

## The collection of scale insects (Insecta: Hemiptera: Coccoidea) in the Natural History Museum Vienna

M. Kalandyk-Kołodziejczyk\* & H. Zettel\*\*

### Abstract

The collection of scale insects deposited in the Natural History Museum Vienna contains about 600 microscope slides. This paper presents the list of species represented in the microscope slide collection with information about the group.

**Key words:** collection, scale insects, microscope slides.

### Zusammenfassung

Die Schildläusesammlung des Naturhistorischen Museums Wien umfasst etwa 600 Präparate auf Objektträgern. Diese Arbeit präsentiert eine Artenliste dieser Sammlung ergänzt durch Informationen über diese Tiergruppe.

### Introduction

The Natural History Museum Vienna (Naturhistorisches Museum Wien, NHMW) houses one of the most important collections of scale insects in Europe. It has been visited by famous coccidologists, e.g. Yair Ben-Dov, Karol Boratyński, Jan Koteja, and Daniele Matile-Ferrero.

The species identification of scale insects and their taxonomy is generally based on the microscopic cuticular features of the long-lived adult female. The identification of species is most often impossible without preparing microscope slides (KOSZTARAB & KOZÁR 1988). Therefore this study refers only to the microscope slide collection. In addition the NHMW collection of dry specimens contains further species not represented in the slide collection. They have been mounted by coccidologists and constitute material for future research. In spite of the importance of the collection, a list containing specimens deposited in NHMW has not been created hitherto.

The aim of this paper is to present such a list of species for the microscope slide collection with additional information about the group.

### Characteristic of scale insects

The scale insects (also called coccoids) constitute the superfamily Coccoidea of the monophyletic suborder Sternorrhyncha within the order Hemiptera. About 8,000 species

\* Dr. Małgorzata Kalandyk-Kołodziejczyk, Department of Zoology, Faculty of Biology and Environmental Protection, University of Silesia, Bankowa 9, 40-007 Katowice, Poland. – malgorzata.kalandyk@us.edu.pl

\*\* Dr. Herbert Zettel, 2<sup>nd</sup> Zoological Department, Natural History Museum Vienna, Burging 7, 1010 Vienna, Austria. – herbert.zettel@nhm-wien.ac.at

of coccoids are described (GULLAN & MARTIN 2009). These insects are generally small (typically less than 5 mm long) and often cryptic in habit, although some of them are highly visible. Coccoids are almost entirely phytophagous, with the exception of a few species that feed on fungal mats and other fungi. Scale insects occur on various parts of their host plants (e.g. stems, leaves, or roots). They can injure or kill plants by depleting them of their sap, transferring viruses and/or excreting honeydew, on which sooty mould develops, so many species are considered to be economically important pests of horticulture, agriculture, and forestry (KONDO et al. 2008).

Scale insects exhibit a very marked sexual dimorphism, which is most pronounced in the adult stage. Adult females are wingless, sac-like with fused body parts; they usually possess well developed mouthparts and may live from some months to several years. Adult males are delicate insects with distinctive head, thorax and abdomen. They do not possess functional mouthparts and live only for a few days. Males are generally alate; they have a pair of membranous forewings and a pair of vestigial hind wings named balancers or halteres, although adult males of some species are wingless (GULLAN & KOSZTARAB 1997).

There are species of scale insects that are economically valuable because of the substances they provide. Some of them, e.g. *Porphyrophora polonica* (LINNÉ, 1778), *P. hamelii* BRANDT in BRANDT & RATZEBURG, 1833, *Kermes vermilio* PLANCHON, 1864, have been used to obtain red dyes for coloring foods and dyeing fabrics, others have been collected to receive valuable secretions in the form of waxes and resins, and even for their use as medicine and food (KONDO et al. 2008).

### Scale insects of Austria

Scale insects occur worldwide, but they are most abundant in the tropical climate zones. The scale insect fauna of Austria has been studied by several authors, but the complete list of species can be extracted only from catalogues (e.g. BEN-DOV et al. 2015). Some species new to this country were recorded a few years ago and also a species new to science (*Acanthococcus thaleri* SZITA, KONCZNÉ BENEDICTY & KOZÁR, 2011) was described from Austria (SZITA et al. 2011). According to MALUMPHY AND KAHRER (2011) the coccoid fauna of Austria has been inadequately studied and there appear to be no specific published data on the occurrence of the common cosmopolitan scale insect species.

