

Wild *Rosa* L. and *Crataegus* L. taxa of the Middle Noteć River Valley (NW Poland)

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Abstract. This paper presents a study on the distribution of hawthorns and wild roses of the Middle Noteć River Valley region in north-west (NW) Poland. The main purpose of the study was to provide a full list of wild *Crataegus* and *Rosa* taxa growing in the examined area. Field studies (2016-2017) and formerly published data, made it possible to recognize 10 taxa (including one rose hybrid within the rank of species). Four new taxa were found in the explored area during studies. These were: *Crataegus rhipidophylla* Gand., *C. ×macrocarpa* Hegetschw., *C. ×subsphaericea* Gand. and *Rosa ×subcanina* (H. Christ) Vuk.

Key words: Rosaceae, distribution of critical taxa, list of the species

1. Introduction

Although vegetation of the Noteć River Valley was investigated by a number of publications (e.g. Wyrwa & Wilkaniec 1994; Zgrabczyńska & Brzeg 2010; Grzelak & Bocian 2011; Grzelak & Murawski 2013, Grzelak *et al.* 2015; Waldon-Rudzionek 2015, 2019; Murawski *et al.* 2017), there is limited data available in scientific literature regarding the distribution of hawthorns and roses in this geographical area. The oldest data come from the end of the 19th century, when *Rosa elliptica* Tausch. var. *inodora* (Fr.) Schwertschl. was reported on slopes of the northern edge of the Noteć River Valley (Abromeit 1899). Currently, this taxon is treated as a synonym of *Rosa inodora* Fr. Grzelak *et al.* (2011) reported *Rosa canina* only from forest vegetation of this valley. More species were reported by Waldon-Rudzionek (2015, 2019): *Crataegus monogyna*, *Rosa canina*, *R. rubiginosa* and *R. rugosa*. Most data of hawthorn and rose species were given by Zajac & Zajac (2001), where the following species were listed (generally in Atlas of Poland squares): *Crataegus laevigata* (CC21), *C. monogyna* (BC27-BC29, BC37-BC39, CC20-CC23, CC30-CC33) and *Rosa canina* (BC28-BC29, BC37-BC39, CC20, CC23, CC30-CC31), *R. dumalis* (CC21-CC23), *R. inodora* (BC27,

BC29, CC31-CC32), *R. rubiginosa* (CC21), *R. rugosa* (BC27, BC37-BC38), *R. sherardii* (CC21) and *R. villosa* (CC30).

Additional studies and information on the occurrence of hawthorns and roses are required for the northern region of Poland (Sołtys-Lelek & Barabasz-Krasny 2015). The aim of this study was, therefore, to supplement knowledge of the current distribution of representatives of the critical genera of *Crataegus* L. and *Rosa* L. in this geographical area, including presentation of the full species composition and their distribution in the Middle Noteć River Valley.

2. Study area

The Middle Noteć River Valley, separated as a meso-region, is part of the Toruń-Eberswald Proglacial Stream Valley in the South Baltic Lakeland subprovince (Kondracki 2009; Solon *et al.* 2018). Its potential vegetation, taking into account soil, humidity and relief conditions, is *Fraxino-Alnetum* (Wojterski *et al.* 1981; Matuszkiewicz 2008). Currently, it is one of the largest low peatlands in Poland. Changes in the course of the Noteć River were caused by high dynamics and regulatory works so that it underwent a major transformation over the period of almost 120 years. This regulatory work was carried

out in order to develop the area, which was considered inaccessible, and to adapt the river as a waterway (Kaniecki & Ptak 2016). Over the past centuries, the Noteć River Valley was also deforested and strongly transformed into one of the largest meadow complexes in Poland. A decrease in the intensity of meadow management resulted in succession of vegetation and appearance of willow thickets and forest complexes, occupying several hundred hectares in places. Currently, the Noteć River Valley is largely a mosaic of meadows of different humidity, ranging from dry to strongly wet, including: oxbow lakes, drainage channels, riverbeds, small surface alder forests, riparian forests and marshy woodlands as well as arable lands here. Compact rural and urban development is focused on edges of the valley (Wylegała *et al.* 2010; Wylegała 2013).

3. Material and methods

Floristic materials were collected between 2016 and 2017, using the field cartogram method based on the ATPOL 10 km × 10 km square grid. The detailing of the ATPOL grid of squares was adopted with methodological assumptions of the “Distribution Atlas of Vascular Plants in Poland – ATPOL” (Zając 1978). Each square was divided into 100 smaller ones (1 km side) with each small square treated as a single locality.

