *Adonis vernalis* 1; *Arabis hirsuta* 14; *Campanula glomerata* 4; *Filipendula vulgaris* 5; *Helianthemum nummularium* subsp. *nummularium* 1; *Phleum phleoides* 1; *Thymus marschallianus* 1; *Veronica spicata* 1; *Asparagus officinalis* 3; **Ch. Molinio-Arrhenatheretea:** *Avenula pubescens* 4; *Galium boreale* 17; *Holcus lanatus 7; Lathyrus pratensis 16; Lolium perenne* 6(2); *Lotus corniculatus* 5(1); *Rumex acetosa* 7; *Stachys palustris* 18; *Trifolium montanum* 4; *Valeriana officinalis* 18; **Ch. Trifolio-Geranietea sanguinei:** *Anemone sylvestris* 1; *Anthericum ramosum* 8; *Astragalus cicer* 3; *A. glycyphyllos* 3; *Thalictrum minus* 8; *Trifolium rubens* 4; *Vicia tenuifolia* 2; *Viola hirta* 17; **Ch. Stellarietea mediae:** *Anagallis arvensis* 15; *Apera spica-venti* 17; *Avena fatua* 2; *Descurainia sophia* 12; *Euphorbia exigua* 2; *Fallopia convolvulus* 18; *Lapsana communis* 18; *Matricaria maritima* subsp. *inodora* 3; *Papaver argemone* 16; *Silene inflata* 4; *Thymelaea passerina* 2(1); *Valerianella dentata* 12; *Veronica hederifolia* 16; *Vicia sativa* 16; *Viola arvensis* 7; **Ch. Artemisietea vulgaris:** *Berteroa incana* 1; *Echinops sphaerocephalus* 18; *Erigeron ramosus* 9; *Geum urbanum* 7; *Lactuca serriola* 8; *Malva alcea* 18; *Senecio erucifolius* var. *tenuifolius* 4; *Torillis japonica* 18; **Others:** *Acer pseudoplatanus* B 5(2); *Agrostis capillaris* 16; *Arabis glabra* 7; *Arenaria serpyllifolia* 1; *Betula pendula* A 13; *Briza media* 1; *Bryum caespiticium* D 1, *Calliergonella cuspidata* D 10; *Campylium stellatum* var. *protensum* D 5(1); *Carex flacca* 15; *Carlina acaulis* 5; *Didymodon fallax* D 6; *Dorycnium germanicum* 1; *Epilobium* sp. 18; *Euphorbia virgultosa* 17; *Festuca* sp. 6(1); *F. trachyphylla* 17; *Fragaria vesca* 5; *Frangula alnus* C 1; *Fraxinus excelsior* B 5(1), C 5; *Genista tinctoria* 8(2); *Hieracium piloselloides* 13; *Hypnum cupressifome* var. *lacunosum* D 8; *Juglans regia* C 10; *Lavathera thuringiaca* 3; *Lembotropis nigricans* 13; *Lithospermum officinale* 3; *Mentha arvensis* 2; *Neslia paniculata* 18; *Odontites serotina* 16; *Orchis militaris* 15; *Orobanche bartlingii* 18(r); *O. elatior* 1(r); *Pinus nigra* B 13; *Primula veris* 1; *Pteridium aquilinum* 16; *Pyrus pyraster* B 8(1); *Quercus robur* B 13; *Robinia pseudoacacia* B 5; *Rubus plicatus* 2; *Setaria pumila* 6; *Solidago virgaurea* 16; *Thymus serpyllum* 5; *Veronica chamaedrys* 6; *Viburnum opulus* B 8; *Vincetoxicum hirundinaria* 2.