According to BEN DOV et al. (2015) there are 90 species of scale insects in Austria, including native and non-native naturalized species and those restricted to greenhouses. They are assigned to eleven families listed in alphabetical order: Acleridae (1 species), Asterolecaniidae (4 species), Coccidae (23), Diaspididae (24), Eriococcidae (10), Kermesidae (6), Matsucoccidae (1), Ortheziidae (5), Pseudococcidae (14), Putoidae (1), Xylococcidae (1 species). There is some detailed information about scale insects that occur in a particular region or city e.g. the coccoid fauna of public parks and greenhouses of Vienna was studied in detail (MALUMPHY & KAHRER 2011): In the urban greenery and glasshouses 30 coccoid species assigned to four families were recorded (22 native and non-native naturalized species and eight species restricted to indoor plants).

## Materials and methods

The collection of scale insects in NHMW contains microscope slides and specimens preserved in the dry state. The microscope slides contain the cuticle of specimens, mostly females, that was cleaned and stained before mounting. There are many different methods of preparing slides (e.g. KOSZTARAB & KOZÁR 1988). The list of species represented in the microscope slides was compiled during short visits in the collection (March 2014, October 2014 and September 2015) by the first author. Table 1 contains the number of all slides of particular species including types. Specimens assigned to genus only were omitted. Information about the collection localities is given (Tab. 1). Table 2 contains only the types deposited in the museum with additional information taken from the original labels. Valid names of species and their taxonomic affiliation are adopted from “A Database of the Scale Insects of the World” (BEN-DOV et al. 2015). The families, genera within the families and species within genera are given in alphabetical order.

### Information about collection and list of species

There are about 600 microscope slides deposited in the Naturhistorisches Museum Wien. Labels on the microscope slides contain the name of the species and often additional data: place of collection, name of the host plant, and also name of the researcher who identified the particular specimen, but the countries where the specimens were collected are often not mentioned. There is also information about remounting and designation of types with author and date. The great majority of microscope slide labels do not contain the date of collecting. The slides usually include one specimen, but some of them contain two or more specimens of one or two species. The majority of slides contains cuticle of the whole specimens (mostly females), but in some cases only parts of cuticle are mounted (e.g. legs of *Puto superbus* (LEONARDI, 1907)).

The specimens represent 120 species (Tab. 1) assigned to 16 families, but the family Ortheziidae is represented by a specimen assigned only to the genus *Orthezia* BOSC D'ANTIC, 1784, so it is not listed. Two species represented by specimens on microscope slides, *Luzulaspis frontalis* GREEN, 1928 (Coccidae) and *Planococcus ficus* (SIGNORET, 1875) (Pseudococcidae), had not been reported from Austria before. The specimen of the first species collected from *Carex pilosa* SCOP. in Semmering was originally determined by Löw as *Signoretia luzulae*, then determined by Koteja as *Luzulaspis frontalis*. The second species is represented by four slides in the collection, but only two of them contain specimens collected in Austria (from *Vitis vinifera* L., determined by Löw). Thereby the number of species of Austria increases to 92.

Most species (38) are assigned to the family Diaspididae, which is the largest family within the superfamily Coccoidea. There are families represented by only one species, e.g. Lecanodiaspididae and Xylococcidae. Some specimens are identified to genus only, e.g. *Planchonia* SIGNORET, 1870, *Eriococcus* TARGIONI TOZZETTI, 1868, *Matsucoccus* COCKERELL, 1909, *Monophlebus* GUÉRIN-MÉNEVILLE, 1827, and *Orthezia* BOSC D'ANTIC, 1784. There are also some slides with undescribed individuals and slides containing specimens of unclear taxonomic affinity (e.g. *Gossyparia ulmi*). Many specimens deposited in the museum were collected over one hundred years ago and were identified by famous coccidologists: Signoret, Lichtenstein and Löw. Individuals were collected in

Tab. 1: List of species represented in the microscope slides in NHMW with data on number of slides and the collection locality. \* Information about the country where the specimens were collected is lacking.