The study covered the area of approximately 390 km² lying between the national road number 11 in Ujście, and the provincial road number 241, which passes over the Noteć River near Nakło. Southern and northern borders of the study area were both formed by a series

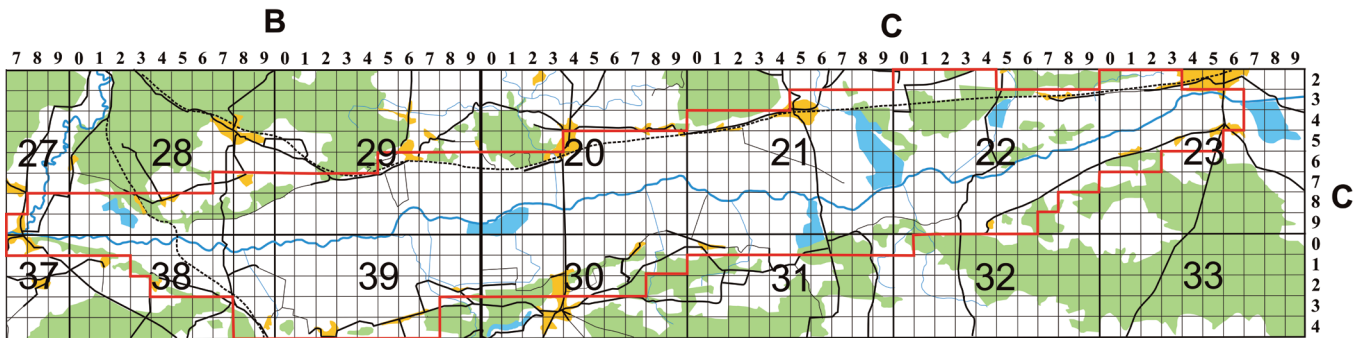


Fig. 1. Study area in the ATPOL grid square system

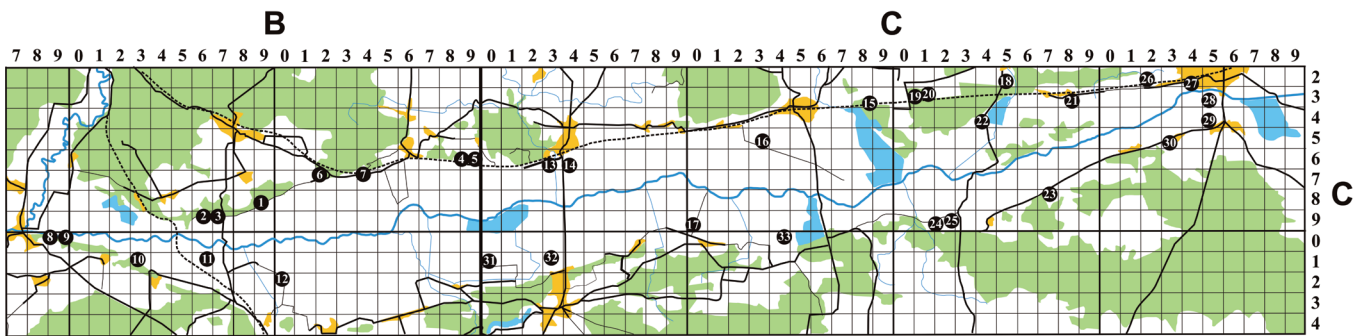


Fig. 2. Location of *Crataegus* species localities in the study area, in the ATPOL grid square system. List of localities cf. Appendix 1

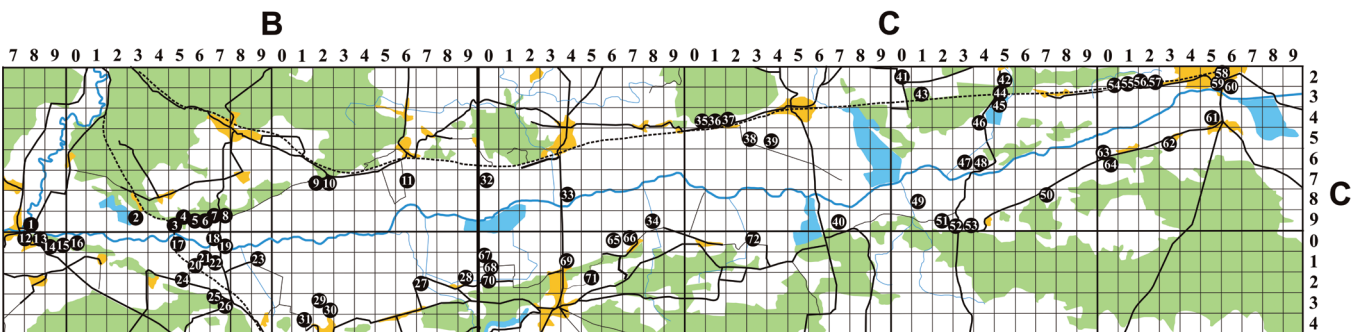


Fig. 3. Location of *Rosa* species localities in the study area, in the ATPOL grid square system. List of localities – cf. Appendix 2

