

## IS *RUBUS PERROBUSTUS* EXPANDING TO THE NORTH? – NEW RECORDS FROM POLAND

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### Abstract

*Rubus perrobustus* Holub is an endemic species of the Europe, whose range stretches from northern Austria, southern Germany, the Czech Republic, Slovakia, northern Hungary, South-western Poland to western Ukraine. Distribution of the species is not completely known as evidenced by its new localities found in recent years in different parts of Europe. The aim of the paper is to present new data on occurrence of *R. perrobustus* in Central Europe (Małopolska Upland, southern Poland). Five new localities of the species were found during phytogeographical studies in the Świętokrzyskie Mountains (central part of Małopolska Upland) using the cartogram method. The new data of *R. perrobustus* distribution indicate that the Świętokrzyskie Mountains and their foreland are the next area of its concentration in Central Europe. The recorded localities are among the most northerly. They may be the result of modern expansion of the species to the north from the eastern part of the Polish Carpathians. However, the similarity of distribution of *R. perrobustus* and a few other brambles recorded in the Polish mountains indicates that the localities found are rather the result of old postglacial migration. One way expects more localities of the species for instance in the uplands of southern Poland and therefore further extension of its range.

**Key words:** Brambles, New localities, Chorology, Expansion

### Introduction

*Rubus perrobustus* Holub is a shrub species from *Rhamnifolii* series of subgenus *Rubus*, which has been relatively recently described in southeastern part of the Czech Republic (Holub, 1992). It is characterised by high-arching stems, which are glabrous, angled and slightly furrowed with uniform prickles on angles. Leaves are 5-foliolate and the terminal leaflets are sharply serrate with straight teeth. The inflorescence of *R. perrobustus* is subcylindrical and narrow. The leaflets of lower leaves of flowering branches are very deeply serrate, often incised (Holub, 1992, 1995; Zieliński, 2004).

The species occurs in submontane and upland areas in diverse types of habitats. It grows in forest communities of *Quercetea robori-petreae* and *Querceto-Fagetea* classes (mainly on its margins), shrub communities of *Rhamno-Prunetea* class, clearing communities of *Epilobietea angustifolii* class, thermophilous tall-herb fringes of *Trifolio-Geranietea sanguinei* class and even in ruderal plant communities of *Artemisietea vulgaris* class (Oklejewicz, 2006; Nobis *et al.*, 2019).

*Rubus perrobustus* is an endemic species to Europe, which occurs mainly in central part of the continent. It has been recorded so far in northern Austria, southern Germany, the Czech Republic, Slovakia, northern Hungary, south-western Poland and western Ukraine. The species was also found in an isolated locality, in northern Italy (Zieliński, 2004; Oklejewicz, 2006; Kurto *et al.*, 2010; Pagitz, 2016; Nobis *et al.*, 2019; Zajac & Zajac, 2019). In Poland, *R. perrobustus* is quite numerous in the eastern part of the Carpathians (most abundant in the Przemyśl Foothills). In addition, it has been found in solitary localities in the Lasy Janowskie forest (Sandomierz Basin) and in the Iłża Foreland (Małopolska Upland) (Zieliński, 2004; Oklejewicz, 2006; Nobis, 2007; Piwowarczyk, 2010; Jaźwa & Stadnicka-Futoma, 2014).

The aim of the paper is to present new data on occurrence of *R. perrobustus* in Central Europe (southern Poland).

**Methods:** New data on the distribution of the species were collected during phytogeographical studies, conducted in the south-western part of the Świętokrzyskie Mountains (southern Poland). The studies were carried out using the cartogram method (Faliński, 1990). Floristic data were collected in the squares of a 2, 5 km based on the ATPOL grid (Zajac, 1978). The collected herbarium specimens were identified by the experts listed in the Acknowledgments and deposited in the Herbarium of the Jagiellonian University in Cracow (KRA).

**Results:** *R. perrobustus* was found in five localities mainly in a forest complex Kowala Forest near Kowala village (Świętokrzyskie Mountains, southern Poland; Fig. 1). The species grows primarily in *Quercus roboris-Pinetum* mixed forests, thermophilous oak woods (*Potentillo albae-Quercetum*) and shrubs in the vicinity of areas strongly transformed by the mining industry. The observed populations were quite numerous and depending on the locality occupied 3–5m<sup>2</sup>.

### List of localities

1. Bocheniec near Małogoszcz (north of the resort in the village), north slope of Bocheńska Mt, EE8211, *Quercus roboris-Pinetum* mixed forest, N 50°47'47,1", E 20°19'49,1"E, leg. G. Łazarski, 7.07.2011.
2. Kielce, south of Leśniówka Str., EE8401, pine forest, N 50°49'01,9", E 20°36'18,4", leg. G. Łazarski, 29.08.2012. Świętokrzyskie Mts, south of Leśniówka-Kielce [Kielce, Leśniówka Str.], Kowala Forest; EE8401, thermophilous oakwood, N 50°48'06,9", E 20°36'12,2", leg. G. Łazarski, 18.06.2014.

