P O L I S H J O U R N A L O F E N T O M O L O G Y
P O L S K I E P I S M O E N T O M O L O G I C Z N E

VOL. **80**: 231-244 Gdynia 30 June 2011
DOI: 10.2478/v10200-011-0017-0

Scale insects (Hemiptera: Coccoidea) of Upper Silesia

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ABSTRACT. Faunistic research conducted in Poland for over 80 years has led to the discovery of 143 species of scale insects that live in the natural environment. The state of knowledge of the coccoid fauna of individual areas is uneven, however, 83 species of scale insects from 8 families were collected in Upper Silesia (Górny Śląsk). Upper Silesia is the region in Poland with the fourth-largest number of species; it is preceded by the Kraków-Wieluń Upland (94 species), Roztocze (88) and the Świętokrzyskie Mts. (86). Two of the species collected in this area – *Trionymus hamberdi* and *Volvicoccus stipae* – are known only from this region. The paper gives a list of scale insect species collected in Upper Silesia together with information on their localities.

KEY WORDS: scale insects, Hemiptera, Coccoidea, Upper Silesia.

INTRODUCTION

Scale insects (coccoids) belong to the superfamily Coccoidea, suborder Sternorrhyncha and order Hemiptera. The world fauna of these plant feeding insects includes nearly 8 000 species (GULLAN & MARTIN 2009). 143 scale insect species occurring in the natural environment have been recorded in Poland (ŁAGOWSKA 2004).

Although faunistic research in our country has been carried out for over 80 years, the level of knowledge on the scale insect fauna of Poland's individual regions is still uneven. For many years there were only three regions – the Kraków-Wieluń Upland (Wyżyna Krakowsko-Wieluńska), Roztocze and the Świętokrzyskie Mountains – where the number of reported species surpassed 60% of the national fauna in this respect. Between 30% and

40% of species were noted in four further regions, one of which was Upper Silesia (Górny Śląsk) (ŁAGOWSKA & GOLAN 2005).

The first information about coccoid species encountered in Upper Silesia was published by SZULCZEWSKI (1931). Further data were published by KOTEJA (1969, 1972), DZIEDZICKA (1970) and KOMOSIŃSKA (1974). However, the literature provided only scarce data on the presence of scale insects, most of which were recorded in only one or two localities. Until 2005 only 51 species had been noted in Upper Silesia (ŁAGOWSKA & GOLAN 2005).

The first systematic investigations planned in advance were conducted in the years 2005-2007 in the protected area of "Cistercian Landscape Compositions of Rudy Wielkie". These resulted in the list of species reported from this region being extended by 22 new species, so that their overall number was now 73 (SIMON & HERCZEK 2010). In 2007 the studies in urban environments were carried out: 15 species were recorded in the urban parks of Katowice and Chorzów (KALANDYK & HERCZEK 2008). The next research was conducted in 2006-2008 in the Garb Tarnogórski area (KALANDYK & WĘGIEREK 2010). Studies on scale insects are still in progress. Different types of plant communities, especially psammophilous and xerothermic grasslands as well as postindustrial areas, are being intensively investigated. This research has brought to light new species among the Silesian coccidofauna.

The aim of this paper is to compile a list of species encountered in Upper Silesia with data on their localities.

Acknowledgements

The authors express their warm gratitude to Prof. dr. hab. Elżbieta Podsiadło for checking the identification of material collected in the years 2005-2008 and for her valuable comments. We would like to thank Prof. dr hab. Wacław Wojciechowski, Prof. dr hab. Aleksander Herczek and Prof. dr hab. Piotr Węgierek for their assistance. Thanks are also due to Anna Szewczyk for checking the manuscript.

CHARACTERISTICS OF THE STUDY AREA

The term Upper Silesia (Górny Śląsk) is used in faunistic catalogues (e.g. KAWECKI 1985, BOGDANOWICZ et. al. 2004) according to the conventional division of Poland into regions. This area borders on Lower Silesia (Dolny Śląsk) and the Kraków-Wieluń Upland (Wyżyna Krakowsko-Wieluńska). There are many problems with establishing the boundaries of the historical region known as Upper Silesia. We have accepted the concept suggested by the authors of the faunistic catalogues and have decided to treat some

localities, e.g. Dąbrowa Górnicza and Siewierz, as part of Upper Silesia, even though from the historical point of view, they should not be included in this region.