Family and species names	Number of slides	Country of collection
<b>Asterolecaniidae</b>		
<i>Asterodiaspis ilicicola</i> (TARGIONI TOZZETTI, 1888)	1	France, Nice
<i>Asterodiaspis quercicola</i> (BOUCHÉ, 1851)	1	France, Paris
<i>Asterodiaspis roboris</i> (RUSSELL, 1941)	1	Austria
<i>Asterodiaspis variolosa</i> (RATZEBURG, 1870)	1	Austria, Vienna
<i>Asterolecanium epidendri</i> (BOUCHÉ, 1844)	2 2	France, Nice *
<i>Bambusaspis bambusae</i> (BOISDUVAL, 1869)	1 1	France, La Reunion *
<i>Bambusaspis miliaris</i> (BOISDUVAL, 1869)	1	France, La Reunion
<i>Planchonia algeriensis</i> NEWSTEAD, 1897	1	France, Montpellier
<i>Planchonia arabidis</i> SIGNORET, 1877	1	Czech Republic, Znojmo
<i>Planchonia fimbriata</i> (BOYER DE FONSCOLOMBE, 1834)	3	France, Montpellier
<i>Pollinia pollini</i> (A. COSTA, 1857)	1	France
<b>Coccidae</b>		
<i>Coccus hesperidum</i> LINNAEUS, 1758	1 11	France *
<i>Ericerus pela</i> (CHAVANNES, 1848)	1	China
<i>Eriopeltis festucae</i> (BOYER DE FONSCOLOMBE, 1834)	1 1	France France, Montpellier
<i>Eriopeltis lichtensteini</i> SIGNORET, 1877	1	*
<i>Eucalymnatus tessellatus</i> (SIGNORET, 1873)	1	*
<i>Eulecanium tiliae</i> (LINNAEUS, 1758)	3 1	Austria, Vienna France, Sceaux
<i>Filippia follicularis</i> (TARGIONI TOZZETTI, 1867)	12 1	France, Montpellier *
<i>Lichtensia viburni</i> SIGNORET, 1873	1	France, Montpellier
<i>Luzulaspis frontalis</i> GREEN, 1928	1	Austria, Semmering
<i>Parafairmairia bipartita</i> (SIGNORET, 1874)	3	France, Cannes
<i>Parasaissetia nigra</i> (NIETNER, 1861)	1	Italy, Florence
<i>Parthenolecanium corni</i> (BOUCHÉ, 1844)	1 3 25 1	Austria, Klosterneuburg Austria, Vienna France, Clamart France
<i>Parthenolecanium persicae</i> (FABRICIUS, 1776)	3 1 1 3	France, Albertville France, Cannes France, Montpellier *
<i>Phyllostroma myrtilli</i> (KALTENBACH, 1874)	1	*
<i>Pulvinaria vitis</i> (LINNAEUS, 1758)	2 5 2	Austria, Freistadt France, Montpellier *

