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Discovery of the primary aphid (Hemiptera: Aphidomorpha) and scale insect (Hemiptera: Coccomorpha) type specimens from the collection of Theodor Hartig (1805–1880)

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Abstract

Theodor Hartig's aphid and scale insect type specimens have been presumed lost or destroyed for the last 140 years. Here we document their discovery at the Bavarian State Collection of Zoology (Zoologische Staatssammlung München, ZSM), in Munich, Germany. These specimens include primary types for 24 aphid, three adelgid, and two armored scale insect species named by Hartig between 1834 and 1851, as well as other specimens of unknown importance.

Key words: Bavarian State Collection of Zoology, Zoologische Staatssammlung München, Sternorrhyncha, Aphididae, Adelgidae, Diaspididae, holotype, syntype

Introduction

Theodor Hartig (1805–1880) was one of the most influential aphid taxonomists of the mid-19th century. Between 1834 and 1857, he was a lecturer (1831–1835) and professor (1835–1838) at the Forest Academy of the University of Berlin, and then later professor of forestry at the Collegium Carolinum in Braunschweig (1838–1878) (Blasius 1887). During this time, he is credited with having named five aphid (Hemiptera: Aphidoidea: Aphididae) genera and 30 species, as well as three adelgid (Hemiptera: Adelgoidea: Adelgidae) species (Table 1). Of these, two genera and 11 species remain valid, three are *nomina dubia* and four are *nomina nuda* (Favret 2023). In addition, he described two scale insect species (Hemiptera: Coccoidea: Diaspididae) (Garcia Morales *et al*. 2016) and eight psyllids (Hemiptera: Psylloidea) (Burckhardt 2008); a single species of each is still recognized as valid.

Not long after Hartig's death, the location of his Sternorrhyncha collection became unknown, with at least one of his contemporaries assuming that the specimens had been lost or destroyed (Löw 1882). As suggested by Burckhardt (2008), the collection was probably acquired along with Hartig's Hymenoptera collection by Josef Kriechbaumer (1818–1902) at the Bavarian State Collection of Zoology in Munich, Germany (Zoologische Staatssammlung München, ZSM) during his tenure as curator between 1858 to 1901 (Diller 1992). Yet, there had not been any record of the Hartig's Sternorrhyncha at the ZSM until Burckhardt (2008) discovered a Schmitt box containing his psyllid collection. In this box were also aphid and scale insect specimens, but their importance was not recognized at the time. Consequently, Hartig's aphid and scale insect types have continued to be assumed lost in more recent literature (Garcia Morales *et al.* 2016; Favret *et al.* 2017; Favret 2023).

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TABLE 1. Aphid and Scale Insects attributed to Theodor Hartig.

Taxon	Rank	Status	Superfamily
Aphis cytisorum cytisorum Hartig, 1841	subspecies	valid	Aphidoidea
Aphis cytisorum Hartig, 1841	species	valid	Aphidoidea
Aphis persicariae Hartig, 1841	species	nomen dubium	Aphidoidea
Aphis pineti Hartig, G.L. & Hartig, T., 1834	species	synonym	Aphidoidea
Aphis platanoidis Hartig, 1841	species	synonym	Aphidoidea
Aphis pyri Hartig, 1841	species	synonym	Aphidoidea
Aphis spinarum Hartig, 1841	species	synonym	Aphidoidea
Aphis villosus Hartig, 1841	species	synonym	Aphidoidea
Aphis viminalis Hartig, 1841	species	synonym	Aphidoidea
Aphis vitellinae Hartig, 1841	species	synonym	Aphidoidea
Callipterinella calliptera (Hartig, 1841)	species	valid	Aphidoidea
Chermes laricis Hartig, 1839	species	synonym	Adelgoidea
Chermes sylvestris Hartig, 1841	species	nomen nudum	Adelgoidea
Cinara laricis (Hartig, 1839)	species	valid	Aphidoidea
Cinara pilicornis (Hartig, 1841)	species	valid	Aphidoidea
Cinara pruinosa (Hartig, 1841)	species	valid	Aphidoidea
Cinara pruinosa pruinosa (Hartig, 1841)	subspecies	valid	Aphidoidea
Eriosoma lanuginosum (Hartig, 1839)	species	valid	Aphidoidea
Lachnus costatus Hartig, 1839	species	synonym	Aphidoidea
Lachnus padi Hartig, 1841	species	nomen dubium	Aphidoidea
Lachnus pallipes (Hartig, 1841)	species	valid	Aphidoidea
Lachnus subterraneus Hartig, 1857	species	nomen dubium	Aphidoidea
Pemphigus (*Pemphigus*) Hartig, 1839	subgenus	valid	Aphidoidea
Pemphigus fraxini Hartig, 1839	species	nomen nudum	Aphidoidea
Pemphigus fraxini Hartig, 1841	species	synonym	Aphidoidea
Pemphigus Hartig, 1839	genus	valid	Aphidoidea
Pemphigus lonicerae Hartig, 1841	species	synonym	Aphidoidea
Pemphigus pedunculi Hartig, 1841	species	synonym	Aphidoidea
Pemphigus quercus Hartig, 1839	species	nomen nudum	Aphidoidea
Pineus strobi (Hartig, 1839)	species	valid	Adelgoidea
Plocamaphis amerinae (Hartig, 1841)	species	valid	Aphidoidea
Plocamaphis amerinae amerinae (Hartig, 1841)	subspecies	valid	Aphidoidea
Pterocomma rufipes (Hartig, 1841)	species	valid	Aphidoidea
Rhizomaria Hartig, 1857	genus	synonym	Aphidoidea
Rhizomaria piceae Hartig, 1857	species	synonym	Aphidoidea
Rhizoterus Hartig, 1841	genus	synonym	Aphidoidea
Rhizoterus vacca Hartig, 1841	species	synonym	Aphidoidea
Schizoneura corni Hartig, 1841	species	synonym	Aphidoidea
Schizoneura Hartig, 1839	genus	synonym	Aphidoidea
Tetraneura (*Tetraneura*) Hartig, 1841	subgenus	valid	Aphidoidea
Tetraneura Hartig, 1841	genus	valid	Aphidoidea
Tetraneura rugicornis Hartig, 1841	species	nomen nudum	Aphidoidea
Tuberculatus annulatus (Hartig, 1841)	species	valid	Aphidoidea
Aspidiotus flavus Hartig, 1839	species	synonym	Coccoidea
Leucaspis pini (Hartig, 1839)	species	valid	Coccoidea

Here we describe the remaining contents of Hartig's Sternorrhyncha collection, including his aphid and scale insect specimens (Figure 1; Supplementary Material 1). We draw on the work of Evenhuis (1982) and Burckhardt (2008) who described Hartig's cynipid (Hymenoptera) and psyllid collections, respectively, and revised the nomenclature concerning Hartig's type specimens in each of these. Acknowledging the significance of this collection and in an attempt to alert the taxonomic community of its existence without further delay, we have opted to forego a formal revision of Hartig's aphid and scale insect names at the present time. Instead, we have made the focus of this work a preliminary study of the remaining contents of his collection and specimens to document their presence, condition, and arrangement so that this information may be preserved in the literature. To this end, we have obtained new high-resolution photographs of the collection using the DScan 2.0 system for the digitization of insect boxes at the ZSM (see https://zsm.snsb.de/einrichtungen/dscan-2-0-kastendigitalisierung/) (Figure 1; Supplementary Material 1). We have also highlighted potential nomenclatural issues that will be investigated and the subject of a subsequent publication following the curation and identification of Hartig's specimens. Furthermore, we have recovered Hartig's journal entries concerning his collected specimens which were also discovered at the ZSM. These notes contain valuable information on the location and date of collection, host plant, and other remarks (Supplementary Material 2). Information from Hartig's notes have been incorporated into the discussion below where pertinent and transcripts are presented in Table 2.

FIGURE 1. Theodor Hartig's Sternorrhyncha collection after Burckhardt's (2008) removal of the Psylloidea.

The state of Hartig's Sternorrhyncha collection

Consistent with Burckhardt's (2008) description, Hartig's specimens (yellowed rectangular labels; Figure 1) are contained in a single Schmitt box along with some specimens later inserted by Kriechbaumer (yellowed square labels). More recent pinned material collected in the 20th century and three vials of scale insects of unknown origin are also in the Schmitt box (Figure 1). We attribute at least 155 pinned specimens from this box to Hartig. A complete list of the species and specimens present among Hartig's Sternorrhyncha is given in Table 3.

Descriptions of Hartig's collections given by Evenhuis (1982) and Burckhardt (2008) are consistent with the present condition of the remainder of Hartig's Sternorrhyncha collection. Specimens are either pinned directly through the thorax or abdomen, or single or multiple specimens are glued to the tip, edge, or surface of white trian-

gular points or rectangular cards, or mounted *in situ* on host plant tissue. In some cases, the *in situ* specimens are mounted using multiple pins inserted directly into the host tissue.

The dried preservation of Hartig's specimens is neither ideal nor conducive to accurate identification in many cases. The current practice of slide-mounting aphids and scale insects allows for more detailed descriptions and identifying characters than are possible with pin or point mounted specimens. However, slide-mounting techniques only became common practice in the latter half of the 1800s (Essig 1948; Miller & Foottit 2017) and modern methods evolved from techniques described well into the 20th century (*e.g.,* Nye 1947; Essig 1948; Hille Ris Lambers 1950). Suffice it to say that many of Hartig's types may be of limited use diagnostically in their present condition and state.

Hartig's specimens are arranged in the Schmitt box in nine rows. Larger white (yellowed) rectangular labels with black borders and solid edges on both sides delineate Hartig's (1841) family-level taxonomic concepts (*i.e.,* Coccina, Hyponomeutes, Aphidina, and Psyllodes). Smaller rectangular labels with black borders, featuring a solid outside edge and series of dimpled circles on the inside edge, delineate genera and species. Genus labels are followed by one or more species labels which are each followed by a series of specimens. These labels are consistent with the ones Hartig used for the documentation of his Hymenoptera collection, as illustrated in Diller (1992). It appears that Hartig preferred to pin his labels using wider gauge pins through their bottom margin as in most of his family and genus labels (Figure 1). These, however, have been removed from his species labels and only pin holes remain. In some cases, specimen pins may have coloured labels with two, three- or four-digit numbers. These correspond with Hartig's journal notes (see page 62, Supplementary Material 2) and are coloured according to the year of collection: white (1833), green (1834), pale red (1835), blue (1836), red (1837), yellow (1838), brown (1839), and violet (1841 – the only year not represented among Hartig's Sternorrhyncha types). White labels with red digits are provided for the year 1840. Additional labels with cursive, and sometimes illegible, handwriting may also accompany specimens. All family- and genus-level names are capitalized. Species names may also be capitalized (18 of 47), but the majority of these are not.