Upper Silesia is generally considered to be one of the most degraded areas in Poland. In fact, the long-lasting influence of mining and metallurgy has changed every component of the environment in significant ways. As a result, environmental degradation has reached levels exceeding all permissible standards. In recent years, however, the economic situation has changed as a result of industrial restructuring. This has resulted in the closure of many factories, steelworks and mines. The pollution caused by these plants has thus decreased. A 50% decrease in air pollution in 10 years was reported in 1998, and this has affected the environmental state of the region. Even so, Upper Silesia remains one of the most polluted regions in Europe (RZĘTAŁA & JANKOWSKI 2001).

Although the level of degradation in Upper Silesia is very high, natural and seminatural ecosystems still exist there. Large areas are covered by woods of the classes *Vaccinio-Piceetea* and *Querco-Fagetea*. Plant communities like psammophilous grasslands of the class *Koelerio glaucae – Corynephoretea canescentis* have developed in the vicinity of rivers and ponds and in abandoned sand quarries. There are also other types of seminatural communities, e.g. xerothermic grasslands of the class *Festuco-Brometea* and moist meadows of the class *Molinio-Arrhenatheretea* (NOWAK 2000).

MATERIALS AND METHODS

The usual method of collecting scale insects is collecting by hand, which involves careful combing through host plants and the soil surface. According to DZIEDZICKA (1967) and KOTEJA (1996) the standard methods for collecting other insects are unsatisfactory in the case of scale insects. KOZÁR & MILLER (2001) analyzed different methods of collecting coccoids and came to the conclusion that hand collection was the most useful. Because the present classification of scale insects is based mainly on the features of adult females, the collecting effort was concentrated on these. Only some species can be identified on the basis of their general appearance; most have to be identified on the basis of permanent microscope slides.

The nomenclature and classification of scale insects used in this paper have been adopted from ŁAGOWSKA (2004), taking into account modifications proposed by DANZIG (2006) and GAVRILOV (2007). The genera within families and the species within genera are arranged in alphabetical order. Chronological analysis was conducted on the basis of the criteria developed by ŁAGOWSKA (2001), taking into account the modifications proposed by GERTSSON (2005).

The name of the localities are arranged in alphabetical order, too. Wherever possible, additional information on districts or parts of towns or cities are given (e.g. Brantolka and

Przerycie). Data on plant communities are given only with respect to our own research.

One abbreviation is used in the text: KWU – Kraków-Wieluń Upland.

RESULTS

83 species from eight families were found in Upper Silesia (Table 1). The most abundant family is the Pseudococcidae, which is represented by 30 species; 20 further species belong to the Coccidae, 13 to the Diaspididae, 12 to the Eriococcidae, 3 each to the Ortheziidae and Margarodidae, and 1 each to the Kermesidae and Asterolecaniidae.

Palaearctic species were the most numerous group (Table 1): species occurring in three or four subregions of the Palaearctic were dominant.

Table 1. Scale insect species collected in Upper Silesia.

Family/species	Chorological element	Plant Communities	Localities
Ortheziidae			
Newsteadia floccosa (DE GEER, 1778)	Pa (ES, M)	Δ Fo, Xe, Pg, Sn, Mo	KOTEJA, 1972, KOTEJA & ŻAK-OGAZA 1983; KAWECKI 1985, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Bukowno*, Dąbrowa Górnicza*, Sikorka *, Ruda Śląska Bielszowice*
Orthezia urticae (LINNAEUS, 1758)	Co	Fo, Xe,Sn	SZULCZEWSKI 1931, KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Dąbrowa Górnicza*, Gołonóg*, Gliwice*, Katowice Śródmieście*
Ortheziola vejdovskyi ŠULC, 1895	Pa (ES, M)	Xe	KALANDYK & WĘGIEREK 2010
Margarodidae			
Matsucoccus pini (GREEN, 1925)	Pa (ES, M)	Fo	SIEWNIAK 1972, KAWECKI 1985, SIMON & HERCZEK 2010
Porphyrophora polonica (LINNAEUS, 1758)	Pa (ES)	Xe, Pg	SZULCZEWSKI 1931, KAWECKI 1948, 1985, ŁAGOWSKA et. al. 2006, KALANDYK & WĘGIEREK 2010
Steingelia gorodetskia NASSONOV, 1908	Pa (ES)	Fo	SIMON & HERCZEK 2010