Family and species names	Number of slides	Country of collection
<i>Rhodococcus perornatus</i> (COCKERELL & PARROTT, 1899)	1	Austria, Mödling
<i>Saissetia coffeae</i> (WALKER, 1852)	4	*
<i>Saissetia oleae</i> (OLIVIER, 1791)	2 1	France, Cannes *
<i>Toumeyella erythrinae</i> KONDO & WILLIAMS, 2003	7	Mexico, Ciudad de México
<i>Toumeyella sallei</i> (SIGNORET, 1873)	6	Mexico
<i>Waxiella africana</i> (GREEN, 1899)	2	Egypt, Wadi Halfa
<i>Waxiella mimosae</i> (SIGNORET, 1872)	4 3	Egypt Egypt, Wadi Halfa
<b>Coelostomidiidae</b>		
<i>Coelostomidia zealandica</i> (MASKELL, 1880)	2	*
<b>Conchaspidae</b>		
<i>Conchaspis acaciae</i> HODGSON, 1967	4	Namibia, Windhoek
<b>Dactylopiidae</b>		
<i>Dactylopius ceylonicus</i> (GREEN, 1896)	1	France, Hyeres
<i>Dactylopius coccus</i> COSTA, 1829	6	Algeria
<b>Diaspididae</b>		
<i>Aonidia lauri</i> (BOUCHÉ, 1833)	1	France, Montpellier
<i>Aonidiella aurantii</i> (MASKELL, 1879)	1	Greece, Chios
<i>Aspidiotus chamaeropsis</i> SIGNORET, 1869	4	*
<i>Aspidiotus nerii</i> BOUCHÉ, 1833	1 6 9 5 1 6 41	Algeria Corsica France France, Cannes France, Montpellier France, Nice *
<i>Aspidiotus spurcatus</i> SIGNORET, 1869	10	France, Paris
<i>Aulacaspis rosae</i> (BOUCHÉ, 1833)	7	France, Paris
<i>Carulaspis atlantica</i> (LINDINGER, 1911)	1	*
<i>Carulaspis juniperi</i> (BOUCHÉ, 1851)	2 4 1 1	Austria, Bisamberg Austria, Vienna France USA, Washington
<i>Carulaspis minima</i> (SIGNORET, 1869)	1 1 4	Austria, Vienna France Italy, Florence
<i>Carulaspis visci</i> (SCHRANK, 1781)	2	Austria
<i>Chionaspis furfura</i> (FITCH, 1857)	2	USA, New York, Ithaca
<i>Chionaspis salicis</i> (LINNAEUS, 1758)	1 1 9	Austria, Vienna France, Montpellier France, Paris
<i>Diaspidiotus ostreaeformis</i> (CURTIS, 1843)	1 6	France, Montpellier France, Vichy

Family and species names	Number of slides	Country of collection
<i>Diaspidiotus pyri</i> (LICHTENSTEIN, 1881)	4	France, Vichy
<i>Diaspidiotus zonatus</i> (FRAUENFELD, 1868)	1 1	Austria, Vienna France, Cannes
<i>Diaspis boisduvalii</i> SIGNORET, 1869	16	*
<i>Diaspis bromeliae</i> (KERNER, 1778)	1	*
<i>Diaspis coccois</i> LICHTENSTEIN, 1882	4	Bahamas
<i>Diaspis echinocacti</i> (BOUCHÉ, 1833)	5	*
<i>Diaspis iodinae</i> BORATYNSKI, 1968	2 16 1	Argentina, Cordoba Uruguay *
<i>Dynaspidiotus abietis</i> (SCHRANK, 1776)	4	Austria, Vienna
<i>Dynaspidiotus tsugae</i> (MARLATT, 1911)	1	USA, New Jersey, New Brunswick
<i>Epidiaspis leperii</i> (SIGNORET, 1869)	2 2	France, Vichy France
<i>Hemiberlesia palmae</i> (COCKERELL, 1893)	1	Bahamas
<i>Hemiberlesia rapax</i> (COMSTOCK, 1881)	1	*
<i>Ischnaspis longirostris</i> (SIGNORET, 1882)	2 7 3	France, Montpellier Senegal *
<i>Lepidosaphes beckii</i> (NEWMAN, 1869)	3 2	France, Montpellier Greece, Chios
<i>Lepidosaphes conchiformis</i> (GMELIN, 1790)	1	France, Paris
<i>Lepidosaphes linearis</i> (MODEER, 1778)	3	France, Paris
<i>Lepidosaphes pinnaeformis</i> (BOUCHÉ, 1851)	5	*
<i>Leucaspis pini</i> (HARTIG, 1839)	3 1	Austria, Brühl France, Paris
<i>Leucaspis pusilla</i> LÖW, 1883	7 1	Austria, Mödling France, Cannes
<i>Parlatoria ziziphi</i> (LUCAS, 1853)	1	Algeria
<i>Pinnaspis aspidistrae</i> (SIGNORET, 1869)	2	*
<i>Poliaspis exocarpi</i> MASKELL, 1892	1	*
<i>Pseudoparlatoria parlatorioides</i> (COMSTOCK, 1883)	1 1	Uruguay *
<i>Pseudotargionia glandulosa</i> (NEWSTEAD, 1911)	1	Egypt, Wadi Halfa
<i>Targionia nigra</i> SIGNORET, 1870	2	France, Cannes
<b>Eriococcidae</b>		
<i>Acanthococcus aceris</i> SIGNORET, 1875	4 4 1	Austria, Weidling Austria, Vienna France, Montpellier
<i>Acanthococcus ericae</i> (SIGNORET 1875)	5	France, Montpellier
<i>Cryptococcus fagisuga</i> LINDINGER, 1936	1	England, Chester
<i>Eriococcus agropyri</i> (BORCHSENIUS, 1949)	1	France, Montpellier
<i>Eriococcus buxi</i> (BOYER DE FONSCOLOMBE, 1834)	1 1	France, Montpellier France