of moraine hills which, in geomorphological terms, clearly separated the Middle Noteć River Valley from Krajeńskie and Chodzieskie Lake Districts. Square numbering: (Figs. 1-3 Appendices 1-2):

All herbarium materials were deposited in the Herbarium of the University School of Physical Education, Gorzow Wielkopolski in Poland. Data from literature were also included.

Taxonomic approach and nomenclature were based on the works of Popek (1996, 2002), Zieliński (1985, 1987), Henker (2000) and Christensen (1992, 1997). Geographical elements for each species followed Popek (2002, 2007) and Zajac & Zajac (2009). Native ranges were given for anthropophytes.

The essential basis to define taxa occurrence frequency was the number of localities counted/treated as habitats: 1-4 localities – very rare; 5-9 localities – rare; 10-15 localities – not so frequent; 16-20 localities – quite frequent; 21-25 localities – frequent; 26-30 localities – very frequent; and >30 localities – common.

Abbreviations used in the list of species: (N) – new taxa for the study area; (b) the list of geographical elements: A – Asian element; CE – European-temperate sub-element; CE:a-ne – Alpine-northern-European distributional type; M – Mediterranean element; IR – Irano-Turanian element; e – eastern; n – northern; w – western; sa – extension in the beginning of diagnosis to the Atlantic region of Europe.

4. Results

The following list of floristic materials collected during the course of this study contains five taxa of *Crataegus* L. genus belonging to subseries *Erianthae* and *Crataegus* (all of which were native taxa) and eight taxa of *Rosa* L. genus, belonging to *Cinnamomeae* DC. and *Caninae* DC. em. H. Christ sections. Among roses, one native hybrid in the rank of nothospecies and one anthropophyte.

4.1. Genus *Crataegus* L.

Ser. *Crataegus*

Subser. *Erianthae*

***Crataegus laevigata* (Poir.) DC.** – CE-M(n)

Very rare species, obtained from 3 localities: BC2969 (5), CC2138 (15), CC2153 (16). Species previously reported from ATPOL CC21 square (Zajac & Zajac 2001).

Subser. *Crataegus*

Crataegus rhipidophylla* Gand. var. *rhipidophylla – (N) – CE-M(e)-IR(w)

Very rare species, obtained from 1 locality: BC2969 (4). ***Crataegus monogyna* Jacq. var. *monogyna*** – sa-CE-M-IR(w)

Frequent species, 23 localities: BC2889 (1), BC2897 (3), BC2972 (6), BC3709 (8, 9), BC3816 (11), BC3920 (12), CC2063 (13), CC2064 (14), CC2190 (17), CC2231 (19, 20), CC2238 (21), CC2244 (22), CC2287 (23), CC2292 (24), CC2322 (26), CC2324 (27), CC2335 (28), CC2353 (30), CC3010 (31), CC3013 (32), CC3104 (33). Species previously reported from ATPOL squares BC27-BC29, BC37-BC39, CC20-CC23, CC30-CC33 (Zajac & Zajac 2001) and generally by Waldon-Rudzionek (2015, 2019).

***Crataegus* × *macrocarpa* Hegetschw.** [*C. laevigata* (Poir.) DC. × *C. rhipidophylla* Gand.] – (N) – CE

Very rare hybrid, obtained from 3 localities, occurred in 2 varieties:

- *Crataegus* × *macrocarpa* Hegetschw. nothovar. *macrocarpa* [*C. laevigata* (Poir.) DC. × *C. rhipidophylla* Gand. var. *rhipidophylla*]. Syn.: *C.* × *macrocarpa* var. *curvisepaloides* Hrabětová

Very rare variety, obtained from 2 localities: BC2896 (2), BC3813 (10).