With the exception of the first two and last two rows of specimens and five species between rows three and seven, the specimens are ordered as presented in Hartig (1841). Whereas rows one and two contain species that are not present in Hartig (1841), but rather in Hartig (1839), the last two rows are either partially (row 8) or wholly (row 9) inconsistent with the order of species listed in either of these publications or are quite obviously mislabelled or misidentified. For example, most of the specimens following the "*Aleurodes*" label in row 9 are in fact aphids and are intermixed with Kriechbaumer's specimens. At least one of Hartig's cynipids appeared to have also been similarly mislabelled (Evenhuis 1982).

Many of the genus and species labels, as well as the Hyponomeutes family label, have the notation "*m.*" or "*n.*", which likely indicate that Hartig credited himself either wholly, or in part with his father Georg Ludwig Hartig (1764–1837), for describing the taxon. These are consistent with notation used in Hartig's (1839) and (1841) publications in which these taxa are described, and are referred to below as type labels. The notation "*m.*" we posit is an abbreviation of the Latin word *mihi* for "to me" which was commonly used to denote new species during this period. Similarly, we suspect that "*n.*" is an abbreviation of the Latin word *nobis* for "to us" as in "*Lachnus pineti n.*" in Hartig (1839) where he is possibly acknowledging the partial authority given to his father, who co-authored Hartig & Hartig (1834) in which this species is first recognized as "*Aphis pineti*".

In some cases, the notation used on the labels conflicts with that used in Hartig's publications. For instance, the labels of five species have the notation "*n.*" even though they are presented with an "*m.*" in Hartig (1841). Only two of these had been previously published in Hartig (1839) with an "*n.*". Likewise, three labels are presented with an "*m.*" where an "*n.*" had been used in Hartig (1839). We also note that *"n.*" was used exclusively in Hartig (1839), and with the exception of "*Chermes laricis n.*"*, "m."* was used exclusively in Hartig (1841).

Two specimen labels have an "*m.*" where there is no notation used at all in Hartig's works. The first of these, "*Hyponomeutes m.*" appears to have been unavailable at the time of his first use of the name in Hartig (1841), as it had been recognized as a synonym or alternate spelling of *Yponomeuta* Latreille, 1796 (Lepidoptera) as early as 1817 (Cuvier 1817). The second label is for *Aphis pyri* Hartig, 1841 [= *Dysaphis plantaginea* (Passerini, 1860)] which is in conflict with *Dysaphis pyri* (Boyer de Fonscolombe, 1841). In contrast, a single species label "*Schizoneura costata*"*,* is not annotated with an "*m.*" or an "*n.*", even though this species appears in Hartig (1839) along with its description first within the genus *Lachnus* Burmeister, 1835, and subsequently in Hartig (1841) within the genus *Schizoneura* Hartig, 1839.

TABLE 2. Transcripts of Hartig's notes corresponding to specimens with field numbers.

Year	Field No.	**Notes**
1833	59	Mitte März in der Hasenheide theils im Moose theils auf Kiefern. 57-59: unterm Moose in der Kief[ern]-Schonung.
1833	61	Mitte März in der Hasenheide theils im Moose theils auf Kiefern.
1833	62	Mitte März in der Hasenheide theils im Moose theils auf Kiefern.
1833	208	Weibchen von Chermes (abietis?) im Eierlegen begriffen, der Wollhaare beraubt. 12. may an Kiefernzweigen. Fig. 19a.
1833	290	Aph. rosae 15 May.
1833	476	Coccus auf Pop[ulus] trem[ula] Anf. Juny.
1833	479	den 7th Juny im Thiergarten. Schwärmte auf Kiefer.
1833	482	den 7th Juny im Thiergarten. [ludt (?) auf Kiefernnadeln] lebendig.
1833	494	Aphis pini x/6 [? in der Charlottenb[urger]] ?
1833	617	daselbst [24/6 auf Fichten im Thiergarten].
1833	619	saß auf einem Acaz[ien] Blatt dicht neben der Fichte. Auf letzterer fand sich ein weißer mit hellgelblichem Mehl bestreuter Coccus (?) von der Bildung wie der Coccus auf Kiefern im vorigen Jahre aber kleiner.
1833	647	647-52: 1/7 Chalcidien aus der Puppe des Ichneumon No. 583 aus B. dispar. Aus 9 Ichneum. wovon 9 Chalcis Weibchen u[nd] 16 Männchen. Also auf ein Cocon circa 1 W[eibchen] u[nd] 2 M[ännchen]. 647: Coccus (?) auf ficten.
1833	925	Von jungen Kiefern geklopft in der Schonung der Hasenheide. 14/7 gleichzeitig mit diesen Insekten Lph. Pinastri 6-8 Linien lang. Ein grün gestreifter Spanner mehrfach. Geom[etridae] fasciaria und 3 Blattwespen Spanner. Am 19 July hatten sich die größten Raupan grün mit hellweißen Seitenstreifen bereits verpuppt.
1833	955	14/7 in der Hausenweide von jungen Eichen geklopft.
1833	1039	Chermes aus kleinen Ulmen Blattgallen 15/7.
1833	1057	Aphis aus großen Ulmen Gallen 22/7.
1834	87	Vom 1. bis 20. May im Thiergarten von Eichen.
1834	164	142-170: Anfang Mai im Thiergarten von den jungen Rothtannen. Die Schwärmzeit der Blutlaus fällt von Mitte Mai bis Mitte Juny während eines ganzen Monats.
1835	526	24/7 im Garten.
1835	527	24/7 im Garten.
1835	572	[?] Heide Ende Sept[em]b[e]r an Gräsern.
1836	298	298: 8/5 Thiergart. Acer.
1836	299	daselbst [8/5 Thiergar. Acer].
1836	300	Sorbus.
1836	351	348-55: 15/5 im Thiergarten [?] und [3]51 auf Prunus padus pp.
1836	359	15/5 daselbst [auf Ahorn] im Thiergarten.
1836	361	auf Prunus padus daselbst [15/5 im Tiergarten].
1836	379	15/5 im Thiergarten [?]
1836	420	17/5 Jungfernheide Laubholz.
1836	519	24/5 Tiergarten [und] auf Fagus
1836	580	27/5 - 6/6 im Garten.
1836	718	Excurs. 12 Juny Jungfernheide. 714-751 Keschern in v. um Eichenbestände.
1836	865	18t Juny in Hammer Garten und nächster Umgebung.
1836	874	im Garten 21/6.
1836	893	Coccus und Pteromaliern daraus von Kiefernnadeln. 15/6 Hasenheide.

.....continued on the next page.

TABLE 2. (Continued)

Year	Field No.	**Notes**
1836	894	Coccus und Pteromaliern daraus von Kiefernnadeln. 15/6 Hasenheide.
1836	895	Coccus und Pteromaliern daraus von Kiefernnadeln. 15/6 Hasenheide.
1836	1100	Aphis [genistae] zusammengezogen. Birkenblätter in welchem Tortrix No. 95 u[nd] 96. 6/7
1836	1102	Aphis [genistae] zusammengez. Pappelblätter 6/7
1836	1128	Coccus von Acacio floribunda.
1836	1136	Aphis aus Garten von Kirschen 15/6.
1836	1138	entspricht 1102: Aphis [genistae] zusammengez. Pappelblätter 6/7.
1836	1139	entspricht 1102: Aphis [genistae] zusammengez. Pappelblätter 6/7.
1836	1267	1/8 - 8/8 Garten [?] lucidulus scheint Cladus albipes anzugehören, obgleich er meist um Rosenbüsche schwärmt.
1836	1435	7/8 auf Weiden an jungen Trieben. Die befallenen Weiden fangen schon an das Laub zu verlieren.
1836	1456	Coccus von Eichen.
1836	1532	32, [?] 15/9 in Menge im Thiergarten beim [Hofjäger Blau Racken] weißwollig.
1836	1706	aus Gallen der N. Vallisnierii n. n. 10/9 - 1/10.
1836	1708	aus Gallen der N. Vallisnierii n. n. 10/9 - 1/10.
1836	1719	Coccus u. [?] . Weibchen, die Jungen [?] 20/9 im Hause.
1836	1720	15/9 von Weiden ??
1836	1741	20/10 Garten.
1836	1752	Weidengallen v. S[alix] viminalis 15/10 - 1/11.
1836	1757	Eichen im Thierg[arten] gef[angen] 15/10.
1837	327	10/6 Kirchhof meist auf Weiden gefangen.
1837	408	28/6 aus Eschen Blatthaut aber (wie auf Pappeln) der Stiel luxuri[e]rt.
1838	604	aus gerollten Pappelstielen Pop[ulus] dilatata in H[?] Park, den ganzen Sommer über.
1839	1036	1030-1038: Mitte Sept[em]b[e]r. Buchhorst. 1036: auf Sorbus acup[aria] zwischen gekräuselten Blättern.
1839	1038	1030-1038: Mitte Sept[em]b[er]. Buchhorst 1035 in Menge auf Akazien 1036 auf Sorbus aucup[aria] zwischen gekräuselten Blättern 1038 auf Cornus sanguineus.
1839	1222	Grüne Blattlaus einzeln auf Spitz-Eichen mit Phylloxera quercus beisammen.
1839	1223	Phylloxera quercus im Herbst auf jungen Spitz-Eichen im Forstgarten. Geflügelte Mitte Oct[o]b[e]r.
1839	1224	Phylloxera quercus im Herbst auf jungen Spitz-Eichen im Forstgarten. Geflügelte Mitte Oct[o]b[e]r.
1839	1226	Aphis gesellig um den Blütenstiel von Mitte Oct[o]b[e]r.
1839	1227	Aphis von Lonicera xylosteum. Ende Oct[o]b[e]r die Geflügelte mit der ungeflügelten in der Copula beobachtet. Unterseite der Blätter.
1839	1228	Aphis lanuginosa von Apfelbäumen. Geflügelt Anf[ang] Oct[o]b[e]r.
1839	1242	Eichen Blattlaus von Saxesen in Spirit[us].
1839	1244	Rhizobius aus Ameisenhaufen und Ameisen von Saxesen in Spirit[us].
1839	1245	Aphis fol. Abiet. Saxesen.
1840	149	[?] auf Cytisus laburnum ende 7.
1840	150	[?] auf Prunus spinosa mitte 7.
1840	152	mitte 7 auf Lonicera xylosteum.
1840	153	mitte 7 auf Lonicera xylosteum.
1840	154	mitte 7 auf Lonicera xylosteum.
1840	155	mitte 7 auf Lonicera xylosteum.
1840	157	Auf eschen blattgallen auf Juni im [garten gefangen].

[] denotes authors' interpretation of or uncertainty in the transcribed text

Finally, there is a "*Pemphigus populi n.*" label but Hartig did not describe a species by this name. Hartig (1841) treated both *Aphis bursarius* [= *Pemphigus bursarius*] Linnaeus, 1758 and *Aphis populi* [= *Pachypappa populi*] Linnaeus, 1758 under *Pemphigus* Hartig, 1839, and since his specimens of *P. bursarius* appear in the collection next to these *P. populi*, we assume that his use of "*n.*" on the label for the latter was in error.

