An updated annotated checklist of scale insects (Hemiptera, Sternorrhyncha, Coccomorpha) of Poland

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Abstract
A checklist of scale insects recorded to date in Poland is presented. The data provided here are based on literature records and include the latest taxonomic and nomenclatural changes and updates on Coccomorpha reported in Poland. Changes in comparison with ScaleNet and Fauna Europaea electronic databases are also discussed. A total of 185 species belonging to 98 genera and 16 families are included in the list. Of this group, 47 species are alien introduced species and live only indoors, and one species, Pulvinaria floccifera (Westwood), develops both indoors and outdoors.

Keywords
Coccoids, native and alien species, validation source

Introduction
Scale insects form a relatively small group of insects in the Polish fauna and represent only approximately 0.7% of the 27,000 insect species currently known in Poland. However, a few species are identified as pests of economic importance, and especially, in recent years, the invasion of alien scale insects has been observed in several parts of Poland (Łagowska et al. 2015, 2018; Golan et al. 2017).

Scale insects have been known for centuries in Poland for the carmine dye extracted from the Polish cochineal scale Porphyrophora polonica (Linnaeus). The presence of P. polonica in Poland was reported for the first time in the 16th century (Miechowita 1521) and
information about the harmful scale insects was published in later years by some authors (Trzebiński 1916; Ruszkowski 1925, 1933; Minkiewicz 1926). Advanced studies on the scale insect fauna of Poland were initiated by Kawecki, whose results have been presented in numerous publications from 1935 to 1985. In the same period and later, Koteja and Koteja and Żak-Ogaza, in publications from 1964 to 2000, extensively studied the Coccocormorpha and greatly contributed to the knowledge of the scale insect fauna in Poland. Further contributions are due to the studies by Komosińska (1961-1987), Komosińska and Podsiadło (1967), Dziedzicka (1970-1990), Podsiadło (1975); Podsiadło and Komosińska (1976), Łagowska (1990-2005), Łagowska and Koteja (1996), Dziedzicka and Karnkowski (1999), Łagowska and Golan (2005) and Łagowska et al. (2015, 2017, 2018).

Finally, 90 native and greenhouse species of scale insects that were new to the Polish fauna were discovered in the years 1961–1980 (Koteja 1985; Łagowska and Golan 2005). However, the records of species new to the Polish fauna significantly decreased from 32 in the period 1971–1980 to 8 in 1991–2005 (Łagowska and Golan 2005), and only another 8 new species were recorded in Poland in 2006-2019.

The early data on the distribution of scale insects in Poland were summarized by Kawecki (1985) in a catalogue listing 170 species, including 34 indoor species, and 11 records of misidentified species or species for which no host plants or localities were given. Later, two checklists of scale insects in Poland were presented by Koteja (1996) and Łagowska (2004) who reported 184 and 185 species respectively, each including 44 indoor species. In addition, an annotated list of alien scale insects present in Poland was published by Łagowska et al. (2015).

Two electronic databases provide important world-wide information on scale insect distribution: the Fauna Europaea (FaEu) database (Burckhardt 2013), which reports 163 species of scale insects from Poland, and the ScaleNet database (García Morales et al. 2016), which lists 177 species. Since the last checklist (Łagowska 2004), several new records of scale insects from Poland have been published (Łabanowski 2009; Kalandyk and Węgierek 2010; Kozár et al. 2013; Łagowska et al. 2015, 2018). In the meantime, the nomenclature of the scale insects has also been partially changed. Moreover, several records reported in FaEu and ScaleNet databases were regarded as doubtful or erroneous and need revision. The present paper provides a comprehensive revised list of the scale insects of Poland with updated nomenclature and references to the first reliable Polish records of each species. In addition, discrepancies between the present list and the last checklist (Łagowska 2004) as well as differences from the records reported in the FaEu and ScaleNet databases are discussed.

The aim of the present checklist is to provide baseline reliable data for future faunistic and taxonomic studies.