Pseudococcidae			
Coccura comari (KÜNOW, 1880)	Pa (ES, M, IT, FE)	Fo, Xe, Pg, Yw, Mo	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Ruda Śląska Bielszowice*
Dysmicoccus newsteadi (GREEN, 1917)	Pa (ES, M, IT)		KOTEJA 1969, KAWECKI 1985
Dysmicoccus walkeri (NEWSTEAD, 1891)	Pa (ES, M, IT, FE)		KOTEJA 1969, KAWECKI 1985
Euripersia tomlini (NEWSTEAD,1892)	Pa (ES, M, IT, FE)	Pg, P	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Katowice*
Heliococcus bohemicus ŠULC, 1912	Pa (ES, M, IT, FE)	Fo	SIMON & HERCZEK 2010 Kuźnia Raciborska*
Heliococcus sulci GOUX, 1934	Pa (ES, M)	Pg	KALANDYK & WĘGIEREK 2010
Heterococcus nudus (GREEN, 1926)	Ho	Pg	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Kamieniec *
Longicoccus psammophilus (KOTEJA,1971)	Pa (ES, M, FE)	Pg	KALANDYK & WĘGIEREK 2010
Metadenopus festucae ŠULC, 1933	Pa (ES, FE)	Xe, Pg	KOTEJA 1972, KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985, KALANDYK & WĘGIEREK 2010
Phenacoccus abditus BORCHSENIUS, 1949	Pa (ES, IT)	Xe, Pg	KALANDYK & WĘGIEREK 2010
Phenacoccus aceris (SIGNORET, 1875)	Ho	Fo, Pg, P, Sy	KAWECKI 1985, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Ruda Śląska Bielszowice*, Ruda Śląska Bykowina*, Ruda Śląska Wirek*,Tarnowskie Góry*, Twardowice*
Phenacoccus hordei (LINDEMAN, 1886)	Pa (ES, M, IT)	Xe, Pg	KOTEJA & ŻAK-OGAZA 1979, 1983, KAWECKI 1985, KALANDYK & WĘGIEREK 2010
Phenacoccus interruptus GREEN, 1923	Pa (ES, M, IT, FE)	Ng, Pg, Mo	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010
Phenacoccus phenacoccoides (KIRIČENKO, 1932)	Pa (ES, IT, FE)	Pg	KALANDYK & WĘGIEREK 2010
Phenacoccus piceae (LÖW, 1883)	Pa (ES, M, FE)	Fo, P	KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985, SIMON & HERCZEK 2010 Ruda Śląska Wirek*
Phenacoccus sp.	Pa (ES)	Pg, Sn	KALANDYK & WĘGIEREK 2010 Katowice Osiedle Paderewskiego – Muchowiec*