- *Crataegus* × *macrocarpa* Hegetschw. nothovar. *calycina* (Peters.) Kerguelen [*C. laevigata* (Poir.) DC. × *C. rhipidophylla* Gand. var. *ronnigeri* (K. Malý) Janjić] Syn.: *C.* × *macrocarpa* Hegetschw. nothovar. *hadensis* (Hrabětová) Christensen, *C. calycina* Peters., *C. calciphila* Hrabětová

Very rare variety, obtained from 1 locality: CC2225 (18).

Crataegus* × *subspaeicea* Gand. nothovar. *subspaeicea [*C. monogyna* Jacq. × *C. rhipidophylla* Gand. var. *rhipidophylla*] – (N) – CE-M(e)-IR(w)

Rare hybrid, obtained from 3 localities: BC2974 (7), CC2292 (25), CC2345 (29).

4.2. Genus *Rosa* L.

I. Sect. *Cinnamomeae* DC.

***Rosa rugosa* Thunb.** – A

Very rare species (anthropophyte), obtained from 2 localities: BC2896 (5, 6). Species previously reported from squares: BC27, BC37, BC38 (Zajac & Zajac 2001) and generally by Waldon-Rudzionek (2015, 2019).

II. Sect. *Caninae* DC. em. H. Christ.

***Rosa dumalis* Bechst.** – CE-M(n)

Very rare and rare species, obtained from 13 localities, occurred in 5 varieties:

- var. *klášterskýi* (Popek) Popek (Fig. 4)
Very rare variety, obtained from 2 localities: BC2972 (10), CC3006 (65).
- var. *afzeliana* (Fr.) Boulenger
Very rare variety, obtained from 1 locality: BC3929 (28).
- var. *dumalis*
Rare variety, obtained from 6 localities: BC3837 (26), CC2220 (41), CC2264 (48), CC2321 (55), CC2353 (62), CC3104 (73).

- var. *coriifolia* (Fr.) Boulenger
Very rare variety, obtained from 3 localities: BC2897 (7), BC2972 (9), BC3807 (19).
- var. *caesia* (Sm.) Boulenger
Very rare variety, obtained from 1 locality: CC3020 (70). Species previously reported from ATPOL squares: CC21-CC23 (Zajac & Zajac 2001).

***Rosa villosa* L. – CE-(M)**

Very rare species, obtained from 1 locality based on literature: species previously reported from square CC30 (Zajac & Zajac 2001).

***Rosa sherardii* Davies var. *sherardii* – CE: a-ne**

Rare species, obtained from 8 localities: BC2895 (3), BC3709 (14), CC2141 (36), CC2197 (40), CC2244 (46), CC2287 (50), CC2293 (53), CC2326 (60). Species previously reported from ATPOL square CC21 (Zajac & Zajac 2001).

***Rosa rubiginosa* L. var. *umbellata* (Leers) Dumort. – sa-CE-M(n)**

Very rare species, obtained from 3 localities: BC3708 (13), CC2141 (35), CC3007 (66). Species previously reported from ATPOL square CC21 (Zajac & Zajac 2001) and generally from the study area by Waldon-Rudzionek (2015; 2019).

***Rosa inodora* Fr. – CE(w)**

Very rare species, obtained from 4 localities based on literature: species previously reported from squares BC27, BC29, CC31 and CC32 (Zajac & Zajac 2001). Also reported at the end of the 19th century from localities near Wyrzysk, on slopes of the northern edge of Noteć River Valley under the name *Rosa elliptica* Tausch. var. *inodora* (Fr.) Schwertschl. (Abromeit 1899).

***Rosa canina* L. – sa-CE-M-IR**

Common species, obtained from 44 localities, occurred in 3 varieties:

- var. *canina*
Very rare variety, obtained from 2 localities: BC3816 (20), CC2070 (32).
- var. *dumalis* Baker
Common variety, obtained from 36 localities: BC2798 (1), BC2893 (2), BC2895 (4), BC2976 (11), BC3708 (12), BC3800 (16), BC3807 (18), BC3817 (22), BC3819 (23), BC3825 (24), BC3837 (25, 26), BC3927 (27), BC3932 (29, 30), BC3941 (31), CC2084 (33), CC2098 (34), CC2153 (38), CC2154 (39), CC2225 (42), CC2231 (43), CC2235 (44, 45), CC2263 (47), CC2281 (49), CC2293 (52), CC2321 (54, 56), CC2326 (58, 59), CC2345 (61), CC2360 (63), CC3010 (68), CC3025 (71), CC3104 (73).
- var. *corymbifera* (Borkh.) Boulenger
Rare variety, obtained from 6 localities: BC2897 (8), BC3816 (21), CC2322 (57), CC2360 (64), CC3014 (69), CC3103 (72).