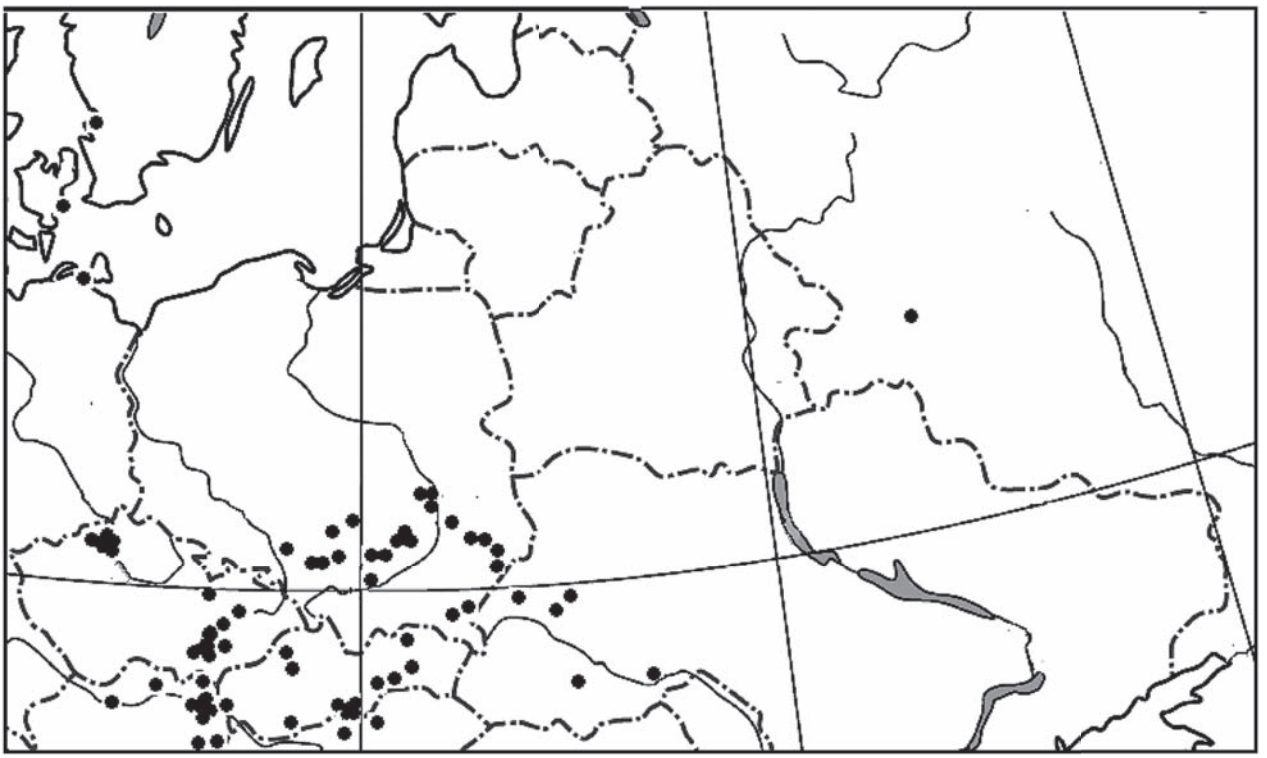

Fig. 2. The distribution of *Orobanche picridis* at the NE range limit, according to Pusch and Günther 2009 (modified and supplemented).

DISCUSSION

Orobanche picridis is strongly threatened in Central Europe. Many of its localities have not been confirmed, e.g. in Germany, the Czech Republic, Slovakia. The localities of *O. picridis* in Poland and Ukraine are the north-eastern limit of its range. In Poland it has been reported from 34 sites, nearly all of which have been recorded in the last ten years. In Poland it mostly occurs in the south and south-east, in the Wyżyna Śląsko-Krakowska, Wyżyna Małopolska and Wyżyna Lubelska uplands, Middle Roztocze, Small Polesie, and the Pogórze Przemyskie foreland. Four unknown localities were discovered in the collections in the KRAM herbarium, in the former Tarnopol province within Poland's interwar borders. They were recorded chiefly in Ukraine in the Lviv, Zolochiv, and Buczacz districts. These specimens were collected in the 1930s and their current status must be confirmed in field investigations. Soil test pits performed at over 20 sites of *O. picridis* in Poland have shown that it parasitizes only *Picris hieracioides*.

In Poland the optimum occurrence of *Orobanche picridis* is recorded in the community Dauco-Picridetum hieracioidis between an altitude of 140 and 435 m, usually over 200 m. The highest altitude reported from Central Europe, ca. 400 m, is in Hüntwangen in Switzerland (P u s c h and G ü n t h e r , 2009).