Planococcus vovae (NASSONOV, 1909)	Pa and Neot.	Pg	KALANDYK & WĘGIEREK 2010
Puto pilosellae (ŠULC, 1898)	Pa (ES, M, IT, FE)	Ng, Xe, Pg, Sn, Yw, Mo	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Katowice Osiedle Paderewskiego – Muchowiec*, Ruda Śląska Bielszowice*, Ruda Śląska Bykowina*
Puto superbus (LEONARDI, 1907)	Pa (ES, M, IT, FE)	P	Katowice Osiedle Paderewskiego – Muchowiec*
Rhodania porifera GOUX, 1935	Pa (ES, IT, FE)	Pg	KOTEJA 1972, KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985, KALANDYK & WĘGIEREK 2010 Kamieniec*
Saccharicoccus penium WILLIAMS, 1962	Pa (ES)	Fo, Me, Ng, Xe, Pg, Sn, Yw, Mo	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Katowice Osiedle Paderewskiego – Muchowiec*, Ruda Śląska Bielszowice*
Spinococcus calluneti (LINDINGER, 1912)	Ho	Fo, Mo	KOTEJA &ŻAK-OGAZA 1983, KAWECKI 1985, SIMON & HERCZEK 2010
Trionymus aberrans GOUX, 1938	Pa (ES, IT, FE)	Fo, Me, Ng, Xe, Pg, Sn, Yw, Mo, Sy	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Katowice*, Ruda Śląska Bielszowice*
Trionymus hamberdi (BORCHSENIUS, 1949)	Pa (ES, M, IT)	Me, Ng, Xe, Pg, Yw, Mo	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010
Trionymus isfarensis (BORCHSENIUS,1949)	Pa (ES, IT, FE)	Pg	KOTEJA & ŻAK-OGAZA 1979, 1983, KAWECKI 1985, KALANDYK & WĘGIEREK 2010
Trionymus perrisii (SIGNORET, 1875)	Pa (ES, M, IT, FE)	Fo, Me, Ng, Xe, Pg, Sn, Yw	KOTEJA 1969, KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Katowice Śródmieście*, Ruda Śląska Bielszowice*, Ruda Śląska Bykowina*, Ruda Śląska Kochłowice*
Trionymus radicum (NEWSTEAD, 1895)	Pa (ES, M)	Me	SIMON & HERCZEK 2010
Trionymus singularis SCHMUTTERER, 1952	Pa (ES)	Pg	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010
Trionymus tomlini GREEN, 1925	Pa (ES, M, IT, FE)	Me, Ng, Xe, Pg, Mo	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Sławków*
Volvicoccus stipae (BORCHSENIUS, 1949)	Pa (ES, IT)	Pg	KALANDYK & WĘGIEREK 2010

Eriococcidae			
Acanthococcus aceris SIGNORET, 1875	Pa (ES, M, IT)	Sy, P	DZIEDZICKA 1970, KAWECKI 1985, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010
Anophococcus agropyri (BORCHSENIUS, 1949)	Pa (ES, M, IT, FE)	Pg, Sn	KALANDYK & WĘGIEREK 2010
Anophococcus greeni (NEWSTEAD, 1898)	Ho	Ng	SIMON & HERCZEK 2010
Anophococcus herbaceus (DANZIG, 1962)	Pa (ES, M)	Pg	DZIEDZICKA & KOTEJA 1971, KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985, KALANDYK & WĘGIEREK 2010
Anophococcus inermis (GREEN, 1915)	Pa (ES)	Xe, Yw, Mo	DZIEDZICKA & KOTEJA 1971, KOTEJA & ŻAK-OGAZA 1983, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010
Anophococcus insignis (NEWSTEAD, 1891)	Ho	Ng, Pg, Yw, Mo	DZIEDZICKA & KOTEJA 1971, KOTEJA & ŻAK -OGAZA1983, KAWECKI 1985, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Ruda Śląska Bielszowice*
Anophococcus pseudinsignis (GREEN, 1921)	Ho	Ng, Pg, Mo	DZIEDZICKA & KOTEJA 1971, KAWECKI 1985, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010
Cryptococcus fagisuga LINDINGER, 1936	Pa (ES, M, IT)	Fo, P, Sy	SZULCZEWSKI 1931, KAWECKI 1985, SIMON & HERCZEK 2010, Ruda Śląska Bykowina*, Ruda Śląska Wirek*
Gossyparia spuria (MODEER, 1778)	Ho	Sy, P	SZULCZEWSKI 1931, RUSZKOWSKI et. al. 1938, DZIEDZICKA 1970, KAWECKI 1985, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010 Dąbrowa Górnicza Gołonóg*, Katowice Śródmieście*, Ruda Śląska Kochłowice*
Kaweckia glyceriae (GREEN, 1921)	Pa (ES, M, IT, FE)	Me, Ng, Xe, Pg, Sn, P, Yw, Mo	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Będzin*, Chorzów Batory*, Chorzów Stary *, Katowice Zawodzie*, Psary*, Ruda Śląska Bielszowice*, Ruda Śląska Bykowina*, Ruda Śląska Kochłowice*, Sosnowiec*
Pseudochermes fraxini (KALTENBACH, 1860)	Pa (ES, M, IT)	Sy, P	SZULCZEWSKI 1931, DZIEDZICKA 1970, KAWECKI 1985, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010 Ruda Śląska Bykowina*