Rosa canina was previously reported from ATPOL squares: BC28-BC29, BC37-BC39, CC20, CC23,

CC30-CC31 by Zajac & Zajac (2001) and generally from the study area by Waldon-Rudzionek (2015, 2019).

***Rosa* × *subcanina* (H. Christ) Vuk. [*R. dumalis* Bechst. × *R. canina* L.] – (N) – CE-M(n)**

Rare taxon, obtained from 5 localities: BC3709 (15), BC3805 (17), CC2141 (37), CC2292 (51), CC3010 (67).

5. Discussion

Following study of the defined geographical area, the resulting list of species from *Crataegus* and *Rosa* genera contained 13 taxa. Of these, five were species of hawthorns and eight of roses. Four previously unreported taxa were found in this area during the study: *C. rhipidophylla* Gand., *C. ×macrocarpa* Hegetschw., *C. ×subsphaericea* Gand., and, *R. ×subcanina* (H. Christ) Vuk.

The Middle Noteć River Valley is characterized by low species diversity. During field studies conducted by the authors, six out of 16 native rose species known from Poland and five out of six native hawthorn species were found here. Two taxa dominated this area: *R. canina* and *C. monogyna*, both of which are common and widely distributed in Poland.

The study also provided additional data on the number of species sites already reported from this site. This allowed for a more accurate determination of the occurrence rate and gave a more accurate picture of their distribution within the study area. This was the case e.g. for *Rosa sherardii* or, common in the country, *R. canina* and *R. dumalis*, previously reported from single or few sites (Zajac & Zajac 2001; Waldon-Rudzionek 2015, 2019). The data obtained during the study confirmed poor knowledge of this area in terms of distribution of species sites from the genera in question.

However, sites of *Rosa villosa* and *R. inodora* were not confirmed (Abromeit 1899; Zajac & Zajac 2001).

During field studies, a hybrid form was found, with intermediate features between *R. canina* and *R. dumalis*. In this paper, a concept was adopted according to Henker (2000), who attributes a hybrid origin to them (*R. dumalis* × *R. canina*) and distinguishes them as separate taxa: *R. ×subcanina* with naked, un-haired leaves and *R. ×subcollina* with hairy leaves.

The highest intra-species variation was found in *Rosa dumalis* (5 varieties). One of the most interesting was, undoubtedly, *R. dumalis* Bechst. var. *klášterskýi* (Popek) Popek. This variety of *R. dumalis* had glandular underneath all over the surface or only on the nerves and hairless (Fig. 4). This rare variety of *R. dumalis* was reported from both the Sandomierz Upland (*locus classicus* in Góry Pieprzowe) and the Cracow-Częstochowa Upland (Popek 1996).



Fig. 4. *Rosa dumalis* Bechst. var. *kląsterskýi* (Poppek) Poppek

Explanations: A – part of fruiting short shoot, B – part of long shoot, C – fruit, D – stipule, E-F – part of leaf (glandular underside). Solid bar = 1 cm

Among the distinguished species, the dominant ones was that with distribution centre in the temperate climate of Europe to the Mediterranean area.

The geographical area analysed in this study did not favor the development of the genera in question. Reasons for this included a very high level of groundwater as well as frequent and numerous floodings, which together promoted the development of vegetation occupying habitats with high soil moisture levels (Okoniewska *et al.* 2014). Modern development of the Noteć River Valley concentrates mainly along the valley edges. Related anthropogenic transformations of relief include changes in water conditions of the valley such as shortening of river course, backfilling of oxbow lakes, straightening of meanders and riverbed modification. Other transformations include changes in relief forms such as pits, sandpits, gravel pits, landfills and embankments (Wylegała *et al.* 2010; Kaniecki & Ptak 2016). Distribution of localities in this study, with species of the studied genera, reflected this modern method of land management. Linear concentrations of species were found quite clearly along roads and railway embankments, and were located on both sides of the valley at the base of the edges of the moraine hills (Figs. 2-3). These were usually slightly higher, drier places where competition from hygrophytes was

limited. In central parts of the studied area, majority of localities were located on roadsides or in close vicinity of roads or banks of drainage ditches (Fig. 5).