Family and species names	Number of slides	Country of collection
<i>Eriococcus devoniensis</i> (GREEN, 1896)	3	Austria, Gloggnitz
<i>Eriococcus thymi</i> (SCHRANK, 1801)	3 7	France, Cannes France, Montpellier
<b>Kermesidae</b>		
<i>Allokermes galliformis</i> (RILEY, 1881)	1	USA, Washington
<i>Kermes roboris</i> (FOURCROY, 1785)	1	France, Clamart
<i>Kermes vermilio</i> PLANCHON, 1864	1	France, Montpellier
<i>Nidularia pulvinata</i> (PLANCHON, 1864)	16	France, Cannes
<i>Olliffiella cristicola</i> COCKERELL, 1896	1	USA, New Mexico
<b>Lecanodiaspididae</b>		
<i>Lecanodiaspis sardoa</i> TARGIONI TOZZETTI, 1869	2 2	France, Montpellier Italy, Campania, Sardinia
<b>Margarodidae</b>		
<i>Dimargarodes meridionalis</i> (MORRISON, 1927)	1	USA, Georgia
<i>Eumargarodes laingi</i> JAKUBSKI, 1950	1	Australia, Queensland, Bundaberg
<i>Margarodes gallicus</i> (SIGNORET, 1876)	1	*
<i>Neomargarodes aristidae</i> BORCHSENIUS, 1949	1	Algeria
<b>Matsucoccidae</b>		
<i>Matsucoccus apachecae</i> RAY & WILLIAMS, 1984	1	USA, Arizona, Chiricahua Mts., Cave Creek
<i>Matsucoccus banksianae</i> RAY & WILLIAMS, 1991	1	USA, Minnesota, Ely
<i>Matsucoccus leiophyllae</i> RAY & WILLIAMS, 1984	1	USA, Arizona, Chiricahua Mts., Cave Creek
<b>Monophlebidae</b>		
<i>Crypticerya montserratensis</i> (RILEY & HOWARD, 1890)	1	Sri Lanka
<i>Drosicha contrahens</i> WALKER, 1858	1	Ceylon
<i>Gueriniella serratulae</i> (FABRICIUS, 1775)	1	*
<i>Icerya purchasi</i> MASKELL, 1879	1	*
<i>Icerya seychellarum</i> (WESTWOOD, 1855)	3	*
<i>Laurencella uhleri</i> (SIGNORET, 1876)	1	Ecuador
<i>Llaveia axin</i> (LLAVE, 1832)	3 3	Guatemala *
<b>Pseudococcidae</b>		
<i>Antonina purpurea</i> SIGNORET, 1875	3 3	France, Cannes France, Montpellier
<i>Coccura comari</i> (KUNOW, 1880)	2 2 2	Austria, Seebenstein France, Montpellier *
<i>Fonscolombia graminis</i> LICHTENSTEIN, 1877	2	France, Montpellier
<i>Heliococcus bohemicus</i> SULC, 1912	2	Austria, Vienna
<i>Lacombia dactyloni</i> (BODENHEIMER, 1943)	1	Malta, Comino