Hartig's Aphid and Scale Insect Types

Hartig's primary type specimens are presented below in order of their appearance in the original Schmitt box under their published names. The nomenclatural history for each of Hartig's names is provided with combination changes, synonymies and homonymies listed chronologically along with references to corresponding taxonomic authorities. Valid names and primary type specimens are identified with bold-type font. Where only a single type specimen was present in association with a type label, the specimen was inferred to be the holotype. For series of specimens associated with type labels, we have refrained from designating lectotypes until Hartig's specimens can be slide-mounted and identified. Collection locality, dates, and host plant data were retrieved from Hartig's handwritten notes if available (Table 2; Supplementary Material 2). Each specimen has received a unique identifier at the ZSM using the prefix SNSB-ZSM-Hemi-Hartig and a number corresponding to its original position within the Schmitt box (*eg.* SNSB-ZSM-Hemi-Hartig-1.07). These position numbers are presented in square brackets, along with Hartig's corresponding field numbers, if available, in parentheses, with information on primary types in the nomenclatural history for each species in the section below. Upon publication of this paper, all primary type material will be transferred to standard insect trays.

Type specimens for five species described by Hartig are missing from the Schmitt box or may be present but are presently unlabelled. These are *Lachnus laricis* Hartig, 1839, *Lachnus pruinosa* Hartig, 1841, *Lachnus subterraneus* Hartig, 1857, *Pemphigus quercus* Hartig, 1839, and *Rhizomaria piceae* Hartig, 1857.

Aspidiotus pini Hartig, 1839

Aspidiotus pini Hartig, 1839: 642, ♂. **SYNTYPES**: (lost), *Pinus*.
Coccus (Aspidiotus) pini (Hartig, 1839) (change of combination—Ratzeburg, 1844: 195).
Leucaspis pini (Hartig, 1839) (change of combination—Signoret, 1868: 865). **Valid**
Aspidiotus flavus Hartig, 1839: 642, ♀ (junior synonym—Fernald, 1903: 245). **SYNTYPES**: 2 (field no. missing [1.11, 1.12]), *Pinus*.

Specimens. Two unlabelled specimens mounted *in situ* on pine needles on separate pins following specimen 379 (Table 3). Presumed to be the females in Hartig's description, but since immature males may also reside under scale covers and the preservation of the specimens does not allow for adequate differentiation of the sexes, their sex cannot be reliably determined. The original types for males of *Aspidiotus pini* [=*Leucaspis pini*] Hartig, 1839, are presumed lost.

Remarks. Many authorities have postulated on the basis of Hartig's descriptions that he confused the sexes of *A. pini* and *Aspidiotus flavus* Hartig, 1839, such that the males and females of the former and latter, respectively, correspond to *L. pini*, and that the sexes in the opposite configuration correspond to *Dynaspidiotus abietis* (Schrank, 1776) (Fernald 1903; Leonardi 1908; Borchsenius 1966; Danzig & Kerzhner 1984). Hartig's type specimens for these two species are consistent with this assertion. Specimens 893 and 894 of *A. pini*, as well as specimens 379 of *A. flavus*, have round, gray shields as in Hartig's description for *A. pini*, and resemble *D. abietis*. Specimen 895 is a dull, orange-yellow male with a shiny black scutellum fitting Hartig's description for *A. flavus*. Again, this specimen appears to be consistent with *D. abietis*, not *L. pini* , the species with which *A. flavus* is currently in junior synonymy and whose males are black. In contrast, the remaining two specimens associated with Hartig's *A. flavus* label are mounted *in situ* on pine needles and match Hartig's description of females of *A. pini.* Given that there are at least three *Leucaspis* Signoret, 1868 species recorded from pine in Germany (Danzig & Kerzhner 1984; Garcia Morales *et al.* 2016), these specimens will need to be slide-mounted for a more definitive identification. Even then, we cannot be certain that the specimens represent the adult females on which the description is based.

Having located the type specimens for *A. pini* and *A. flavus*, in accordance with Article 75.8 of the International

Commission of Zoological Nomenclature (ICZN) (1999), the neotype formerly designated for *A. pini* by Danzig & Kerzhner (1984) from a single female collected from *Pinus sylvestris* in Triglitz, Germany on 10.VI.1909, and currently deposited in the Zoological Museum of the Russian Academy of Sciences, St. Petersburg, Russia, shall no longer be name-bearing. However, since the only remaining primary types for *A. pini* are not representative of this taxon (Article 75.6), and that those for *A. flavus* are neither diagnosable in their present state nor preserved in a manner consistent with current standards of curation (Article 75.5), this case will be referred to the ICZN with the recommendation that it uses its plenary power to set aside the newly discovered *A. pini* syntypes in favor of the prevailing use of the name *L. pini* with the existing neotype as the name-bearing type.

Aspidiotus flavus Hartig, 1839

Aspidiotus flavus Hartig, 1839: 642, ♂. **SYNTYPE**: 1 (895 [1.09]), *Pinus.*
Coccus (*Aspidiotus*) *flavus* (Hartig, 1839) (change of combination—Ratzeburg, 1844: 195).
Diaspide flavus (Hartig, 1839) (change of combination—Signoret, 1868: 853).
Dynaspidiotus abietis (Schrank, 1776) (senior synonym—Fernald, 1903: 251, "*Aspidiotus abietis* (Schr.)"). **Valid**
Aspidiotus pini Hartig, 1839: 642, ♀ (junior synonym—Danzig & Kerzhner, 1984: 102). **SYNTYPES**: 8 (893 [1.07]; 894 [1.08]; 379 [1.10]), *Pinus.*

Specimens. One pointed on pin 893 and three on two points on pin 894 following the "*Aspidiotus pini m.*" labels. A single pointed adult male on pin 895 and four of unknown sex on a single point on pin 379, following the "*flavus m.*" label. Specimens 893-895 were collected from pine needles on June 15, 1836 in Hasenheide, Berlin, Germany. Specimen 379 was collected on May 15, 1836 in Tiergarten, Berlin, Germany.

Remarks. We suspect that specimen 379 has been incorrectly placed within the collection as it is in clear conflict with the description for *A. flavus* (see under *Aspidiotus pini* Hartig, 1839).

Coccus strobus Hartig, 1839

Coccus strobus Hartig, 1839: 643. **SYNTYPES**: 3 (field no. missing [2.04]; 87 [2.05]).
Chermes strobi (Hartig, 1839) (change of combination and senior synonym with respect to *Chermes corticalis* Kaltenbach, 1843: 197—Ratzeburg, 1844: 203).
Coccus strobi (Hartig, 1839) (alternate spelling—Hartig, 1851: 85).
Chermes corticalis Kaltenbach, 1843 (misapplied junior synonym—Buckton, 1883: 23, "*Chermes strobi,* Hartig (?)").
Pineus strobi (Hartig, 1839) (change of combination—Börner, 1908: 415). **Valid**

Specimens. Two covered in wax and mounted on a rectangular card without a label. A third (87) covered in wax and mounted *in situ* on plant tissue. Hartig's notes indicate that it was collected between May 1–20, 1834 from oak in Tiergarten, Berlin, Germany.

Remarks. Hartig (1839) identified the North American white pine, *Pinus strobus*, as the host plant and source of species etymology for *Coccus strobus* Hartig,1839 so specimen 87 may be mislabelled or oak was accidentally identified as the host in his notes. Hartig (1839) was in doubt about the generic placement of *C. strobus* and other related pine and spruce feeding species. Indeed, general confusion about where to place species of *Coccus* Linnaeus, 1758, *Chermes* Linnaeus, 1758, and *Kermes* Linnaeus, 1740 extended well into the next century (Burdon 1907). We cannot be completely certain of the identity of these specimens without slide mounting them, but the individual *in situ* on pine bark and the description by Hartig (1839) of this species covering the trunks of *Pinus strobus* in white wool "as if covered with snow," leave little doubt that these specimens are *Pineus strobi* (Hartig, 1839), the only adelgid species that exhibits this trait.

Rhizoterus vacca Hartig, 1841

Rhizoterus vacca Hartig, 1841: 363. **HOLOTYPE**: (1244 [3.02]).
Forda formicaria von Heyden, 1837 (senior synonym—Kaltenbach, 1843: 209). **Valid**

Specimen. One aptera mounted on a point. A second point on the same pin has a damaged specimen (possibly *Formica rufa* Linnaeus, 1761 see below). Collected from anthills and ants into alcohol by Wilhelm Saxesen in April 1839 from an unknown location.

Remarks. There is some uncertainty around the identity of the aphid specimen. The antennae of this species were illustrated in Hartig (1841, Fig. 13) and therein depicted in a manner consistent with the current use of the name *Forda formicaria* von Heyden, 1837 in that they are five segmented with the third segment similar in length to the fourth and fifth combined. However, high resolution photographs of specimen 1244 show what appears to be six-segmented antennae with antennal segment III of similar length to IV. Given the contradictory information, the identity of the specimen remains uncertain. If not *F. formicaria* it may be that the specimen instead represents a species in the genus *Paracletus* von Heyden, 1837 which have six segmented antennae but otherwise resemble *F. formicaria*. Confirmation of the synonymy is needed.

Hartig's notes indicate that the genus was believed to be *Rhizobius* Burmeister, 1835 [= *Prociphilus* Koch, 1857], and are consistent with Hartig's (1841) description which indicates that the specimen was collected together with *F. rufa* by Saxesen and resembled *Rhizobius pini* Burmeister, 1835.

Chermes laricis Hartig, 1839

Chermes laricis Hartig, 1839 : 644. **SYNTYPES**: 10 (field no. missing [3.16, 3.17]), *Larix*.
Adelges laricis (Hartig, 1839) (change of combination—Schouteden, 1900: 138).
Adelges laricis Vallot, 1836 (senior secondary homonym and synonym—Börner & Schilder, 1932: 688, "*A. laricis* Vallot, Hartig"; Börner, 1952: 207, "*Chermes laricis* Htg. 1837, 1841 part."). **Valid**
Sacchiphantes viridis (Ratzeburg, 1843) (junior synonym—Börner, 1952: 208, "*Ch. Laricis* Htg. 1841 part.").

Specimens. Seven alatae and three apterous progredientes mounted *in situ* on four and three larch needles, respectively, all on two pins. There are no labels corresponding to Hartig's notes accompanying the specimens so their collection information cannot be determined.

Remarks. Hartig (1839) also described material under the name "*Coccus laricis* B[ouché]" but no specimens are labelled as such in his collection. Börner & Schilder (1932) recognized *Chermes laricis* Hartig, 1839 as a homonym of *Adelges laricis* Vallot, 1836. However, later Börner (1952) treated it in part with *Sacchiphantes viridis* [= *Adelges viridis*] (Ratzeburg, 1843), but never provided a justification for this. Investigation of the potential synonymy with *A. viridis* and confirmation of the synonymy with *A. laricis* are needed.