Rhizococcus munroi (BORATYŃSKI, 1962)	Pa (ES, M, IT)	Fo	SIMON & HERCZEK 2010
Kermesidae			
Kermes quercus (LINNAEUS, 1758)	Pa (ES, M, IT)	Fo, P	SZULCZEWSKI 1931, KAWECKI 1985, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010 Katowice Śródmieście*, Ruda Śląska Kochłowice*, Ruda Śląska Bielszowice*
Coccidae			
Eriopletis festucae (BOYER DE FONSCOLOMBE, 1834)	Ho	Xe	SZULCZEWSKI 1931, KAWECKI 1985, KALANDYK & WĘGIEREK 2010
Eriopeltis stammeri SCHMUTTERER, 1952	Pa (ES, IT)	Me, Pg, Yw	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Ruda Śląska Bielszowice*, Ruda Śląska Bykowina*, Ruda Śląska Kochłowice*, Ruda Śląska Wirek*
Eulecanium ciliatum (DOUGLAS, 1891)	Pa (ES, M, FE)		SZULCZEWSKI 1931, KAWECKI 1985
Eulecanium tiliae (LINNAEUS, 1758)	Ho, Or	Sy, Fo, P	DZIEDZICKA 1970, KAWECKI 1985, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010 Ruda Śląska Kochłowice*
Lecanopsis formicarum NEWSTEAD, 1893	Pa (ES, M, FE)	Xe, Pg, Sn	SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010
Luzulaspis frontalis GREEN, 1928	Pa (ES)	Me, Fo, Xe, P	KOTEJA 1969, KAWECKI 1985, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Katowice Ligota*
Luzulaspis luzulae (DUFOUR, 1864)	Pa (ES, M)		KOTEJA 1969, KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985
Luzulaspis scotica GREEN, 1926	Pa (ES)		KOTEJA 1969, 1979, KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985
Palaeolecanium bituberculatum (SIGNORET, 1874)	Pa (ES, M, IT)	Xe	DZIEDZICKA 1970, DZIEDZICKA & MARCHEWCZYK 1970, KAWECKI 1985, KALANDYK & WĘGIEREK 2010
Parafairmairia bipartita (SIGNORET, 1872)	Pa (ES, M)	Fo	KOTEJA & ROŚCISZEWSKA 1970, KAWECKI 1985, SIMON & HERCZEK 2010
Parthenolecanium corni (BOUCHÉ, 1844)	Co	Sy, Fo, Ng, Xe, Pg, Sn, P, Yw, Mo	SZULCZEWSKI 1931, DZIEDZICKA 1970, KAWECKI 1985, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010, KALANDYK &