Family and species names	Number of slides	Country of collection
<i>Phenacoccus aceris</i> (SIGNORET, 1875)	14	France, Annecy (Haute Savoie)
	21	France, Paris
<i>Phenacoccus piceae</i> (LÖW, 1883)	1	*
<i>Phenacoccus quadricaudatus</i> (SIGNORET, 1875)	9	France, Nice
<i>Planococcus citri</i> (RISSO, 1813)	1	England, Chester
	5	France, Nice
<i>Planococcus ficus</i> (SIGNORET, 1875)	2	Austria
	2	*
<i>Pseudococcus longispinus</i> (TARGIONI TOZZETTI, 1867)	2	France, Cannes
	7	*
<i>Pseudococcus viburni</i> (SIGNORET, 1875)	13	France, Hyères
<i>Ritsemia pupifera</i> LICHTENSTEIN, 1879	8	France, Montpellier
<i>Spilococcus mamillariae</i> (BOUCHÉ, 1844)	2	*
<i>Trionymus perrisii</i> (SIGNORET, 1875)	6	France, Montpellier
<b>Putoidae</b>		
<i>Puto antennatus</i> (SIGNORET, 1875)	6	France, Briançon
<i>Puto superbus</i> (LEONARDI, 1907)	8	Croatia, Dalmatia
<b>Xylococcidae</b>		
<i>Xylococcus filiferus</i> LÖW, 1882	3	Austria, Baden

Tab. 2: The list of types deposited in the NHMW. Names in first column and remarks in third column are taken from original labels.

Species name on slide	Types	Remarks	Valid species name
<i>Antonina purpurea</i> Sign.	Lectotype (two slides: one with venter and the other with dorsum), two paralectotypes		<i>Antonina purpurea</i> SIGNORET, 1875
<i>Asterolecanium roboris</i> Rsl.	Paratype		<i>Asterodiaspis roboris</i> (RUSSELL, 1941)
<i>Carulaspis minima</i> Targioni Tozzetti, <i>Diaspis minima</i>	Type material (four slides)		<i>Carulaspis minima</i> (SIGNORET, 1869)
<i>Ceroplastes mimosa</i> Signoret, 1872	Lectotype, three paralectotypes	Lectotype and paralectotypes designated by Y. Ben-Dov	<i>Waxiella mimosae</i> (SIGNORET, 1872)
<i>Dactylopius cyperi</i> Signoret, 1875	Lectotype, four paralectotypes	Lectotype mounted and designated by Y. Ben-Dov, 1994; paralectotypes designated by Y. Ben-Dov	<i>Planococcus citri</i> (RISSO, 1813)



Species name on slide	Types	Remarks	Valid species name
<i>Dactylopius indicus</i>	Lectotype	Lectotype mounted and designated by Y. Ben-Dov, 1994	<i>Dactylopius ceylonicus</i> (GREEN, 1896)
<i>Dactylopius viburni</i>	Lectotype, eleven paralectotypes	Lectotype and paralectotypes mounted and designated Y. Ben-Dov, D. Matille, 11.1994	<i>Pseudococcus viburni</i> (SIGNORET, 1875)
<i>Diaspis iodinae</i> Borat.	Holotype, eleven paratypes		<i>Diaspis iodinae</i> BORATYNSKI, 1968
<i>Fonscolombia graminis</i> Licht.	Lectotype		<i>Fonscolombia graminis</i> LICHTENSTEIN, 1877
<i>Ischnaspis longirostris</i> (Signoret)	Type		<i>Ischnaspis longirostris</i> (SIGNORET, 1882)
<i>Lacombia urbanii</i> Borat.	Paratype		<i>Lacombia dactyloni</i> (BODENHEIMER, 1943)
<i>Matsucoccus apachecae</i> Ray & Williams, 1984	Paratype		<i>Matsucoccus apachecae</i> RAY & WILLIAMS, 1984
<i>Matsucoccus banksianae</i> Ray & Williams, 1991	Paratype	Remounted in balsam 1980	<i>Matsucoccus banksianae</i> RAY & WILLIAMS, 1991
<i>Matsucoccus leiophyllae</i> Ray & Williams, 1984	Paratype		<i>Matsucoccus leiophyllae</i> RAY & WILLIAMS, 1984
<i>Ortonia uhleri</i> Signoret, 1876	Lectotype	Mounted in October 2003 by Y. Ben-Dov Bet Dagan, Israel	<i>Laurencella uhleri</i> (SIGNORET, 1876)
<i>Ortonia bouvari</i> Sign. 1876	Lectotype, two paralectotypes	Lectotype mounted and designated 2003 Yair Ben-Dov, Bet Dagan, Israel	<i>Llaveia axin</i> (LLAVE, 1832)
<i>Trionymus perrisii</i> (Signoret, 1875)	Lectotype, three paralectotypes	Lectotype designated by Y. Ben-Dov, D. Matille, 1995	<i>Trionymus perrisii</i> (SIGNORET, 1875)
<i>Pseudococcus aesculi</i> Signoret, 1875	Lectotype, 18 paralectotypes	Lectotype and paralectotypes mounted and designated Y. Ben-Dov, D. Matille, 01.1995	<i>Phenacoccus aceris</i> (SIGNORET, 1875)
<i>Pseudococcus mespili</i>	Lectotype	Lectotype designated, mounted and labelled by Y. Ben-Dov, D. Matille, 01.1995	
<i>Pseudococcus platani</i>	Lectotype, 13 paralectotypes	Lectotype and paralectotypes designated, mounted and labelled by Y. Ben-Dov, D. Matille, 01.1995	