3. Kowala Duża (north of the eastern end of the village), EE8400, thermophilous shrubs, N 50°48'08,3", E 20°35'56,6", leg. G. Łazarski, 14.08.2012.
4. Kowala Duża (north of the western end of the village), EE8410, *Quercus robur*-*Pinetum* mixed forest, N 50°47'49, 2", E 20°35'47,6", leg. G. Łazarski, 14.08.2012.
5. Bilcza-Podgórze (north of the village), EE8411, *Quercus robur*-*Pinetum* mixed forest, N 50°47'49,0", E 20°36'09,1", leg. G. Łazarski, 30.07.2013. Świętokrzyskie Mts, north of the western end of the village Bilcza, EE8411, [thermophilous] oakwood, N 50°47'59,3", E 20°36'13,9" leg. G. Łazarski, 30.07.2013.

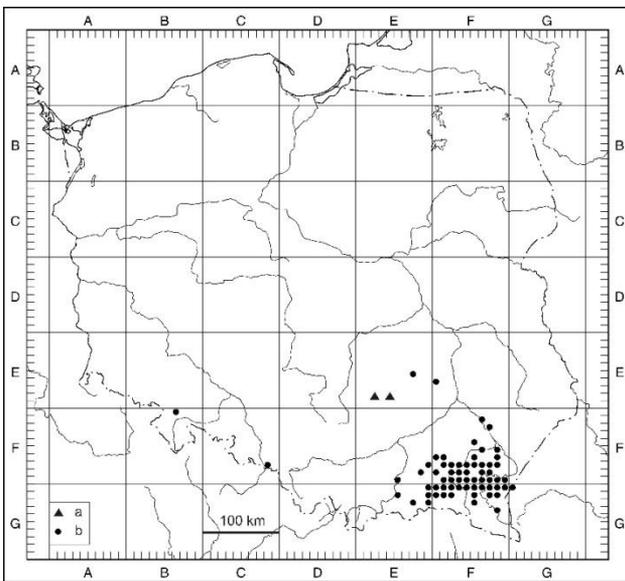


Fig. 1. Distribution of *Rubus perrobustus* Holub in Poland: a – localities found by the author, b – other localities (Zajac & Zajac, 2019, modified).

## Discussion

Knowledge of the range of *R. perrobustus* is incomplete. New localities of the species are reported on a regular basis. Some of them, like the localities in Italy and Germany, are far away from the area where the species occurs in a fairly compact range (Pagitz, 2016). Until recently it was thought that the north and the east border of the species in Poland runs through the eastern part of the Polish Carpathians (Oklejewicz, 2006). However, in subsequent years, the bramble was found much further to the north in the Iłża Foothills (Malopolska Upland) and to the east – in western Ukraine (Nobis, 2007; Piwowarczyk, 2010; Nobis *et al.*, 2019). The new data of *R. perrobustus* distribution (Fig. 1) indicate that Świętokrzyskie Mountains and their foreland are the next area of concentration of its localities in Central Europe.

Due to insufficient knowledge of the distribution of the species it is difficult to determine its migration path to Poland (Oklejewicz, 2006). It can be assumed that the species spread to the Polish territory from the Czech Republic, where it occurs quite often. The solitary localities of *R. perrobustus* in south-western Poland may confirm this direction of migration (Zajac & Zajac 2019).

Finding the species in five localities in the Świętokrzyskie Mountains may indicate that the species spreads northwards from the Polish Eastern Carpathians, where visible concentration of its localities has been found. The studied part of the Świętokrzyskie Mountains is largely transformed by the mining industry and progressive urbanisation. It is recognised that fragmentation and transformation of habitats due to anthropopressure is conducive to the spread of brambles. It is considered that undisturbed wood communities are poor in brambles. The number and abundance of *Rubus* species increase only when anthropogenic habitat changes are strong (Oklejewicz, 2006). The area around Kowala village, where the majority of localities were found, is one the most transformed by the mining industry in the Świętokrzyskie Mountains and can be considered susceptible to colonisation by brambles. However, analysing the ranges of other brambles in Poland, you can identify species that have similar distribution patterns as *R. perrobustus*, i.e., their localities are concentrated in the Carpathians with little concentration of localities in the Świętokrzyskie Mountains. Such distribution is typical, among others, to *R. bifrons*, *R. glivicensis* and *R. montanus* or *R. wimmerianus* (Zieliński, 2004). The similarity in the distribution of the species may indicate their similar history in the Holocene epoch. Therefore, you should rather assume that the localities of *R. perrobustus* localities in the uplands in southern Poland may be the result of old post-glacial migration rather than modern expansion of the species. Further records of the species can be expected, among others in the other uplands of southern Poland, and therefore further extension of its range.

## Conclusion

The new data of *Rubus perrobustus* distribution suggest that Świętokrzyskie Mountains and their foreland (southern Poland) are the next area of concentration of its localities in Central Europe. Fragmentation and transformation of habitats in this region due to anthropopressure is conducive to the spread of the species. However, similar distribution patterns for *R. perrobustus* and several other bramble species suggest that the recorded localities in the uplands in southern Poland may be the result of old post-glacial migration.

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