Materials and methods

The list presented in this paper is based on the literature records of Coccomorpha in Poland available up to September 2019. A reference to the first reliable record of each species is included. Fossil species of scale insects and those that have been
intercepted only once on imported plant materials are excluded. Families and species within each family are listed in alphabetical order according to the classification used in the ScaleNet database (García Morales et al. 2016). The references to species recorded in Poland reported in FaEu and ScaleNet have been checked and, if erroneous, corrected in the present lists. Changes in systematic status and synonymies, mostly proposed by Kozár et al. (2013) and Danzig and GavriloZimin (2014, 2015), and presently accepted in ScaleNet database, have been adopted in the present list. Scale insect species recorded in Poland are listed in Table 1. They belong to four categories as follows: (i) native species; (ii) alien species established outdoors; (iii) alien species established indoors; and (iv) alien species that can live and develop both outdoors and indoors. The definition of alien species in this paper is the one proposed by Łagowska et al. (2015).

### Results

At the present time the Polish scale insect fauna comprises a total of 185 species, distributed in 98 genera and 16 families. The Pseudococcidae are the most numerous family, with 50 recorded species, followed by Diaspididae (48 species), Coccidae (43 species), and Eriococcidae (sensu lato) (18 species) (Table 1). The remaining 12 families are each represented by 1–5 species. The ratio of species to genera differs between families. The highest ratio (2.6:1) is in the Eriococcidae, followed by Coccidae (2.3:1), Diaspididae (2.0:1), and Kermesidae (2.0:1) (Table 2). The ratio of species number per genus in the Pseudococcidae family is 1.8:1, which is close to the general mean ratio of 1.9:1 reported for Poland (Table 2).

### Table 1. Checklist of scale insects (Hemiptera: Sternorrhyncha: Coccomorpha) of Poland (* alien established indoors only; ** alien established outdoors; ***alien established indoors and outdoors.