Taking into account occurrence frequency of roses and hawthorns in the studied area, 8 taxa were classified as very rare, recorded on, at most, 4 sites. They included: *Crataegus rhipodophylla* and *Rosa villosa* (1 site each), anthropophyte – *Rosa rugosa* (2 sites), *Crataegus laevigata*, *C. ×macrocarpa*, *C. ×subspaeiricera* as well as *Rosa rubiginosa* (3 sites each) and *Rosa inodora*

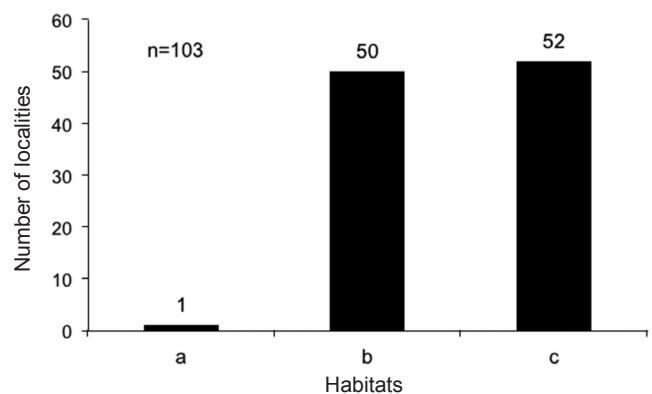


Fig. 5. Habitats of *Crataegus* nad *Rosa* species in the study area
Explanations: a – peripheries of forests, b – wastelands, c – roadside

(4 sites). The most common species were: *Rosa canina* (44 sites), *Crataegus monogyna* (23 sites) and *R. dumalis* (13 sites). They were also the most common species of hawthorn and wild rose in Poland. *Crataegus monogyna* and *Rosa canina* are species characterized by high flexibility in terms of ecological requirements. Taking into account ecological index numbers according to Zarzycki *et al.* (2002), both *C. monogyna* and *R. canina* are able to tolerate light conditions in the range from half shade to full light. These species also have a wide range for soil moisture index, from fresh to moist soils, while their trophic index ranges from moderately poor (mesotrophic) to very rich (extremely fertile) soils. The adaptability of both these species to habitat is an important factor influencing their distribution. It may be argued that they behave like synanthropic species and benefit from their ability to colonize (not very numerous in the valley) habitats corresponding to their requirements. Regarding *C. monogyna*, the literature

reports that its habitat preferences vary depending on anthropogenic environmental changes. Most localities of *C. monogyna* are located in anthropogenically changed areas (Oklejewicz *et al.* 2014).

Generally, within the study area, five out of six native hawthorn species occurring in Poland and six out of 16 reported native roses were found. Such a result indicates that this small area is not distinguished by a particular species richness of roses and hawthorns. However, this study complements data on their distribution in this part of Poland.

Author Contributions

Research concept and design: W. Gruszka

Acquisition and/or assembly of data: W. Gruszka

Data analysis and interpretation: A. Sołtys-Lelek

Drafting the article: A. Sołtys-Lelek, W. Gruszka

Critical revision: A. Sołtys-Lelek

Final approval: A. Sołtys-Lelek, W. Gruszka

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Appendix 1. Localities of *Crataegus* species