Pemphigus fraxini Hartig, 1841

Pemphigus fraxini Hartig, 1839: 645 (*nomen nudum*).
Pemphigus fraxini Hartig, 1841: 367. **SYNTYPES**: 7 (408 [4.08]; field no. missing [4.09-4.14]), *Fraxinus*.
Prociphilus fraxini (Hartig, 1841) (change of combination—Börner, 1952: 193, in contradiction to secondary homonymy and synonymy with *Pemphigus fraxini* (Geoffroy, 1762) and *Pemphigus fraxini* (Fabricius, 1777) identified on p. 291: "fraxini Aphis Geoffr. 1762 p.[494] (= F. 1776 p. [303], Htg. 1841 p. 367)").
Prociphilus fraxini (Fabricius, 1777) (senior secondary homonym and synonym—Eastop & Hille Ris Lambers, 1976: 57, "*A. fraxini* Geoffroy, 1762 invalid"; Eastop & Hille Ris Lambers, 1976: 342). **Valid**

Specimens. Seven alates with wax covered abdomens mounted on separate pins. The only specimen with a corresponding journal entry (408) was collected from the leaves and stems of ash [*Fraxinus*] on June 28, 1837.

Remarks. The name was first published as *Pemphigus fraxini* in Hartig (1839), but was not accompanied by a description, definition or an indication and therefore is not available. In Börner (1952), the name is treated in combination with the genus *Prociphilus* and as a homonym and synonym of both *Aphis fraxini* Geoffroy, 1762 (*nomen nudum*) and *Aphis fraxini* [= *Prociphilus fraxini*] Fabricius, 1777. Confirmation of this synonymy is needed as *Prociphilus bumeliae* (Schrank, 1801) also occurs on *Fraxinus* in Europe and is similar in morphology.

Pemphigus lonicerae Hartig, 1841

Pemphigus lonicerae Hartig, 1841: 367. **SYNTYPES**: 9 (152 [4.23] lost; 153 [4.25]; 154 [4.22]; 155 [4.24]; 157 [4.21] lost), *Lonicera xylosteum.*
Prociphilus (*Stagona*) *xylostei* (De Geer, 1773) (senior synonym—Kaltenbach, 1843: 187, "*Pemphigus xylostei"*). **Valid**

Specimens. Presumed to have originally been nine specimens mounted on points or pinned on five pins. However, five pointed specimens on a single pin (157), as well as another specimen (152), are lost. Only host tissue remains on the pin for specimen 157. Specimen 153 is an alate, and 154 and 155 are wax covered apterae. Specimens 152-155 were collected mid-July, 1840 from *Lonicera xylosteum.* Specimens 157 were collected in June, 1840 from an ash leaf gall (pinned in the collection) in the ducal forest garden (*i.e.* Herzogliche Forstgarten, from here on referred to as Forstgarten) near Riddagshausen, Braunschweig, Germany, established by Hartig in 1838 (Hartig 1870).

Remarks. Specimens 157 may be misidentified or misplaced *P. fraxini* within the collection since *Prociphilus xylostei* (De Geer, 1773) does not occur on ash. Hartig's *P. fraxini* specimens are pinned in the same row.

Pemphigus pedunculi Hartig, 1841

Pemphigus pedunculi Hartig, 1841: 367. **SYNTYPES**: 3 (1757 [4.26]; field no. missing [4.27, 4.28]), Q*uercus.*
Thelaxes dryophila (Schrank, 1801) (senior synonym—Börner, 1952: 181, "? *Pemphigus pedunculi* Htg. 1841"). **Valid**

Specimens. One damaged alate (1757) mounted on a point, and two pinned apterae without labels. Specimen 1757 was collected from the shoots of oak on October 15, 1836 in Tiergarten, Berlin, Germany.

Remarks. Börner (1952) expressed uncertainty about the synonymy of *Pemphigus pedunculi* Hartig, 1841 with *Thelaxes dryophila* (Schrank, 1801). Confirmation of the synonymy with *T. dryophila* is needed.

Schizoneura lanuginosa Hartig, 1839

Schizoneura lanuginosa Hartig, 1839 : 645. **SYNTYPES**: 2 (Field no. missing [5.06, 5.07]; 1532 [5.03]; 1741 [5.02]), *Ulmus*.
Eriosoma lanuginosum (Hartig, 1841) (change of combination—Baker, 1915: 16). **Valid**

Specimens. Found in abundance on September 15, 1836 in Tiergarten, Berlin, Germany. An alate (1532) was collected and mounted on a point. Another alate (specimen 1741) collected from Forstgarten, Braunschweig, Germany on October 20, 1836 and pinned. Six additional specimens and an elm gall are also present. Four of these are card-mounted together on a single pin with a white, handwritten label that reads "Blutlause *Schizoneura lanigera*". Next to these but left of Hartig's standard label for *Schizoneura lanigera* [=*Eriosoma lanigerum*] (Hausmann, 1802), are two specimens pointed on separate pins. The first of these (1039) was collected July 17, 1833 from an elm gall. Hartig refers to this as "*Chermes*" in his journal entry. The second pin and the gall are unlabelled.

Remarks. Specimens 1532 and 1741 are larger in size compared to the remaining specimens, and unlike the latter, or at least specimen 1039, were not clearly associated with elm at the time of collection. Also, while the wings of specimen 1532 are disfigured, those of specimen 1741 have venation that is inconsistent with *Eriosoma lanuginosum* (Hartig, 1839). Its forewings have unbranched medial veins and its hindwings have transverse veins that arise very close together and do not resemble Hartig's own illustrations (Hartig 1841, Fig. 24). Instead, it appears to be a species of *Prociphilus*. Thus, these two specimens may not correspond to the *Schizoneura lanuginosa* Hartig, 1839 type specimens.

Whether the six additional specimens belong to Hartig's *S. lanuginosa* series or to his *S. lanigera* is to be determined. Their order within the Schmitt box suggests the former despite the handwritten *S. lanigera* label. At least one of these (1039) was collected from elm, the host of *E. lanuginosa*, and the gall pinned nearest to this specimen resembles an *E. lanuginosa* gall. If they instead correspond to Hartig's *S. lanigera* series, the host record does not agree since this species has not been recorded from elm in Europe and Hartig (1841) only listed apple as its host.

Lachnus costatus Hartig, 1839

Lachnus costatus Hartig, 1839: 645. **SYNTYPES**: 6 (field no. missing [5.09, 5.11, 5.12]; 1245 [5.10]; 482 [5.13]), *Picea abies*.
Schizoneura costata (Hartig, 1839) (change of combination—Hartig, 1841: 367).
Cinara costata (Zetterstedt, 1828) (senior secondary homonym and synonym—Börner, 1952: 45, "*Lachnus costata* (Zett. 1828) Wahlgr, 1939"). **Valid**

Specimens. Six on five pins following the *Schizoneura costata* (Hartig, 1839) label, all in poor condition. All but one (1245) are apterae. Four are mounted on three points; one of these with a needle from its host plant also on the pin. Specimen 1245 collected from "Abiet" by Wilhelm Saxesen in 1839 and pinned. Specimen 482 collected alive from pine needles in Tiergarten, Berlin on June 7, 1833 and then pinned with host tissue.

Remarks. Hartig (1841) identified *Picea abies* as the host, but an unlabelled *in situ* specimen in this series appears to be from a different host species. Hartig placed this species within the genus *Lachnus* in Hartig (1839) and then transferred it to the genus *Schizoneura* (Hartig 1841) on the basis of the shape of the wing and radial cell. Confirmation of the current synonymy with *Cinara costata* (Zetterstedt, 1828), recognized first by Börner (1952), is needed.

Schizoneura corni Hartig, 1841

Schizoneura corni Hartig, 1841: 367. **SYNTYPES**: 7 (field no. missing [5.14, 5.17-5.20]; 865 [5.15]; 1038 [5.16]), *Cornus sanguinea*.
Anoecia corni (Fabricius, 1775) (senior secondary homonym and synonym—Börner, 1952: 179). **Valid**

Specimens. Seven alates on separate pins. Specimen 865 collected near "Hammer Garten" on June 18, 1836. Specimen 1038 collected from *Cornus sanguinea* in Buchhorst, Germany in mid-September, 1839.

Remarks. Hartig (1841) was uncertain about the separation of his species from *Anoecia corni* (Fabricius, 1775). As there are several species of *Anoecia* Koch, 1857 recorded from dogwood in Europe, the synonymy with *A. corni* cannot be reliably confirmed at the present time. Specimen 865 is likely misplaced in the collection as it appears to belong to the tribe Pemphigini rather than Anoeciinae. It lacks the protuberant secondary rhinaria and dark pterostigma characteristic of *A. corni*, and the hindwing veins arise from a single point.

Aphis pineti Hartig G.L. & Hartig, T., 1834

Aphis pineti Hartig, G.L. & Hartig, T., 1834: 29. **SYNTYPES**: 4 (field no. missing [6.04-6.07]).
Lachnus pineti (Hartig G.L. & Hartig, T., 1834) (change of combination—Hartig 1839: 645, "*Lachnus pineti n.*").
Cinara (*Schizolachnus*) *pineti* (Fabricius, 1781) (senior primary homonym and synonym—Hartig, 1841: 368, "*L. pineti* Fabr.").
Cinara pini (Linnaeus, 1758) (senior synonym—Eastop & Hille Ris Lambers, 1976: 238). **Valid**

Specimens. Four pinned apterae lacking specimen identifiers.

Remarks. Hartig used the name *Lachnus pineti* in both Hartig (1839) and Hartig (1841), and in each included a reference to an earlier work, in which this species was given the name *Aphis pineti* Hartig & Hartig, 1834 and described only as having hairy tarsi. In Hartig (1839), he transferred the species to the genus *Lachnus* and used the notation "*n.* [*nobis*]" acknowledging the authority of both himself and his father. At this time, Hartig recognized the species as synonymous with *Lachnus fasciatus* Burmeister, 1835 [= *Lachnus roboris* (Linnaeus, 1758)]. Later in Hartig (1841), he recognized these as *Lachnus pineti* [= *Cinara pineti*] (Fabricius, 1781), and in his collection the specimens are labelled as "*Pineti* Fabr.". Interestingly, neither the earlier name *A. pineti* Hartig & Hartig or the homonymy with Fabricius' name appear to have been acknowledged in more recent aphid taxonomic work. Börner (1952) did not treat Hartig's name, but transferred *Aphis pineti* [= *Cinara pineti*] Fabricius, 1781 to the genus *Schizolachnus* Mordwilko, 1909. Eastop & Hille Ris Lambers (1976) recognized the synonymy of *Lachnus pineti* Hartig, 1839 with *Cinara pini* (Linnaeus, 1758). However, Hartig (1841) clearly distinguished between *Lachnus pini* [= *Cinara pini*] (Linnaeus, 1758) and *L. pineti* on the basis of setal characteristics of the tarsi, describing the latter as the rough-footed pine aphid in contrast to the former's smooth feet. Thus, on the basis of Hartig's work, the synonymy of *A. pineti* Hartig & Hartig with *C. pini* (Eastop & Hille Ris Lambers 1976) is likely to be incorrect.