| Taxa                                      | Validation source      |
|-------------------------------------------|------------------------|
| **Asterolecaniidae**                      |                        |
| 1. Asterolecanis quercicola (Bouché, 1851) | Boratyński 1961        |
| 2. Asterolecanis variolosa (Ratzeburg, 1870) | Wünn 1919              |
| 3. Asterolecanis epidendri (Bouché, 1844)* | Kawecki 1985           |
| 4. Planchonia arabida Signoret, 1876      | Komosińska and Podsiadło 1967 |
| **Cerococcidae**                          |                        |
| 5. Antecerococcus intermedius (Balachowsky, 1930) | Koteja 1984 |
| **Coccidae**                              |                        |
| 6. Cercopis rusci (Linnaeus, 1758)*       | Szulczewski 1926       |
| 7. Coccus hesperidum Linnaeus, 1758*      | Brischke 1883          |
| 8. Eriopeltis festucae (Fonscolombe, 1834) | Szulczewski 1921       |
| 9. Eriopeltis lichtensteini Signoret, 1877 | Szulczewski 1921       |
| 10. Eriopeltis stammeri Schmutterer, 1952 | Komosińska and Podsiadło 1967 |
| 11. Eucalympathus texellatus (Signoret, 1873)* | Koteja 1972 |
| 12. Eulecanium ciliatum (Douglas, 1891)   | Wünn 1919              |
| 13. Eulecanium douglasi (Sulc, 1895)      | Żak-Ogaza 1961         |
| 14. Eulecanium franconicum (Lindinger, 1912) | Kawecki 1938         |
| 15. Eulecanium sericeum (Lindinger, 1906) | Kawecki 1938           |
| 16. Eulecanium tiliae (Linnaeus, 1758)    | Kawecki 1935           |
| Taxa                                           | Validation source |
|-----------------------------------------------|--------------------|
| 17. *Lecanopsis formicarum* Newstead, 1893     | Koteja 1969        |
| 18. *Lecanopsis subterranea* (Gomez-Menor Ortega, 1948) | Koteja and Żak-Ogaza 1969 |
| 19. *Luzulaspis dactylis* Green, 1928          | Żak-Ogaza and Koteja 1964 |
| 20. *Luzulaspis frontalis* Green, 1928         | Koteja 1964        |
| 21. *Luzulaspis grandis* Borchsenius, 1952     | Żak-Ogaza and Koteja 1964 |
| 22. *Luzulaspis luzulae* (Dufour, 1864)        | Kawecki 1938       |
| 23. *Luzulaspis nemorosa* Koteja, 1966         | Koteja 1966        |
| 24. *Luzulaspis scottica* Green, 1926          | Komosińska and Podsiadło 1967 |
| 25. *Nemolecanium graniforme* Wünn, 1921       | Wünn 1919          |
| 26. *Palaeolecanium bituberculatum* Signoret, 1873 | Kawecki 1935     |
| 27. *Parafairmairia bipartita* Signoret, 1872  | Żak-Ogaza and Koteja 1964 |
| 28. *Parafairmairia gracilis* Green, 1916      | Kawecki 1935       |
| 29. *Parasaissetia nigra* Nietner, 1861*       | Kawecki 1985       |
| 30. *Parthenolecanium corni* Bouché, 1844      | Lindinger 1911     |
| 31. *Parthenolecanium pomeranicum* Kawecki, 1954 | Kawecki 1954     |
| 32. *Parthenolecanium rufulum* Cockerell, 1903 | Kawecki 1957       |
| 33. *Parthenolecanium scotica* Green, 1926     | Komosińska and Podsiadło 1967 |
| 34. Cryptococcidae                             |                    |
| 35. Cryptococcus fagiisuga Lindinger, 1936     | Śzulczewski 1921    |
| 36. Pseudochermes fraxini (Bouché, 1833)*      | Komosińska 1968    |
| 37. Aonidella auranti (Maskell, 1879)*         | Dziedzicka 1988b   |
| 38. Aspidiotus destructor Signoret, 1869*       | Karnkowski 1993    |
| 39. Aspidiotus nerii Bouché, 1833*             | Ruszkowski 1933    |
| 40. Aulacaspis rose (Bouché, 1833)**           | Schander 1910      |
| 41. Aulacaspis yasumatsui Takagi, 1977*        | Trzebiński 1916    |
| 42. Carulaspi juniperi (Bouché, 1851)          | Komosińska 1968    |
| 43. Chionaspis salicis (Linnaeus, 1758)         | Dziedzicka 1989    |
| 44. Chrysomphalus aonidens (Linnaeus, 1758)*   | Schander 1910      |
| 45. Chrysomphalus dictyonemmi (Morgan, 1889)*  | Trzebiński 1916    |
| 46. Comstockaspis permica (Comstock, 1881)**   | Szulczewski 1926   |
| 47. Diaspidiotus alni (Marchal, 1909)          | Szulczewski 1926   |
| 48. Diaspidiotus batavicus (Lindinger, 1912)    | Komosińska 1974    |
| 49. Diaspidiotus giga (Thiem & Gerneck, 1934)  | Krasztofowicz 1957 |
| 50. Diaspidiotus marani (Zahradnik, 1952)      | Szulczewski 1921   |
| 51. Diaspidiotus ostreariaformis (Curtis, 1843)| Szulczewski 1921   |
| Taxa | Validation source |
|------|--------------------|
| 68. Diaspidiotus pyri (Lichtenstein, 1881) | Szulczewski 1921 |
| 69. Diaspidiotus zonatus (Fau fend, 1868) | Szulczewski 1921 |
| 70. Diaspis boisdalvii Signoret, 1869* | Czyżewski 1975 |
| 71. Diaspis bromeliae (Kerner, 1778)* | Kawecki 1985 |
| 72. Diaspis echinocacti (Bouché, 1883)* | Czyżewski 1937 |
| 73. Dynaspidiotus abietis (Schranks, 1776) | Kawecki 1935 |
| 74. Dynaspidiotus britannicus (Newstead, 1898)* | Szulczewski 1926 |
| 75. Furchadaspis zamiae (Kuwana, 1902)* | Komosińska 1968 |
| 76. Gymnaspis aechmeae (Newstead, 1898)* | Komosińska 1961 |
| 77. Hemiberlesia cyanophylli (Signoret, 1869)* | Komosińska 1965 |
| 78. Hemiberlesia glauciceps (Komosińska, 1965)* | Komosińska 1961 |
| 79. Hemiberlesia lataniae (Signoret, 1869)* | Czyżewski 1937 |
| 80. Hemiberlesia palmae (Cockerell, 1892)* | Komosińska 1961 |
| 81. Hemiberlesia rapax (Comstock, 1881)* | Komosińska 1961 |
| 82. Howardia biclavis (Comstock, 1883)* | Dziedzicka 1987 |
| 83. Kwanaspis pseudoleucaspis (Kuwana, 1902)* | Komosińska 1966 |
| 84. Lepidosaphes conchiformis (Gmelin, 1790) | Komosińska 1969 |
| 85. Lepidosaphes juniperi (Lindinger, 1912) | Komosińska 1969 |
| 86. Lepidosaphes neustadi (Sulc, 1895) | Komosińska 1974 |
| 87. Lepidosaphes tokionis (Kuwana, 1902)* | Łabanowski 2009 |
| 88. Lepidosaphes ulmi (Linnaeus, 1758) | Trzebiński 1916 |
| 89. Lencapis breve Colvé, 1882 | Szulczewski 1921 |
| 90. Lencapis pini (Hartig, 1839) | Szulczewski 1921 |
| 91. Parlatoria parlatoriae (S ulc, 1895)* | Trzebiński 1916 |
| 92. Parlatoria pergangii Comstock, 1881* | Kamińska 1966 |
| 93. Parlatoria proteus (Curtis, 1843)* | Komosińska 1964 |
| 94. Pinnaspis apsidistae (Signoret, 1869)* | Komosińska 1969 |
| 95. Pinnaspis strachani (Cooley, 1899)* | Komosińska 1961 |
| 96. Pseudaulacaspis pentagona (Targioni-Tozzetti, 1886)* | Dziedzicka and Karnkowski 1999 |
| 97. Rhizaspidiotus canariensi (Lindinger, 1911) | Łagowska 1990 |
| 98. Umbaspis regularis (Newstead, 1911)* | Komosińska 1968 |