- BC2889.** 1. S from the Morzewo village; 53°4'9.70"N; 16°54'4.76"E
BC2896. 2. SW from the Krzewina village; 53°03'51.3"N; 16°51'28.7"E
BC2897. 3. SW from the Krzewina village; 53°03'51.1" N; 16°52'01.3"E
BC2969. 4. SW from the Wolsko village; 53°5'28.21"N; 17° 2'58.95"E. 5. SW from the Wolsko village; 53°5'27.22" N; 17° 3'15.09"E
BC2972. 6. near the Prawomyśl village; 53°5'05.8"N; 16°57'5.1"E
BC2974. 7. between the villages of Byszewice and Miasteczko Huby; 53°05'7.3"N; 16°58'31.8"E
BC3709. 8. Ujście town; 53°03'12.20"N; 16°44'56.0" E. 9. Ujście town; 53°03'09.6"N; 16°45'22.4"E
BC3813. 10. NW from the Nietuszkow village; 53°02'33.8"N; 16°49'7.8"E
BC3816. 11. near the Milcz vilage; 53°02'32.4" N; 16°51'23.0"E
BC3920. 12. E from the Ciszewo village; 53°02'23.8"N; 16°55'02.9"E
CC2063. 13. near the Dworzakowo village; 53°05'27.0"N; 17°06'14.5"E
CC2064. 14. S from the Białośliwie village; 53°05'19.8"N; 17°07'20.5" E
CC2138. 15. E from the Osiek nad Notecią village; 53°07'16.8"N; 17°19'55.2"E
CC2153. 16. near the Żuławka village; 53°06'22.8"N; 17°15'57.2"E
CC2190. 17. near the Lipia Góra village; 53°03'48.0"N; 17°13'02.1"E
CC2225. 18. S from the Samostrzel village; 53°07'59.4"N; 17°26'22.7"E
CC2231. 19. near the Jadwizyn village; 53°07'27.0"N; 17°22'25.4"E. 20. near the Jadwizyn village 53°07'27.2"N; 17°22'25.7"E
CC2238. 21. Łodzia village; 53°07'37.8"N; 17°29'04.5"E
CC2244. 22. N from the Ostrówiec village; 53°06'50.2"N; 17°25'50.4"E
CC2287. 23. near the Weronika village; 53°04'59.3"N; 17°27'57.7"E
CC2292. 24. near the Ludwikowo village; 53°04'12.5"N; 17°23'32.2"E. 25. near the Ludwikowo village; 53°04'12.9"N; 17°23'32.0"E
CC2322. 26. near the Bielawy village; 53°07'58.6"N; 17°32'36.2"E
CC2324. 27. Nakło nad Notecią town; 53°07'52.2"N; 17°34'14.5"E
CC2335. 28. S from the Nakło nad Notecią town; 53°07'22.5"N; 17°35'08.3"E
CC2345. 29. E from the Rozwarzyn village; 53°06'54.1"N; 17°34'53.7"E
CC2353. 30. near the Polichno village 53°06'29.8"N; 17°33'15.6"E
CC3010. 31. N from the Józefowice village; 53°02'33.9"N; 17°03'54.7"E
CC3013. 32. near Atanazyn village; 53°02'54.1"N; 17°06'27.0"E
CC3104. 33. S from the Lipa village; 53°03'33.4"N; 17°16'35.8"E