With respect to the synonymy of *A. pineti* Hartig & Hartig and *L. fasciatus* in Hartig (1839), the latter is currently recognized as a junior synonym of *L. roboris* despite different host associations for these taxa. *Lachnus fasciatus* like *A. pineti* was described from *Pinus sylvestris* (Hartig, 1841) whereas *L. roboris* occurs on *Quercus* and *Castanea* (Blackman & Eastop 2023). Interestingly, the synonymy of *L. fasciatus* with that of *L. roboris* was recognized by Burmeister (1839) himself on the basis of comparisons with illustrations of the latter in Curtis (1835). Burmeister (1835) described the wings of *L. fasciatus* as hyaline with a transverse band in the middle and tips broadly brown with a hyaline marginal point in agreement with the wing colour of *L. roboris*. In contrast, Kaltenbach (1843), while acknowledging its prior synonymy with *L. roboris,* continued to treat *L. fasciatus* as a distinct species, and noted morphological differences between the two species. He also treated *A. pineti* Fabricius as distinct, but unfortunately did not acknowledge Hartig's (1841) synonymy of *A. pineti* Hartig & Hartig with this species. Later, Walker (1848) recognized *L. fasciatus* as a synonym of *C. costata* describing its wings as colourless, clouded with brown, and longer than its body. He also described *L. roboris* as having wings that are short and narrow, and dark brown in colour with three colourless bands (Walker 1848). These later treatments seems to suggest knowledge of differences in wing colour and morphology between *L. fasciatus* and *L. roboris* around the time of Hartig's descriptions. Hartig's *L. pineti* specimens, however, are distinct from his *C. costata* and *L. roboris* specimens, and might signal his justification for the synonymy of *A. pineti* Hartig & Hartig with *A. pineti* Fabricius. Still, without seeing Burmeister's type specimens for *L. fasciatus* it is difficult to determine whether the conflict here stems from Hartig's (1839) synonymy of *A. pineti* Hartig & Hartig with *L. fasciatus* or Burmeister's (1839) synonymy of the latter with *L. roboris*. The discrepant host-association between *L. fasciatus* and *L. roboris* does seem to suggest that this synonymy may be incorrect.

One plausible explanation could be that the synonymy of *L. fasciatus* and *L. roboris* in Burmeister (1839) was based on contradictory information in Curtis' description of *L. roboris* which was accompanied by a description and illustrations clearly depicting the genus *Cinara* Curtis, 1835 (see Hottes, 1930b for discussion). However, Hartig also appears to have confused the identity of several of these species. For instance, his collection contains specimens labelled *L. pineti* (Fabricius) and *L. roboris* (Linnaeus), but neither of these is consistent with current usage. Hartig's *L. pineti* specimens are too large for this species, and his *L. roboris* specimens lack this species' distinctive forewing pigmentation. Instead, the forewings are dusky, brown throughout with dark pterostigma, as described in Hartig (1841). The identity of Hartig's *A. pineti* specimens will need to be determined to confirm its synonymy with *C. pini* as is currently accepted or with *A. pineti* Fabricius as proposed by Hartig (1841). If neither synonymy is supported and there are no other available and potentially valid synonyms, a replacement name may be necessary to remove it from homonymy with *A. pineti* Fabricius (Article 60.2).

Aphis pilicornis Hartig, 1841

Aphis pilicornis Hartig, 1841: 369. **HOLOTYPE**: (617 [7.02]), *Picea*.
Cinaropsis pilicornis (Hartig, 1841) (change of combination—Börner, 1952: 43).
Cinara pilicornis (Hartig, 1841) (change of combination—Hottes, 1953: 158). **Valid**

Specimens. A single pinned alate (617) collected from spruce on June 24, 1833 in Tiergarten, Berlin, Germany.

Remarks. Although its generic assignment has yet to be determined, specimen 617 does not belong to the genus *Cinara* as determined by the curved radial veins on its forewings and the process terminalis being greater in length than the base of antennal segment six. The specimen may instead represent a species of *Periphyllus* van der Hoeven, 1863 recorded from an accidental host. Given the discrepancy between the specimen's identity and the name *Cinara pilicornis* Hartig, 1841, and that the name is well established in the literature, this case will be referred to the ICZN with the recommendation that it use its plenary power to set aside the existing name-bearing type in accordance with Article 75.6 so that the prevailing use of the name may be maintained and that a neotype be designated.

Aphis viminalis Hartig, 1841

Aphis viminalis Hartig, 1841: 369. **HOLOTYPE** : (327 [7.03]), *Salix.*

Aphis viminalis Boyer de Fonscolombe, 1841 (senior primary homonym—Hottes, 1930a: 184).
Pterocomma salicis salicis (Linnaeus, 1758) (senior synonym—Börner, 1952: 67, "*P.* (*C.*) *salicis*). **Valid**

Specimens. A single pinned alate (327) collected from willow in Kirchhof, Germany, on June 10, 1837.

Remarks. The specimen appears to lack the large, swollen and brightly coloured siphunculi characteristic of this species. Interestingly, Hartig (1841) also did not mention this distinctive character in his description. The current synonymy with *Pterocomma salicis* (Linnaeus, 1758) was proposed by Börner (1952) without justification. Thus, given that he was unlikely to have seen Hartig's type material the synonymy may be incorrect. The name *Aphis viminalis* Hartig, 1841 is also in conflict with *Aphis viminalis* Boyer de Fonscolombe, 1841 [= *Tuberolachnus salignus* (Gmelin, 1789)] . Since the date of publication of Hartig (1841) cannot be reliably placed it is considered to be published on December 31, 1841 (Article 21.3.2). Boyer de Fonscolombe's name, however, was published on March 17, 1841, and therefore has priority. A replacement name may be necessary for *A. viminalis* Hartig if its synonymy with *P. salicis* is not supported since there are no other available synonyms.

Aphis vitellinae Hartig, 1841

Aphis vitellinae Hartig, 1841: 369. **SYNTYPES**: 3 (1706 [7.04]; 1708 [7.06] lost; 1752 [7.05] lost), *Salix viminalis.*
Aphis vitellinae Schrank, 1801 (senior primary homonym— Hottes, 1930a: 184).
Tuberolachnus salignus (Gmelin, 1789) (senior synonym—Börner, 1952: 45). **Valid**

Specimens. A single pointed alate (1706) collected in 1836. Two other pointed specimens (1708 and 1752) lost. Hartig's notes for 1706 and 1708 indicate the specimens were collected with sawfly galls between September 10 and October 1, 1836. Specimen 1752 was collected with galls on *Salix viminalis* between October 15 and November 1, 1836.

Remarks. The specimen is not in agreement with the current use of the name *T. salignus*. It is black and hairless with red legs and black tarsi, as Hartig (1841) described. Börner (1952) recognized the synonymy but again likely without having seen Hartig's specimens or providing a justification so the synonymy is probably incorrect. As discussed by Hottes (1930a), *Aphis vitellinae* [= *Chaitophorus vitellinae*] Schrank, 1801 has priority over *Aphis vitellinae* Hartig 1841 so the latter may require a replacement name if its synonymy with *T. salignus* is not supported and there are no other available synonyms.

Aphis rufipes Hartig, 1841

Aphis rufipes Hartig, 1841: 369. **HOLOTYPE**: (1435 [7.07]), *Salix.*
Pterocomma rufipes (Hartig, 1841) (change of combination—Börner, 1952: 66). **Valid**

Specimens. A single pinned alate (1435) collected from young shoots of willow on August 7, 1836.

Aphis pallipes Hartig, 1841

Aphis pallipes Hartig, 1841: 369. **HOLOTYPE**: (519 [7.08]), *Fagus sylvatica.*
Schizodryobius pallipes (Hartig, 1841) (change of combination—Börner, 1952: 46).
Lachnus pallipes (Hartig, 1841) (change of combination—Szelegiewicz, 1962: 73). **Valid**

Specimens. A single pinned alate (519) collected in Tiergarten, Berlin, Germany, on May 24, 1836.

Remarks. Hartig (1841) indicated that this species is from *Fagus sylvatica* ("Rothbucke"), but the host is recorded only as "*Fagus*" in Hartig's notes. While the specimen is consistent with Hartig's (1841) description, it does not agree with the current use of the name *Lachnus pallipes* (Hartig, 1841). As was the case for Hartig's *A. pilicornis* holotype, the specimen may instead be a *Periphyllus* species from an accidental host. Szelegiewicz (1962) appears to be the first authority to treat this species within the genus *Lachnus* though apparently without justification. Previously it had been treated in the genus *Schizodryobius* van der Goot, 1913 by Börner (1952) which is now recognized

as a synonym of *Lachnus* (Eastop & Hille Ris Lambers 1976). Since the name *L. pallipes* is well established in the literature with recent re-descriptions of the sexual morphs and a neotype designation (Mróz et al. 2015), the case will be referred to the ICZN once the identity of the holotype is determined with the recommendation that it uses its plenary power to set aside the existing name-bearing type in accordance with Article 75.6.

Aphis amerinae Hartig, 1841

Aphis amerinae Hartig, 1841: 369. **SYNTYPES**: 2 (1720 [7.09] lost), *Salix.*
Plocamaphis amerinae (Hartig, 1841) (change of combination—Börner, 1952: 67). **Valid**

Specimens. Presumed to have been two pointed specimens on a single pin (1720), as evident from vacant points, collected from willow on September 15, 1836.

Aphis calliptera Hartig, 1841

Aphis callipterus Hartig, 1841: 369. **SYNTYPES**: 3 (1100 [7.10]), *Betula*.
Calaphis callipterus (Hartig, 1841) (change of combination—Börner, 1952: 58).
Procalaphis callipterus (Hartig, 1841) (change of combination—Quednau, 1954: 23).
Callipterinella calliptera (Hartig, 1841) (change of combination—Higuchi, 1972: 56). **Valid**

Specimens. Three pointed alates on a single pin (1100) collected from birch leaves on July 6, 1836.

Remarks. The entry from Hartig's journal identifies these specimens as "*Aphis genistae"* (Table 2).

Aphis villosus Hartig, 1841

Aphis villosus Hartig, 1841: 369. **SYNTYPES**: 9 (298 [7.11]; 300 [7.12]; field no. missing [7.13, 7.14]; 359 [7.15]), *Acer.*
Periphyllus villosus (Hartig, 1841) (change of combination—Börner, 1952: 51).
Periphyllus testudinaceus (Fernie, 1852) (junior synonym—Eastop & Hille Ris Lambers, 1976: 349, "?"). **Valid**

Specimens. Nine alates on five pins. Two specimens (298) on one pin collected on May 8, 1836, and another on a separate pin (300). Specimens on 298 collected from maple in Tiergarten, Berlin, Germany. Specimen 300 collected from *Sorbus.* Date and location not given but assumed to be the same as for specimen 298. Two specimens on each of two unlabelled pins with unknown collection information. Two specimens on a single pin (359) collected from maple on May 15, 1836 in Tiergarten.