**Eriococcidae**

| 99. Acanthococcus aceris Signoret, 1875 | Kawecki 1957 |
| 100. Acanthococcus macedoniensis Fetykó & Kaydan, 2013 | Kozár et al. 2013 |
| 101. Anophococcus agropyri (Borchsenius, 1949) | Koteja and Żak-Ogaza 1966 |
| 102. Anophococcus confusus (Danzig, 1962) | Koteja 1971a |
| 103. Anophococcus herbaceus (Danzig, 1962) | Trzebiński 1916 |
| 104. Anophococcus inermis (Green, 1915) | Komosińska 1964 |
| 105. Anophococcus insignis (Newstead, 1891) | Komosińska 1964 |
| 106. Anophococcus pseudinsignis (Green, 1921) | Komosińska 1964 |
| 107. Anophococcus sp. (Moder, 1778) | Komosińska 1964 |
| 108. Anophococcus aceris Signoret, 1875 | Trzebiński 1916 |
| 109. Greenisca brachypodii Borchsenius & Danzig, 1966 | Komosińska 1964 |
| 110. Greenisca gossi (Balachowsky, 1954) | Komosińska 1964 |
| 111. Kermes quercus (Linnaeus, 1758) | Komosińska 1964 |
| 112. Kermes quercus (Linnaeus, 1758) | Trzebiński 1916 |
| 113. Kermes roboris (Fourcroy,1785) | Komosińska 1964 |

**Kermesidae**

| 114. Neomargarodes festucae Archangelskaja, 1935 | Jakubski 1965 |

**Margarodidae**

| 115. Rhizococcus cantium (Wiliams, 1985) | Komosińska 1964 |
| 116. Rhizococcus munroi (Boratyński, 1962) | Komosińska 1964 |