			WĘGIEREK 2010 Będzin*, Chorzów Stary*, Ruda Śląska Bielszowice*, Ruda Śląska Bykowina*, Ruda Śląśka Kochłowice*, Sosnowiec*
Parthenolecanium fletcheri (COCKERELL, 1893)	Ho	Sy	SZULCZEWSKI 1931, SIMON & HERCZEK 2010 Chorzów Centrum*
Parthenolecanium pomeranicum (KAWECKI, 1954)	Pa (ES, M)	Sy, P	KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010 Chorzów Centrum*
Parthenolecanium rufulum (COCKERELL, 1903)	Pa (ES, M, IT)	Sy, Fo, Pg, P	DZIEDZICKA 1970, KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Ruda Śląska Bielszowice*, Ruda Śląska Wirek*
Phyllostroma myrtilli (KALTENBACH, 1874)	Ho	Fo	KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985, SIMON & HERCZEK 2010
Physokermes hemicryphus (DALMAN, 1826)	Ho	Fo, Sy	KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985, SIMON & HERCZEK 2010 Ruda Śląska Bykowina*
Physokermes piceae (SHRANK, 1801)	Ho		SZULCZEWSKI 1931, DZIEDZICKA 1970
Pulvinaria vitis (LINNAEUS, 1758)	Co	Fo	SZULCZEWSKI 1931, DZIEDZICKA 1970, KAWECKI 1985, SIMON & HERCZEK 2010 Katowice*
Sphaerolecanium prunastri (BOYER DE FONSCOLOMBE, 1834)	Ho		ŁĘSKI 1971, KAWECKI 1972, 1985 Wojkowice*
Vittacoccus longicornis (GREEN, 1916)	Pa (ES)		KOTEJA 1969, KAWECKI 1985
Asterolecaniidae			
Asterodiaspis variolosa (RATZENBURG, 1870)	Co	Fo, Pg, P	SZULCZEWSKI 1931, PODSIADŁO 1975, KAWECKI 1985, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Ruda Śląska Bielszowice*, Ruda Śląska Kochłowice*, Ruda Śląśka Wirek*
Diaspididae			
Carulaspis juniperi (BOUCHÉ, 1951)	Ho	Sy, Pg, P	SZULCZEWSKI 1931, KALANDYK & HERCZEK 2008, SIMON & HERCZEK

			2010, KALANDYK & WĘGIEREK 2010 Gliwice Centrum*
Chionaspis salicis (LINNAEUS, 1758)	Pa and Or	Sy, Pg, P	SZULCZEWSKI 1931, KAWECKI 1985, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Ruda Śląska Bykowina*
Diaspidiotus bavaricus (LINDINGER, 1912)	Pa (ES, M)	Fo	SIMON & HERCZEK 2010
Diaspidiotus gigas (THIEM & GERNECK, 1934)	Ho		KOMOSIŃSKA 1974, KAWECKI 1985
Diaspidiotus ostreaeformis (CURTIS, 1843)	Co	Sy, Fo, Me, Pg, Sn, P, Yw, Mo	KAWECKI 1985, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Ruda Śląska Bielszowice*, Ruda Śląska Bykowina*, Ruda Śląska Wirek*
Diaspidiotus pyri (LICHTENSTEIN, 1881)	Pa, Or		SZULCZEWSKI 1931, KAWECKI 1985
Diaspidiotus zonatus (FRAUENFELD, 1868)	Pa (ES, M, IT)		SZULCZEWSKI 1931, KAWECKI 1985
Insulaspis newsteadi (ŠULC, 1895)	Pa (ES, M, IT)	Yw	SIMON & HERCZEK 2010
Lepidosaphes conchiformis (GMELIN, 1790)	Ho, Neotr.		KOMOSIŃSKA 1974
Lepidosaphes ulmi (LINNAEUS, 1758)	Co	Sy, Fo, Me, Pg, Sn, P, Yw, Mo	SZULCZEWSKI 1931, DZIEDZICKA 1970, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010 Ruda Śląska Bielszowice*, Ruda Śląska Bykowina*, Ruda Śląska Wirek*
Leucaspis loewi COLVÉE, 1882	Pa (ES, M, IT)	Fo, Pg, Mo, P	SZULCZEWSKI 1931, KOMOSIŃSKA 1974, KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985, KALANDYK & HERCZEK 2008, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010
Leucaspis pini (HARTIG, 1839)	Pa (ES, M, IT)	Pg, Fo	KOMOSIŃSKA 1974, KAWECKI 1985, SIMON & HERCZEK 2010, KALANDYK & WĘGIEREK 2010Ruda Śląska Kochłowice*
Nuculaspis abietis	Pa (ES, M,	Fo	SZULCZEWSKI 1931, DZIEDZICKA

(SCHRANK, 1776)	IT)		1970, KOMOSIŃSKA 1974, KOTEJA & ŻAK-OGAZA 1983, KAWECKI 1985, SIMON & HERCZEK 2010 Ruda Śląska Kochłowice*