Remarks. Confirmation of the synonymy with *Periphyllus testudinaceus* (Fernie, 1852) is needed as Eastop & Hille Ris Lambers (1976) expressed uncertainty in this treatment.

Aphis platanoidis Hartig, 1841

Aphis platanoidis Hartig, 1841: 369. **SYNTYPES**: 4 (299 [7.16]; 420 [7.17]), *Acer.*
Drepanosiphum platanoidis (Schrank, 1801) (senior primary homonym and synonym—Börner, 1952: 312, "*platanoidis Aphis* Schrk. 1801 p.112 (= Htg.)"). **Valid**

Specimens. Four alatae on two pins. Two specimens (299) collected from maple on May 8, 1836 in Tiergarten. Two specimens (420) collected on May 17, 1836 from Jungfernheide, Berlin, Germany.

Remarks. Confirmation of the synonymy is needed as there are several *Drepanosiphum* Koch, 1855 species known from Germany.

Aphis annulatus Hartig, 1841

Aphis annulatus Hartig, 1841: 369. **SYNTYPES**: 6 (1222 [7.18], 2 lost), *Quercus.*
Callipterus annulatus (Hartig, 1841) (change of combination—Walker, 1858: 295).
Callipterinella annulata (Hartig, 1841) (change of combination—Baker, 1917: 427).
Myzocallis annulata (Hartig, 1841) (change of combination—Theobald, 1927: 348).
Tuberculoides annulatus (Hartig, 1841) (change of combination—Börner, 1952: 61).
Tuberculatus (*Tuberculoides*) *annulatus* (Hartig, 1841) (change of combination—Eastop & Hille Ris Lambers, 1976: 441). **Valid**

Specimens. Six pointed on a single pin (1222). All present (four) are alates, collected in 1839 from oak ("Spitz-Eichen").

Remarks. Hartig's journal entry indicates that the aphids were green and solitary, and collected together with "*Phylloxera quercus*".

Aphis pyri Hartig, 1841

Aphis pyri Hartig, 1841: 369. **SYNTYPES**: 6 (field no. missing [7.19], 1 lost).
Dysaphis pyri (Boyer de Fonscolombe, 1841) (senior primary homonym—Hottes, 1930a: 182; Eastop, 1974: 164; Melville, 1981: 239).
Sappaphis mali (Ferrari, 1872) (junior synonym—Börner, 1952: 98).
Dysaphis (*Pomaphis*) *plantaginea* (Passerini, 1860) (junior synonym—Doncaster, 1973: 61). **Valid**

Specimens. Six pointed on a single pin. All present (five) are alates.

Remarks. Hottes (1930a) identified the priority of *Aphis pyri* Kittel, 1827 over *Aphis pyri* Hartig , *Aphis pyri* Boyer de Fonscolombe, 1841 and *Aphis pyri* Koch, 1854, but maintained Hartig's name because the species to which it applied could not be verified on account of the lack of type specimens. Eastop (1974) petitioned the ICZN to have both *A. pyri* Kittel and the name *Aphis pyri* Vallot, 1802 supressed in favor of Boyer de Fonscolombe's name, and the decision to conserve the latter was published by Melville (1981). In regard to the conflict of the latter with Hartig's name, as with other conflicts between Hartig and Boyer de Fonscolombe's names mentioned earlier, *A. pyri* Boyer de Fonscolombe has priority over *A. pyri* Hartig. Since both species are presently treated as congeneric, the next oldest available synonym for *A. pyri* Hartig is *Myzus plantagineus* [= *Dysaphis plantaginea*] Passerini, 1860. Upon determination of Hartig's holotype, if the synonymy with the latter species is not supported, a replacement name may be necessary to remove it from homonymy with *A. pyri* Boyer de Fonscolombe since no other synonyms are available.

Favret (2023) lists the name *Lachnus pyri* (Hartig, 1841) from Rudow (1875) in the nomenclatural history for *Aphis pyri* Hartig. However, Rudow (1875) made reference to this name in association with the wrong host species, *Prunus padus*. We believe Rudow's (1875) use of the name *Lachnus pyri* was in error and that the intended species was actually *Lachnus padi* (Hartig, 1841) (see below).

Aphis spinarum Hartig, 1841

Aphis spinarum Hartig, 1841: 370. **SYNTYPES**: 14 (150 [8.04] lost; 1226 [8.05], 3 lost), *Prunus spinosa.*
Hyalopterus pruni (Geoffroy, 1762) (senior synonym—Börner, 1952: 68). **Valid**

Specimens. Six pointed on a single pin (150) with leaf tissue collected from *Prunus spinosa* in 1840. All specimens lost. Note that the leaf tissue appears to be coated in white powdery mildew, as described in Hartig (1841). An additional eight pointed specimens on a single pin collected in 1839 (1226). Three specimens are lost, and the rest are nymphs.

Remarks. Börner (1952) treated *Aphis spinarum* Hartig, 1841 as a synonym of *Hyalopterus pruni* (Geoffroy, 1762), and Favret *et al.* (2017) reaffirmed this on the basis of host-association. Unfortunately, all specimens that were clearly associated with *Prunus spinosa,* as determined by Hartig's notes, have been lost with the exception of pinned host tissue (150) that appears to contain traces of a waxy residue and possibly aphid exuviae. The only remaining type specimens (1226) associated with the *A. spinarum* label are clearly not *H. pruni*, and while they appear to belong to the Macrosiphini, their exact identity is yet to be determined. Hartig wrote that they were observed feeding together around the peduncles of their host plant, but the host itself was not identified.

Aphis cytisorum Hartig, 1841

Aphis cytisorum Hartig, 1841: 370. **SYNTYPES**: 6 (149 [8.10], 2 lost), *Laburnum anagyroides*. **Valid**

Specimens. Six pointed on a single pin; two are lost. Hartig's journal entry indicates that the specimens were collected from *Laburnum anagyroides* [= *Cytisus laburnum*] at the end of July, 1840.

Other specimens of significance

Chermes sylvestris Hartig, 1851 *nomen nudum*

Chermes sylvestris Hartig, 1851: 67. **SYNTYPES**: 9 (208 [2.10]; no field numbers [3.13-3.15]), *Pinus*.

Specimens. Following the "*Coccus sylvestris m.*" label, an unknown number of specimens covered in wax mounted *in situ* on a card-mounted pine twig, an unknown number of specimens covered in wax mounted *in situ* on a card-mounted group of eight pine needle bundles, an unknown number of specimens covered in wax mounted *in situ* on a rectangular card at the bases of four pine needle bundles, an unknown number of immatures mounted on a rectangular card, and one pointed individual (208) collected on the May 12, 1833 from pine branches. Hartig's notes indicate that it was a female laying eggs and associated with wax. He identified it as "*Chermes* (*abietis*?)" and has included a reference to a figure "19a" from an as yet unknown publication.

Also, beginning with the pin at the left of "*Chermes sylvestris m.*" label, an unknown number of specimens covered in wax mounted *in situ* on pine needles on 4 pins, with eight, four, eight, and two pine needles, respectively. We include the pin at the left of the label in this series since it is consistent with other specimens pinned in this series, whereas it is not consistent with Hartig's *Chermes abietis* [= *Adelges abietis*] Linnaeus, 1758 series in which it is placed. The "*Chermes sylvestris m.*" label reads "M[Mitte].7.1842 Forstg." Possibly identifying the date of collection as mid-July, 1842 and the location as Forstgarten, Braunschweig, Germany. No number labels are present to allow referral to Hartig's notes for details on their collection.

Remarks. In Hartig (1851), "*Chermes sylvestris m.*" is listed with several other scale insect and aphid species as sucking insects that are injurious to pine, but is the only species identified as having been recently observed. No taxonomic description or definition is provided, other than to say that it frequently occurred on three year old seedlings in Forstgarten, Braunschweig, Germany. Both Hartig (1839) and (1841) are indicated as sources for this list of species (Hartig 1851, pg. 69). However, neither of these publications refer to "*Chermes sylvestris m.*" directly. Hartig (1839) did suggest that *C. strobus* and another related species on young pine trees may be distinct from the genus *Coccus.* For the latter, he provided the tentative name "*C. pini*?" and a brief description of the shape of its body and tibia relative to *C. strobus*. It is unclear whether the reference to Hartig (1839) in Hartig (1851) should be viewed as a proper indication, as the citation itself was attributed to his list of sucking insects and not specifically to the name *C. sylvestris*. Nor can it be determined whether "*C. pini*?" was among the taxa being referred to in Hartig (1839). Nevertheless, we believe that both his "*C. pini*?" and *C. sylvestris* are probably the same species now treated under the name *Pineus pini* (Goeze, 1778) (see the discussion below). Thus, since no description, definition, or indication, is provided for *C. sylvestris*, the name is unavailable and should be treated as a *nomen nudum* (Article 12.1). We are not aware of any mention of the name "*Coccus sylvestris*" in Hartig's publications.

We suspect that the specimens labelled "*Coccus sylvestris m.*" and "*Chermes sylvestris m.*" in Hartig's collection are likely different forms of *P. pini* or *Pineus orientalis* (Dreyfus, 1888). *Pineus pini* and *P. orientalis* belong to a species complex with generations on *Pinus* that cannot be distinguished morphologically, the difference being that *P. pini* is anholocyclic on pine (most commonly on *Pinus sylvestris* in Europe) and *P. orientalis* is holocyclic, alternating between pine and spruce (Blackman & Eastop 2023). The *in situ* specimens in both locations in the box are settled on what is very likely *Pinus sylvestris,* the common 2-needle pine in central Europe. Therefore, it is likely that the specimens labelled "*Coccus sylvestris m*." are the wingless exules that settle on the bark and base of needle bundles, and the specimens labelled "*Chermes sylvestris m.*" are the winged form that can originate from pine or spruce that settle on the needles. Host alternation between pine and spruce in this species complex was not confirmed until later (Marchal 1913), and would not have been known to Hartig. Annand (1928) described a species *Pineus sylvestris* Annand, 1928 apparently without knowledge of Hartig's previous mention of this species name.

Tetraneura rugicornis Hartig, 1841 *nomen nudum*

Tetraneura rugicornis Hartig, 1841: 366 (*nomen nudum*—Remaudière & Remaudière, 1997: 236). **HOLOTYPE**: (874 [4.06]).

Specimen. A single, very badly damaged, alate that is pinned through the thorax. The specimen was collected on June 21, 1836 from Forstgarten, Braunschweig, Germany.