Similar phytocoenotic conditions are observed for the species in Central Europe. The number of individuals at the sites varies considerably and changes every year. They may not occur each year. A sudden and abundant occurrence with high host cover and its disappearance after a few years or its re-occurrence a few years later are characteristic of the species. *O. picridis* is very sensitive to an increase in grassland cover and succession changes. Its populations at the localities range from a few shoots to a few thousand shoots. The most abundant populations consisting of a few hundred to over a thousand shoots were recorded at the sites in Murawy Dobromierskie, Wesołówka, Góry Pińczowskie Mts or near Dąbrowa Górnicza, and in SE Poland: Nowy Dwór, Machnowska Góra Mt, Żurawnica.

Species biodiversity at the localities occupied by *Orobanche picridis* is also high. Many species extremely rare in Poland were observed when phytosociological relevés were performed in the communities with *O. picridis*. These include: *Adonis vernalis*, *Dorycnium germanicum*, *Linum hirsutum*, *Orobanche bartlingii*, *O. elatior*, *O. kochii*, *O. lutea*, *Senecio erucifolius* var. *tenuifolius*, *Thymelaea passerina*, *Carlina onopordifolia*, *Linosyris vulgaris*, *Orthanta lutea*, *Lathyrus latifolius* and other.

Processes of secondary succession must be controlled and the initial type and weak cover of the localities occupied by *Orobanche picridis* must be preserved

to protect the species. It is also recommended to control the localities and to monitor the abundance of the parasite and its host.

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Rewizja rozmieszczenia i analiza ekologiczna *Orobanche picridis* (Orobanchaceae) na NE granicy zasięgu, w Polsce i na Ukrainie

Streszczenie

Orobanche picridis należy do gatunków submediterrańsko-subatlantyckich. Zwartym zasięgiem obejmuje głównie Europę południowo-zachodnią. Stanowiska w Polsce i na Ukrainie tworzą północno-wschodni kres zasięgu gatunku. Należy do holopasożytów korzeniowych i pasożytuje głównie na *Picris hieracioides*. W Polsce jest gatunkiem silnie zagrożonym, zamieszczonym w czerwonej księdze i liście, podlega także ścisłej ochronie prawnej. *O. picridis* notowany jest w kraju z 34 stanowisk, z czego niemal wszystkie znalezione zostały w ostatnim 10-leciu. W Polsce występuje głównie na południu kraju, na Wyżynie Śląsko-Krakowskiej, Wyżynie Małopolskiej, Wyżynie Lubelskiej, Roztoczu Środkowym, Małym Polesiu oraz na Pogórzu Przemyskim, natomiast na Ukrainie, w dawnym województwie tarnopolskim. Populacje gatunku na stanowiskach wynoszą od kilku do ponad tysiąca pędów. Preferuje inicjalne siedliska, silnie nasłonecznione, często na ciężkiej rędzinie kredowej, tj. odłogi, ugory śródpolne, obrzeża pól, porzucone pola, sady i pastwiska, murawy kserotermiczne. Są to głównie zbiorowiska przejściowe w obrębie półruderalnych kserotermicznych zbiorowisk pionierskich z klasy Artemisietea vulgaris (optimum w Dauco-Picridetum hieracioidis) z domieszką gatunków z Agropyretea-intermedio-repentis lub rzadziej w zbiorowiskach suchych łąk (Arrhenatherion elatioris); z dużym udziałem gatunków kserotermicznych z klasy Festuco-Brometea i Trifolio-Geranietea sanguinei, a także segetalnych z klasy Stellarietea mediae. W typowych murawach kserotermicznych notowany rzadziej, zazwyczaj w inicjalnych lub słabo zwartych ich postaciach ze związku Cirsio-Brachypodion pinnati. Głównym zagrożeniem dla gatunku jest wtórna sukcesja roślinności, a także niestabilny, często synantropijny charakter siedlisk. Ochrona siedlisk gatunku nie jest łatwa, gdyż zaraza rośnie często na gruntach prywatnych, w miejscach porzuconych pól,

lub w ich strefie kontaktowej, skąd zagrożeniem jest wpływ herbicydów. Odłogi często są przekształcane w pola lub zostają zalesione. W celu ochrony należy, przede wszystkim, przeciwdziałać wzrostowi zwarcia siedlisk na skutek koszenia i okresowego płytkiego przedrapywania gleby, kontrolować liczebność żywiciela oraz objąć stanowiska monitoringiem przyrodniczym.