Chorological element: Co – cosmopolitan; ES – Euro-Siberian; FE – Far Eastern; Ho – Holarctic; IT – Irano-Turanian; M – Mediterranean; Neotr – Neotropical; Or – Oriental; Pa – Palaearctic.
Δ Plant communities: Fo – forests; Me – meadows; Mo – moorlands; Ng – Nardus grasslands; P – parks; Pg – psammophilous grasslands; Sn – seminatural xerothermic communities; Sy – synanthropic habitats; Xe – xerothermic grasslands; Yw – young woodlands.
Data on the localities marked with an asterisk (*) have not been published.

One of the best known species – *Porphyrophora polonica* – was also noted in Upper Silesia. From the fourteenth to the sixteenth century it had an important impact on Poland' s economic situation as a source of cochineal dye and an item of trade. Nowadays, the dwindling numbers of *P. polonica* are noticeable. For this reason the only possibility of preserving natural populations of this rare species is legal protection and inclusion on the Red List of threatened species (ŁAGOWSKA et al. 2006). Information on new localities of *P. polonica* is valuable: one was discovered at Bobrowniki in *Festuco-Brometea* xerothermic grassland (KALANDYK & WĘGIEREK 2010).

Some species occurring in Upper Silesia are treated as rare in Poland, because they have been noted in only one or two different regions.

One of the most interesting species registered there is *Puto superbus.* In June 2010 a new locality of this rare species was found in a Katowice park. This is the second locality of this species in Poland; *P. superbus* was reported for the first time in the Mazovian Lowland, being collected from the leaves and stems of *Festuca rubra* (ŁAGOWSKA 2000). In Katowice it was found on the leaves of *Arrhenatherum elatius* and on the ground. The data on this new locality has not been published before.

Another species that is worthy of attention is *Coccura comari*. It was considered to be rare, noted only in two regions of Poland: the Sandomierz Lowland (KAWECKI 1985) and Roztocze (ŁAGOWSKA & KOTEJA 1996). In Upper Silesia it was found in numerous populations in the Landscape Park and in a brownfield site in Ruda Śląska Bielszowice. The data on this latter locality have not been published.

DISCUSSION

At present the Coccoidea fauna of Upper Silesia is represented by 83 species, i.e. 58% of the national fauna. It is the region with the fourth-largest number of species, preceded

only by the Kraków-Wieluń Upland (94 species) (KOTEJA & ŻAK-OGAZA 1983), Roztocze (88) (ŁAGOWSKA & KOTEJA 1996), and the Świętokrzyskie Mts. (86) (KOTEJA & ŻAK-OGAZA 1989).

Upper Silesia borders on the Kraków-Wieluń Upland. Faunistic research in this region has been going on for over 20 years and resulted in the publication of a list of 94 species collected there (KOTEJA & ŻAK-OGAZA 1983). Systematic investigation of these insects in Upper Silesia started in 2005 and continues to this day.

71 species were sound to be common to both Upper Silesia and the Kraków-Wieluń Upland. In these two regions 23 species were registered only in the KWU. Some of them are considered rare in Poland e.g. *Xylococcus filiferus*, *Longicoccus festucae*, *Greenisca gouxi*. In Upper Silesia 12 species were found that were not collected in the KWU. Two of them – *Trionymus hamberdi* and *Volvicoccus stipae* – have not been reported from any other region in Poland.

Only 47 species were found in Lower Silesia (KOTEJA 1984), four of which have not been recorded in Upper Silesia: *Atrococcus cracens*, *Eriopeltis lichtensteini*, *Eulecanium franconicum*, *Parafairmairia gracilis*. In comparison with Upper Silesia, Lower Silesia is poorly investigated.

Advanced faunistic investigations in Upper Silesia started a mere six years ago. During these studies 32 new species have been noted in this region. The expansion of research to new areas within in the boundaries of Upper Silesia may result in the list of species being extended in the near future.

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Received: May 05, 2011
Accepted: May 31, 2011