Remarks. The hind wing venation of this specimen does not agree with the genus *Tetraneura* Hartig, 1841 which should have a single transverse vein.

Lachnus padi Hartig, 1841 *nomen dubium*

Lachnus padi Hartig, 1841: 368 (*nomen dubium*—Eastop & Hille Ris Lambers, 1972: 237). **HOLOTYPE**: (361 [6.11]), *Prunus padus*.
Lachnus pyri (Hartig, 1841) (misspelling—Rudow, 1875: 77, "*P. padus*" identified as host).
Pterochloroides persicae (Cholodkovsky, 1898) (misapplied junior synonym—Börner, 1952: 47, "Syn. ?").

Specimen. A single pinned alate collected on May 15, 1836 from *Prunus padus* in Tiergarten, Berlin, Germany.

Remarks. The specimen does not belong to the genus *Lachnus*. Its antennae are longer than its body, its secondary rhinaria are transverse, it lacks pigmented wings and it appears to have a waxy secretion on its legs and antennae. It is our opinion instead that the specimen belongs to the genus *Euceraphis* (Walker, 1870). Confirmation of its identity is needed, but it is clear that its synonymy with *Pterchloroides persicae* (Cholodkovsky, 1898) as proposed by Börner (1952) is incorrect.

Aphis persicariae Hartig, 1841 *nomen dubium*

Aphis persicariae Hartig, 1841: 370 (*nomen dubium*—Favret *et al.,* 2017: 568, as "*Hyalopterus persicariae*"). **SYNTYPES**: 7 (no field numbers [8.01-8.03]).
Hyalopterus amygdali (Blanchard, 1840) (senior synonym—Börner, 1952: 68).

Specimens. Seven pointed specimens on three pins along with leaf tissue, all lacking specimen labels. Three specimens, one alate and two apterae, mounted to the surface of a single point on a pin. Two specimens, one alate and one aptera, mounted to the surface of a single point on a pin. Two alatae mounted to the surface of a single point on a pin. Leaf tissue on each of the three pins contain white aphid skin casts.

Remarks. Börner (1952) treated *Aphis persicariae* Hartig, 1841 as a junior synonym of *Hyalopterus amygdali* (Blanchard, 1840), but it has been recognized as a *nomen dubium* since Favret *et al.* (2017) completed a synonymic revision of the genus *Hyalopterus* Koch, 1854. Further study is necessary to clarify to which *Hyalopterus* species the name corresponds.

Conclusion

The primary type specimens for 24 aphid, 3 adelgid and 2 armored scale insect species described by Theodor Hartig have been rediscovered at the ZSM. Seven of these are represented by a single specimen that is now recognized as the holotype. All others represented by series of specimens are to remain as syntypes until further scrutiny can verify their identities. The types for *L. padi* and *A. persicariae*, names currently recognized as *nomina dubia*, are among the specimens present in the collection, as are the syntypes for *C. sylvestris* and *T. rugicornis*, which are both *nomina nuda*. Unfortunately, the type specimens for a single species, *Aphis amerinae* Hartig, 1841 are entirely lost, along with partial series for at least eight other species as evidenced by vacant points or pins, or the absence of a specimen of a particular sex referenced in Hartig's descriptions (e.g., *Aspidiotus pini*).

While the primary focus of this work was to document the contents of Hartig's collection and bring knowledge of its existence to the attention of the taxonomic community, we recognize that a necessary next step will be to

TABLE 3. Theodor Hartig's aphid and scale insect specimens.

Pos.[a]	Taxon	Verbatim Label	No.[b]	Status	Field No.	Year[c]	Remarks
1.01	*Coccina*	Coccina $_{\text{Scharlachläuse}}$	na				
1.02	*Phthirius*	*Phtirius*	1				
1.03	*Phthirius*		1				
1.04	*Phthirius*		1				
1.05	*Phthirius*	*inquinalis*	1				
1.06	*Aspidiotus*	*Aspidiotus*	na				
1.07	*Aspidiotus pini*	*Pini* $_{\text{m.}}$	1	syntype	893	1836	*Dynaspidiotus abietis*?
1.08	*Aspidiotus pini*		3	syntype	894	1836	*Dynaspidiotus abietis*?
1.09	*Aspidiotus flavus*	*flavus* $_{\text{m.}}$	1	syntype	895	1836	Male; *Dynaspidiotus abietis*?
1.10	*Aspidiotus flavus*		4	syntype	379	1836	*Dynaspidiotus abieitis*?
1.11	*Aspidiotus flavus*		1	syntype			in situ
1.12	*Aspidiotus flavus*		1	syntype			in situ
1.15	*Lecanium*	*Lecanium*	1		1456	1836	
1.16	Coccoidea		3				
1.17	Coccoidea		1		476	1833	in situ
1.18	Coccoidea		1				in situ
1.19	Lepidoptera		1		718	1836	pupae
1.20	undetermined		1		1128	1836	
1.21	Aleyrodoidea		1		1719	1836	pupae
1.22	Aleyrodoidea		2				pupae; *in situ*
1.23	Coccoidea		1		572	1835	
2.01	Aphidoidea	Forstgarten Wurzel von Weißtanne	1				alatae; on roots of silver fir
2.02	undetermined		4				1 missing
2.03	*Coccus*	*Coccus.*	na				
2.04	*Coccus strobus*	*Strobus* $_{\text{m.}}$	2	syntypes			
2.05	*Coccus strobus*		1	syntype	87	1834	*in situ;* discrepant host
2.06	*Coccus sylvestris*	*Sylvestris* $_{\text{m.}}$	?	syntypes			*in situ; Pineus pini/orientalis*(?)

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TABLE 3. (Continued)

Pos.[a]	Taxon	Verbatim Label	No.[b]	Status	Field No.	Year[c]	Remarks
2.07	*Coccus sylvestris*		?	syntypes			*in situ; Pineus pini/orientalis*(?)
2.08	*Coccus sylvestris*		?	syntypes			*in situ; Pineus pini/orientalis*(?)
2.09	*Coccus sylvestris*		?	syntypes			nymphs*; Pineus pini/orientalis*(?)
2.10	*Coccus sylvestris*		1	syntypes	208	1833	*Pineus pini/orientalis*(?)
2.11	*Dorthesia*	*Dorthesia*	na				
2.12	*Dorthesia urticae*	*Urticae*	1				
2.13	*Dorthesia urticae*		1				
2.14	*Dorthesia urticae*		1		955	1833	
2.15	*Monophlebus*	*Monophlebus*	na				
2.16	*Monophlebus fuscipennis*	*fuscipennis*	1				alatae
2.17	*Monophlebus fuscipennis*		1				alatae
2.18	*Monophlebus fuscipennis*		1				alatae
2.19	*Monophlebus fuscipennis*		1		619	1833	alatae
2.20	*Monophlebus fuscipennis*		1				
2.21	*Monophlebus fuscipennis*		1				
2.22	Hyponomeutes	*Hyponomeutes* m.	na				
2.23	*Rhizobius*	*Rhizobius*	na				
2.24	*Rhizobius pini*	*Pini:*	?				
3.01	*Rhizoterus*	*Rhizoterus* m.	na				
3.02	*Rhizoterus vacca*	*vacca* m.	1	holotype	1244	1839	apterae and damaged ant(?); discrepant morphology
3.03	Aphidina	Aphidina Blattläuse	na				
3.04	*Phylloxera*	*Phylloxera* Boyer D. F.	na				
3.05	*Phylloxera quercus*	*Quercus* B. D. F.	8		1224	1839	alatae, 1 missing
3.06	*Phylloxera quercus*		5		1223	1839	alatae
3.07	*Phylloxera quercus*		1				host tissue
3.08	*Chermes*	*Chermes*	na				
3.09	*Chermes abietis*	*Abietis*	1		479	1833	alatae and host tissue

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TABLE 3. (Continued)

Pos.[a]	Taxon	Verbatim Label	No.[b]	Status	Field No.	Year[c]	Remarks
3.10	*Chermes abietis*		1		647	1833	in situ
3.11	*Chermes abietis*		1				in situ
3.12	*Chermes sylvestris*		8	syntypes			*in situ; Pineus pini/orientalis*(?)
3.13	*Chermes sylvestris*	*sylvestris* $_{m.}$ M[itte].7.1842 Fortsg.	4	syntypes			*in situ; Pineus pini/orientalis*(?)
3.14	*Chermes sylvestris*		16	syntypes			*in situ; Pineus pini/orientalis*(?)
3.15	*Chermes sylvestris*		1	syntypes			*in situ; Pineus pini/orientalis*(?)
3.16	*Chermes laricis*	*Laricis* $_{n.}$	7	syntypes			alatae, some missing; in situ
3.17	*Chermes laricis*		3	syntypes			in situ
4.01	*Tetraneura*	*Tetraneura* $_{n.}$	na				
4.02	*Tetraneura ulmi*	*Ulmi*	2				alatae, 1 missing
4.03	*Tetraneura ulmi*		1				gall
4.04	*Tetraneura ulmi*		1				gall
4.05	*Tetraneura ulmi*		3				apterae; *in situ*
4.06	*Tetraneura rugicornis*	*rugicornis* $_{n.}$	1	holotype	874	1836	alatae; discrepant morphology
4.07	*Pemphigus*	*Pemphigus* $_{n.}$	na				
4.08	*Pemphigus fraxini*	*Fraxini* $_{m.}$	1	syntype	408	1837	alatae
4.09	*Pemphigus fraxini*		1	syntype			alatae
4.10	*Pemphigus fraxini*		1	syntype			alatae
4.11	*Pemphigus fraxini*		1	syntype			alatae
4.12	*Pemphigus fraxini*		1	syntype			alatae
4.13	*Pemphigus fraxini*		1	syntype			alatae
4.14	*Pemphigus fraxini*		1	syntype			alatae
4.15	*Pemphigus bursarius*	*bursarius*	1		1138	1836	alatae
4.16	*Pemphigus bursarius*		1		1139	1836	alatae
4.17	*Pemphigus bursarius*		1		402	1836	alatae
4.18	*Pemphigus bursarius*		2		1057	1833	apterae, 1 missing
4.19	*Pemphigus bursarius*		1				host tissue

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TABLE 3. (Continued)