| 117. Kermes quercus (Linnaeus, 1758) | Szulczewski 1921 |
| 118. Kermes roboris (Fourcroy, 1785) | Koteja and Żak-Ogaza 1983 |
| Taxa | Validation source |
|------|-------------------|
| 120. Porphyrophora polonica (Linnaeus, 1758) | Miechowita 1521 |
| **Matsucoccidae** | |
| 121. Matsucoccus pini (Green, 1925) | Boratyński 1960 |
| **Monophlebidae** | |
| 122. Icerya purchasi Maskell, 1879* | Chalarńska and Labanowski 2002 |
| 123. Palaeococcus fuscipennis (Burmeister, 1835) | Szulczewski 1921 |
| **Steingeliidae** | |
| 124. Steingelia gorodetskia Nasonov, 1908 | Nasonov 1908 |
| **Xylococcidae** | |
| 125. Xylococcus filiferus Löw, 1883 | Kawecki 1948 |
| **Ortheziidae** | |
| 126. Arctorthezia cataphracta (Olafson, 1772) | Kawecki 1938 |
| 127. Neusteadia floccosa (De Geer, 1778) | Kawecki 1938 |
| 128. Insignorthesiapaludina (Browne, 1887)* | Ruszkowski 1933 |
| 129. Orthezia urticae (Linnaeus, 1758) | Nowicki 1868 |
| 130. Ortheziola vejdovskyi Śulc, 1895 | Komosińska and Podsiadło 1967 |
| **Pseudococcidae** | |
| 131. Arroccocus cracens Williams, 1962 | Koteja 1971a |
| 132. Arroccocus paludinus (Green, 1921) | Koteja 1971a |
| 133. Balanococcus boratynskii Williams, 1962 | Koteja 1986 |
| 134. Borococcus ingricus Danzig, 1960 | Koteja 1986 |
| 135. Brevennia pulveraria (Newstead, 1892) | Zak-Ogaza and Koteja 1964 |
| 136. Ceroputo pilosellae Śulc, 1898 | Kawecki 1948 |
| 137. Chaetococcus sulcii (Green, 1934) | Koteja and Zak-Ogaza 1969 |
| 138. Coccus comari (Künow, 1880) | Koteja et al. 1978 |
| 139. Dysmicoccus angustifrons (Hall, 1926) | Koteja and Zak-Ogaza 1979 |
| 140. Dysmicoccus walkeri (Newstead, 1891) | Komosińska and Podsiadło 1967 |
| 141. Fonscolombia abdita (Borchsenius, 1949) | Koteja 1971a |
| 142. Fonscolombia europaea (Newstead, 1897) | Koteja and Zak-Ogaza 1969 |
| 143. Fonscolombia tomlinii (Newstead, 1892) | Koteja 1972 |
| 144. Heliozoccus boremica Śulc, 1912 | Komosińska 1977 |
| 145. Heliozoccus destructor Bochsenius, 1941 | Koteja et al. 1978 |
| 146. Heliozoccus sulci Goux, 1934 | Łagowska and Koteja 1996 |
| 147. Heterococcus nuda (Green, 1926) | Zak-Ogaza and Koteja 1964 |
| 148. Kiritshenkella lianae Koteja, 1988 | Koteja 1988 |
| 149. Metadenopus festucae Śulc, 1933 | Koteja and Zak-Ogaza 1969 |
| 150. Mirococcopsis subterranea (Newstead, 1893) | Koteja and Zak-Ogaza 1969 |
| 151. Mirococcus clausus Bochsenius, 1949 | Koteja 1971b |
| 152. Mirococcus festucae Koteja, 1971 | Koteja 1971b |
| 153. Nipaecoccus nipae (Maskell, 1893)* | Cyżewski 1937 |
| 154. Peliococcopsis parviceraria (Goux, 1937) | Koteja et al. 1978 |
| 155. Peliococcus albiflorus (Lindering, 1912) | Koteja and Zak-Ogaza 1966 |
| 156. Peliococcus morrioni Kiritchenko, 1936 | Łagowska 2005b |
| 157. Peliococcus balteatus (Green, 1928) | Koteja 1972 |
| 158. Peliococcus manifesta (Bochsenius, 1949) | Koteja and Zak-Ogaza 1989 |
| 159. Phenacoccus acris (Signoret, 1875) | Wünna 1919 |
| 160. Phenacoccus bordei Lindeman, 1886 | Koteja and Zak-Ogaza 1979 |
| 161. Phenacoccus interruptus Green, 1923 | Zak-Ogaza and Koteja 1964 |
| 162. Phenacoccus phaeacocoides (Kiritchenko, 1932) | Łagowska and Koteja 1996 |
| 163. Phenacoccus piceae (Löw, 1883) | Kawecki 1935 |
| 164. Planococcus citri (Risso, 1813)* | Szulczewski 1926 |
| 165. Planococcus vossii (Nasonov, 1908) | Kawecki 1948 |
| 166. Pseudococcus longispinus (Targioni Tozzetti, 1867)* | Szulczewski 1926 |
| 167. Pseudococcus maritimus (Ehrhorn, 1900)* | Drziedzicka 1988a |
| 168. Rhodania occulta Schmutzerer, 1952 | Koteja and Zak-Ogaza 1966 |
Table 2. Number of scale insect species per genus in relation to families in Poland.