different countries, but most of them were found in Europe, especially in France. They occurred mostly on grasses (e.g. *Calamagrostis arundinacea* L. ROTH, *Avena sativa* L.) or woody plants (e.g. *Aesculus hippocastanum* L., *Pinus cembra* L.). Some specimens were collected only in glasshouses, e.g. *Lepidosaphes pinnaeformis* (BOUCHÉ, 1851), *Pinnaspis aspidistrae* (SIGNORET, 1869) (Diaspididae), and *Spilococcus mamillariae* (BOUCHÉ, 1844) (Pseudococcidae). There are also specimens that were mounted by Y. Ben-Dov and D. Matile-Ferrero from dry material to microscope slides; some specimens were remounted. There is a rich collection of types including holotypes, lectotypes, paratypes, and paralectotypes (Tab. 2). These slides mostly contain single specimens.

The undescribed specimens and also specimens of unclear taxonomic affinity should be identified in the near future. The slides deposited in the NHMW are of great taxonomic significance and will be used for morphological research by the next generations of coccidologists.

#### Acknowledgements

We thank Prof. Dr. Piotr Węgierek and Dr. Ewa Simon (both Department of Zoology, University of Silesia) for useful comments on an earlier version of the manuscript, and Alice Laciny MSc (Natural History Museum Vienna) for improvement of the language.

#### References

- BEN-DOV Y., MILLER D.R. & GIBSON G.A.P., 2015: ScaleNet. <http://www.sel.barc.usda.gov/scalenet/scalenet.htm> [accessed on 10<sup>th</sup> September 2015]
- GULLAN P.J. & KOSZTARAB M., 1997: Adaptations in scale insects. – *Annual Review of Entomology* 42: 23–50.
- GULLAN P.J. & MARTIN J.H., 2009: Sternorrhyncha (jumping plant-lice, whiteflies, aphids, and scale insects), pp. 957–967 in: RESH V.H. & CARDÉ R.T. (eds.): *Encyclopedia of Insects*. Elsevier, San Diego.
- KONDO T., GULLAN P.J. & WILLIAMS D.J., 2008: Coccidology. The study of scale insects (Hemiptera: Sternorrhyncha: Coccoidea). – *Revista Corpoica, Ciencia y Tecnología agropecuaria* 9 (2): 55–61.
- KOSZTARAB M. & KOZÁR F., 1988: Scale insects of Central Europe. – *Akademiai Kiado, Budapest*, 456 pp.
- MALUMPHY C. & KAHRER A., 2011: New data on the scale insects (Hemiptera: Coccoidea) of Vienna, including one invasive species new for Austria. – *Beiträge zur Entomofaunistik* 12: 47–60.
- SZITA É., KONCZNÉ BENEDICTY Z. & KOZÁR F., 2011: Description of a new species of *Acanthococcus* (Hemiptera: Coccoidea: Eriococcidae) from Austria. – *Acta Zoologica Academiae Scientiarum Hungaricae* 57 (1): 35–41.