Appendix 2. Localities of *Rosa* species

- BC2798.** 1. Ujście town; 53°03'18.1"N; 16°44'04.6"E
BC2893. 2. S from the Dziembówko village; 53°03'44.7"N; 16°48'53.6"E
BC2895. 3. E from the Dziembówko village; 53°03'37.2"N; 16°50'25.8"E. 4. E from the Dziembówko village; 53°03'43.8"N; 16°50'58.6"E
BC2896. 5. S from the Krzewina village; 53°03'52.0"N; 16°51'44.0"E. 6. S from the Krzewina village; 53°03'51.7"N; 16°51'48.6"E
BC2897. 7. S from the Krzewina village; 53°03'52.9"N; 16°52'32.5"E. 8. S from the Krzewina village; 53°03'52.9"N; 16°52'32.7"E
BC2972. 9. Prawomyśl village; 53°04'50.8"N; 16°56'27.2"E. 10. Prawomyśl village; 53°04'54.0"N; 16°57'00.7"E
BC2976. 11. S from the Miasteczko Krajeńskie village; 53°05'06.2"N; 17°00'27.6"E
BC3708. 12. Ujście town; 53°03'13.0"N; 16°44'13.0"E. 13. Ujście town; 53°03'14.1"N; 16°44'33.4"E
BC3709. 14. Ujście town; 53°03'13.5"N; 16°44'52.8"E. 15. Ujście town; 53°03'09.9"N; 16°45'21.1"E
BC3800. 16. E from the Ujście town; 53°03'06.3"N; 16°45'52.8"E
BC3805. 17. W from the Milcz village; 53°02'52.0"N; 16°50'50.5"E
BC3807. 18. N from the Milcz village; 53°03'16.3"N; 16°52'36.5"E. 19. N from the Milcz village; 53°03'13.6"N; 16°52'42.9"E
BC3816. 20. Milcz village; 53°02'29.4"N; 16°51'21.7"E. 21. Milcz village; 53°02'37.5"N; 16°51'38.8"E
BC3817. 22. Milcz village; 53°02'30.9"N; 16°52'16.8"E
BC3819. 23. Ciszewo village; 53°02'41.1"N; 16°53'55.1"E
BC3825. 24. Nietuszkowo village; 53°02'09.1"N; 16°50'33.1"E
BC3837. 25. Milcz village; 53°01'47.4"N; 16°52'35.0"E. 26. Milcz village; 53°01'47.1"N; 16°52'34.1"E
BC3927. 27. Raczyn village; 53°02'21.3"N; 17°01'52.7"E
BC3929. 28. Raczyn village; 53°02'11.3"N; 17°02'49.2"E
BC3932. 29. N from the Strzelce village; 53°01'27.7"N; 16°57'8.8"E. 30. near the Strzelce village; 53°01'22.9"N; 16°57'17.3"E
BC3941. 31. W from the Strzelecin village; 53°01'11.1"N; 16°55'44.7"E
CC2070. 32. S from the Wolsko village; 53°05'10.1"N; 17°04'22.4"E
CC2084. 33. S from the Białośliwie village; 53°04'31.6"N; 17°07'29.3"E
CC2098. 34. Lipia Góra village; 53°03'54.5"N; 17°11'35.6"E
CC2141. 35. Bąkowo village; 53°06'33.1"N; 17°13'33.0"E. 36. Bąkowo village; 53°06'33.1"N; 17°13'33.0"E. 37. Bąkowo village; 53°06'33.3"N; 17°13'33.4"E
CC2153. 38. Żuławka village; 53°06'21.8"N; 17°15'12.3"E
CC2154. 39. Żuławka village; 53°06'11.1"N; 17°16'06.0"E
CC2197. 40. near the Mieczkowo village; 53°03'55.5"N; 17°19'30.8"E
CC2220. 41. S from the Żelazno village; 53°07'55.2"N; 17°22'09.2"E
CC2225. 42. Samostrzel village; 53°07'59.4"N; 17°26'22.7"E
CC2231. 43. Jadwiżyn village; 53°07'27.0"N; 17°22'25.4"E
CC2235. 44. Samostrzel village; 53°07'40.2"N; 17°26'14.2"E. 45. Samostrzel village; 53°07'29.9"N; 17°26'0.14"E
CC2244. 46. between the villages of Samostrzel and Ostrówiec; 53°06'50.2"N; 17°25'50.9"E
CC2263. 47. Ositko village; 53°05'37.3"N; 17°25'01.6"E
CC2264. 48. between the villages of Ositko and Ostrówiec; 53°05'43.3"N; 17°25'26.8"E
CC2281. 49. near the Ludwikowo village; 53°04'36.3"N; 17°23'05.2"E
CC2287. 50. Weronika village; 53°04'59.3"N; 17°27'57.7"E
CC2292. 51. near the Ludwikowo village; 53°04'12.5"N; 17°23'32.2"E
CC2293. 52. near the Kowalewko village; 53°04'13.1"N; 17°24'59.0"E. 53. near the Kowalewko village 53°04'13.1"N; 17°24'59.9"E
CC2321. 54. between the villages of Anieliny and Bielawy; 53°07'56.0"N; 17°31'33.3"E. 55. between the villages of Anieliny and Bielawy; 53°07'56.8"N; 17°31'33.9"E. 56. between the villages of Anieliny and Bielawy; 53°07'58.3"N; 17°31'55.0"E
CC2322. 57. Bielawy village; 53°07'59.0"N; 17°32'44.9"E
CC2326. 58. Nakło nad Notecią town; 53°07'54.9"N; 17°35'53.8"E. 59. Nakło nad Notecią town; 53°07'41.5"N; 17°36'0.12"E. 60. Nakło nad Notecią town; 53°07'41.5"N; 17°36'0.12"E
CC2345. 61. N from the Paterek village; 53°07'12.1"N; 17°35'05.7"E
CC2353. 62. Polichno village; 53°06'29.8"N; 17°33'15.6"E
CC2360. 63. Józefkowo village; 53°06'2.88"N; 17°30'49.9"E. 64. Józefkowo village ; 53°06'0.74"N; 17°30'53.37"E
CC3006. 65. Heliodorowo village; 53°3'11.57"N; 17° 9'21.28"E
CC3007. 66. Heliodorowo village; 53°03'17.6"N; 17°10'30.8"E
CC3010. 67. N from the Józefowice village; 53°02'55.7"N; 17°03'56.4"E. 68. N from the Józefowice village; 53°02'33.0"N; 17°03'54.5"E
CC3014. 69. near the Atanazyń village; 53°02'59.2"N; 17°07'22.5"E

CC3020. 70. Nałęczka village; 53°02'14.6"N; 17°03'46.9"E

CC3025. 71. Szamoty village; 53°02'36.0"N; 17°08'53.5"E

CC3103. 72. N from the Lipa village; 53°03'34.5"N; 17°16'02.7"E

CC3104. 73. N from the Nowy Dwór village; 53°03'34.9"N; 17°17'03.0"E