| Family                  | Number of genus | Number of species | Ratio of species to genera |
|-------------------------|-----------------|-------------------|----------------------------|
| Asterolecaniidae        | 3               | 4                 | 1.3:3                      |
| Cerococcidae            | 1               | 1                 | 1:1                        |
| Coccidae                | 19              | 43                | 2.3:1                      |
| Cryptococcidae          | 2               | 2                 | 1:1                        |
| Diaspididae             | 23              | 48                | 2.0:1                      |
| Eriococcidae            | 7               | 18                | 2.6:1                      |
| Kermeidae               | 1               | 2                 | 2.0:1                      |
| Margarididae            | 2               | 2                 | 1:1                        |
| Matsucoccidae           | 1               | 1                 | 1:1                        |
| Monophlebidida          | 2               | 2                 | 1:1                        |
| Steingeliidae           | 1               | 1                 | 1:1                        |
| Xylococcidae            | 1               | 1                 | 1:1                        |
| Ortheziidae             | 5               | 5                 | 1:1                        |
| Pseudococcidae          | 27              | 50                | 1.8:1                      |
| Putoidae                | 1               | 1                 | 1:1                        |
| Rhizococcidae           | 2               | 4                 | 2.0:1                      |
| All scale families      | 98              | 185               | 1.9:1                      |

Of the 185 species present in Poland, 133 (71.9%) are native (Figure 1). The alien scale insect species number 52 (28.1% of total); these species clearly dominate over the native ones in the Diaspididae family, while the remaining families are represented by 1–10 alien species or only by native species (Figure 1). Of the 52 alien species known in Poland, 47 can develop only indoors, while five, namely *Aulacaspis rosae*, *Comstockaspis perniciosa*, *Parthenolecanium fletcheri*, *Pulvinaria floccifera*, and *P. hydrangeae*, overwinter and develop outdoors. *Pulvinaria floccifera* develops both indoors and outdoors (Table 1).
Figure 1. Native and alien scale insect species in different families in Poland.

Discussion

The scale insect species recorded in Poland represent only ca. 7.3% of the 2536 species known in the Palearctic region (García Morales et al. 2016) and ca. 41.1% of the 450 species reported in Europe (Pellizzari and Germain 2010). The previous checklist of scale insects of Poland was published 15 years ago (Łagowska 2004) and listed 185 species distributed in nine families and 94 genera. In the present list, the families Cryptococcidae, Matsucoccidae, Monophlebidae, Steingeliidae, Xylococcidae, Putoidae, and Rhizoecidae have been added, using the currently accepted classification of Coccomorpha. Moreover, eleven species new for the country have been added and ten species removed. The new entries are: Asterodiaspis quercicola, Pulvinaria hydrangeae, P. regalis, Aspidiotus palmarum, Aulacaspis yasumatsui, Lepidosaphes tokionis, Acanthococcus macedoniensis, Icerya purchasi, Spilococcus mamillariae, Volvicoccus volviifer, and Rhizoecus americanus. Of these V. volviifer, P. hydrangeae, P. regalis, and A. macedoniensis are established outdoors (Kalandyk and Węgierek 2010; Kozár et al. 2013; Łagowska et al. 2018), whereas A. yasumatsui, L. tokionis, S. mamillariae, and R. americanus, are indoors species (Łabanowski 2009). Icerya purchasi and A. palmarum were overlooked in the previous checklist and are therefore added to the present one. Asterodiaspis quercicola is here considered as a valid species (García Morales et al. 2016), despite the fact that Podsiadlo (1990) and Stumpf and Lambdin (2006) considered A. quercicola and A. variolosa as synonyms.

Of the ten species removed from the list, six have been synonymized with other species (Eulecanium slavum (Kawecki, 1961), Lepidosaphes oleae Leonardi, 1908, Heliococcus danzigae Bazarov, 1974, Trionyxus isfærensis Borchsenius, 1949,
The presence of these three species in Poland, cited by the ScaleNet database, is a misunderstanding of the text of Koteja (1984), which records them as present in several European countries (Portugal, France, Algeria, Cyprus) but not in Poland. These three
species were not listed by any of the researchers studying the fauna of scale insects in Poland, so they are excluded from the present list. The same species have also been incorrectly recorded in the FaEu database.

*Asterodiaspis minor* (Russell, 1941)

This species was recorded by Russell (1941) in Poland, but Podsiadlo (1975) recognized only *Asterodiaspis quercicola* and *A. variolosa* in Poland based on extensive morphological studies. Since this time, *A. minor* was not listed in the subsequent publications pertaining to the fauna of scale insects in Poland and is excluded from the present list, although it is listed in the ScaleNet database.

*Epidiaspis leperii* (Signoret, 1869)

In the ScaleNet database Poland is included among the locations of distribution of this species based on the paper of Danzig and Pellizzari (1998). However, the paper does not provide any precise indication of its presence in Poland. The species was also not listed later by the researchers who studied the fauna of scale insects in Poland, so it is excluded from the present list.

*Kermes bacciformis* Leonardi, 1908 and *Kermes ilicis* (Linnaeus, 1758)

These two species are recorded as hosts of a parasitoid by Sugonyaev (1965), and are cited by the ScaleNet database as records of distribution of scale insects, but this is probably a misunderstanding of the text, as the distribution records concern the parasitoid species and not the scale insects. These two species have also been incorrectly included in the FaEu database.

*Lecanopsis turcica* (Bodenheimer, 1951)

Poland was included among the countries in which this species is distributed in the FaEu database, but the source of information is missing. As there is no published evidence for the presence of this coccid in Poland, it is excluded from the present list.

*Leucaspis pusilla* Löw, 1883

This species is erroneously recorded in the ScaleNet catalogue citing Danzig and Pellizzari (1998), but those authors do not mention Poland as a location of its distribution.
Matsucoccus matsumurae (Kuwana, 1905)

Poland was included among the countries where this species is present in the FaEu database, but the source of information is missing. As there is no evidence for the presence of this species in Poland, it is excluded from the present list.

Parlatoria oleae (Colvee, 1880) and Parlatoria theae Cockerell, 1896

These two species are recorded as present in Poland in the FaEu database with an incorrect citation of ScaleNet as the source of information. We have been unable to trace the original sources of publication concerning the presence of these species in Poland and therefore we consider these records erroneous.

Parlatoria ziziphi (Lucas, 1853)

This species is cited in ScaleNet based on Komosińska (1964). However, this species was only found on citrus fruits imported to Poland. Since P. ziziphi was not mentioned in subsequent papers, we assume that this species is not established in Poland.

Pseudococcus viburni (Signoret, 1875)

Poland was included among the countries in which this species is present in the FaEu database, but the source of information is missing. As there is no evidence of the presence of this mealybug in Poland, this species is excluded from the present list.

Trionymus levis (Tang, 1992)

Koteja (1974) and Koteja and Żak-Ogaza (1983) do not provide evidence of the presence of T. levis in Poland as cited by the ScaleNet database. Moreover, this species was not listed in the subsequent publications related to the Polish fauna of scale insects and is therefore removed from the present checklist. It has also been incorrectly included in the FaEu database.

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