Pos.[a]	Taxon	Verbatim Label	No.[b]	Status	Field No.	Year[c]	Remarks
4.20	*Pemphigus populi*	Populi $_{n.}$	4		604	1838	alatae, apterae, and gall; on the basis of gall shape and host species, this may be *P. spyrothecae* Passerini, 1860
4.21	*Pemphigus lonicerae*	*Lonicerae* $_{m.}$	5	syntypes	157	1840	aphids (missing) and host tissue; discrepant morphology
4.22	*Pemphigus lonicerae*		1	syntype	154	1840	apterae
4.23	*Pemphigus lonicerae*		1	syntype	152	1840	missing
4.24	*Pemphigus lonicerae*		1	syntype	155	1840	apterae
4.25	*Pemphigus lonicerae*		1	syntype	153	1840	alatae
4.26	*Pemphigus pedunculi*	*pedunculi* $_{m.}$	1	syntype	1757	1836	alatae
4.27	*Pemphigus pedunculi*		1	syntype			apterae
4.28	*Pemphigus pedunculi*		1	syntype			apterae
5.01	*Schizoneura*	*Schizoneura* $_{n.}$	na				
5.02	*Schizoneura lanuginosa*	*lanuginosa* $_{n.}$	1	syntype	1741	1836	alatae; discrepant morphology
5.03	*Schizoneura lanuginosa*		1	syntype	1532	1836	alatae
5.04	*Schizoneura lanigera*	Blutlaus *Schizoneura lanigera*	4				alatae
5.05	*Schizoneura lanuginosa*		1		1039	1833	alatae
5.06	*Schizoneura lanuginosa*		1				alatae
5.07	*Schizoneura lanuginosa*		1				gall
5.08	*Schizoneura lanigera*	*lanigera* $_{Banks.}$	7		1228	1839	missing
5.09	*Schizoneura costatus*	*costatus*	1	syntype			apterae and host tissue
5.10	*Schizoneura costatus*		1	syntype	1245	1839	alatae
5.11	*Schizoneura costatus*		1	syntype			alatae
5.12	*Schizoneura costatus*		1	syntype			alatae
5.13	*Schizoneura costatus*		1	syntype	482	1833	alatae and host tissue
5.14	*Schizoneura corni*	*Corni* $_{m.}$	1	syntype			alatae
5.15	*Schizoneura corni*		1	syntype	865	1836	alatae; discrepant morphology

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TABLE 3. (Continued)

Pos.[a]	Taxon	Verbatim Label	No.[b]	Status	Field No.	Year[c]	Remarks
5.16	*Schizoneura corni*		1	syntype	1038	1839	alatae
5.17	*Schizoneura corni*		1	syntype			alatae
5.18	*Schizoneura corni*		1	syntype			alatae
5.19	*Schizoneura corni*		1	syntype			alatae
5.20	*Schizoneura corni*		1	syntype			alatae
6.01	*Lachnus*	*Lachnus*	na				
6.02	*Lachnus pini*	*Pini*	1		925	1833	alatae; discrepant morphology
6.03	*Lachnus pini*		>7		494	1833	alatae and apterae; discrepant morphology
6.04	*Lachnus pineti*	*Pineti* Fabr	1	syntype			apterae; discrepant morphology
6.05	*Lachnus pineti*		1	syntype			apterae; discrepant morphology
6.06	*Lachnus pineti*		1	syntype			apterae; discrepant morphology
6.07	*Lachnus pineti*		1	syntype			apterae; discrepant morphology
6.08	*Lachnus roboris*	*Roboris* Lin.	1		1242	1839	alatae; discrepant morphology
6.09	*Lachnus roboris*		1				alatae; discrepant morphology
6.10	*Lachnus roboris*		2				alatae and apterae; discrepant morphology
6.11	*Lachnus padi*	*Padi* m.	1	holotype	361	1836	alatae; discrepant morphology
6.12	*Lachnus fagi*	*Fagi*	1				alatae
6.13	*Lachnus fagi*		?				in situ
6.14	*Lachnus fagi*		?				in situ
7.01	*Aphis*	*Aphis*	na				
7.02	*Aphis pilicornis*	*pilicornis* m.	1	holotype	617	1833	alatae; discrepant morphology
7.03	*Aphis viminalis*	*Viminalis*	1	holotype	327	1837	alatae; discrepant morphology
7.04	*Aphis vitellinae*	*Vitellinae* m.	1	syntype	1706	1836	alatae; discrepant morphology
7.05	*Aphis vitellinae*		1	syntype	1752	1836	missing
7.06	*Aphis vitellinae*		1	syntype	1708	1836	missing
7.07	*Aphis rufipes*	*rufipes* m.	1	holotype	1435	1836	alatae
7.08	*Aphis pallipes*	*pallipes* m.	1	holotype	519	1836	alatae; discrepant morphology

.....continued on the next page

TABLE 3. (Continued)

Pos.[a]	Taxon	Verbatim Label	No.[b]	Status	Field No.	Year[c]	Remarks
7.09	*Aphis amerinae*	*Amerinae* m.	2	syntypes	1720	1836	missing
7.10	*Aphis callipterus*	*callipterus* m.	3	syntypes	400	1836	alatae
7.11	*Aphis villosus*	*villosus* m.	2	syntype	298	1836	alatae
7.12	*Aphis villosus*		1	syntype	300	1836	alatae
7.13	*Aphis villosus*		2	syntypes			alatae
7.14	*Aphis villosus*		2	syntypes			alatae
7.15	*Aphis villosus*		2	syntypes	359	1836	alatae
7.16	*Aphis platanoidis*	*Platanoidis* m.	2	syntypes	299	1836	alatae
7.17	*Aphis platanoidis*		2	syntypes	420	1836	alatae
7.18	*Aphis annulatus*	*annulatus* m.	6	syntypes	1222	1839	alatae, 2 missing
7.19	*Aphis pyri*	*Pyri* m.	6	syntypes			alatae, 1 missing
8.01	*Aphis persicariae*	*persicariae* m.	3	syntypes			alatae, apterae, and host tissue
8.02	*Aphis persicariae*		2	syntypes			alatae, apterae, and host tissue
8.03	*Aphis persicariae*		2	syntypes			alatae and host tissue
8.04	*Aphis spinarum*	*spinarum* m.	6	syntypes	150	1840	leaf with powdery mildew; all specimens missing
8.05	*Aphis spinarum*		8	syntypes	1226	1839	nymphs, 3 missing; discrepant morphology
8.06	*Aphis pruni*	*Pruni*	4		1136	1836	alatae
8.07	*Aphis rosae*	*Rosae*	2				alatae and apterae
8.08	Aphis rosae		1		290	1833	alatae
8.09	*Aphis sambuci*	*Sambuci* Lin.	3				alatae
8.10	*Aphis cytisorum*	*Cytisorum* m.	6	syntypes	149	1840	alatae and host tissue, 2 missing
8.11	*Aphis tiliae*	*Tiliae* Lin.	1		1267	1836	alatae
8.13	*Aphis tiliae*		6				alatae with host, 3 missing
9.01	*Psyllodes*	*Psyllodes* [...]	na				
9.02	Aphidoidea	*Aleurodes*	2		527	1835	alatae; not a whitefly as labelled
9.03	Aphidoidea		1		526	1835	alatae; not a whitefly as labelled

.....continued on the next page

TABLE 3. (Continued)

Pos.[a]	Taxon	Verbatim Label	No.[b]	Status	Field No.	Year[c]	Remarks
9.04	Aphidoidea	*Chelidonii; serrati-cornis* $_{n.}$	1		580	1836	alatae; not a whitefly as labelled
9.05	*Aleyrodes chelidonii*		3		351	1836	
9.06	Aphidoidea		1				alatae
9.07	Aphidoidea		1		61	1833	alatae
9.08	Aphidoidea		2		62	1833	alatae
9.10	Aphidoidea		1				alatae
9.12	Aphidoidea		1		164	1834	alatae
9.16	Aphidoidea		1				alatae
9.17	Aphidoidea		1		1036	1839	alatae
9.19	Aphidoidea	Bei[...] Seesen	4				apterae
9.20	Aphidoidea		5				apterae
9.21	Aphidoidea		4				apterae
9.22	Aphidoidea		5				apterae
9.23	Aphidoidea		8		1227	1839	apterae; 6 missing or damaged
9.24	Aphidoidea		3		59	1833	alatae
9.25	Lepidoptera		1				pupae

[a]Position/SNSB-ZSM-Hemi-Hartig# (row.specimen); ordered left to right, top to bottom ignoring Kriechbaumer's specimens (square labels)

[b]na, label only

[c]Year collected

provide species determinations where possible. Doing so will allow for the confirmation of synonymies and to verify agreement between Hartig's types and current concepts for the species involved. To this end, efforts are presently underway to coordinate the preparation and identification of the Hartig's specimens at the ZSM. Despite this limitation, we have been able to use high-resolution photographs of the collection and specimens to identify 14 species described by Hartig that may be either wholly or partially inconsistent with the current use of their names. These include the newly inferred holotypes for *R. vacca*, *Aphis pilicornis*, *A. viminalis,* and *L. pallipes,* as well as *L. padi* and *T. rugicornis*. The syntypes for *Aspidiotus pini* and *A. flavus*, *P. lonicerae, S. lanuginosa, S. corni*, *Aphis pineti, A. vitellinae,* and *A. spinarum* are also among these. Both of *Aspidiotus pini* and *L. pallipes* have had neotypes designated previously, so in accordance with Article 75.8 of the ICZN those are no longer to be name-bearing. As mentioned in the remarks above, these two cases will be referred to the ICZN for a decision on whether the newly rediscovered name-bearing types may be set aside in favor of the neotypes in order to preserve the prevailing usage of the names. Similarly, a recommendation will be proposed to set aside the holotype for *C. pilicornis* which is also in disagreement with prevailing usage and a neotype designated. Through these recommendations, it is our intent to provide further stability to the taxonomy of the species involved.

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References

Annand, P.N. (1928) *A Contribution Toward a Monograph of the Adelginae (Phylloxeridae) of North America*. Stanford University Press, Palo Alto, California, 146 pp.

Baker, A.C. (1915) *The woolly apple Aphis. United States Department of Agriculture. Report 101*. U.S. Government Printing Office, Washington, D.C., 55 pp.

Baker, A.C. (1917) Eastern aphids, new or little known, part II. *Journal of Economic Entomology*, 10, 420–433. https://doi.org/10.1093/jee/10.4.420

Blackman, R.L. & Eastop, V.F. (2023) Aphids on the world's plants. An online identification and information guide. Available from: http://www.aphidsonworldsplants.info/ (accessed 14 August 2023)

Blanchard, E. (1840) *Histoire Naturelle des Insectes, Orthoptères, Névroptères, Hémiptères, Hyménoptères, Lépidoptères et Diptères. Tome troisème.* P. Duménil, Paris, 672 pp. https://doi.org/10.5962/bhl.title.59226

Blasius, W. (1887) n.k. *In*: *Theodor Hartig: Nekrolog. Bavarian State Library (Zool. 53 g-24).* Commissionsverlag der Schulbuchhandlung. Braunschweig, pp. 131–145.

Börner, C. (1952) Europae centralis Aphides: die Blattläuse Mitteleuropas, Namen, Synonyme, Wirtspflanzen, Generationszyklen. *In*: *Schriften der Thüringischen Landesarbeitsgemeinschaft für Heilpflanzenkunde und Heilpflanzenbeschaffung in Weimar und Mitteilungen der Thüringischen Botanischen Gesellschaft. Heft 4. Beiheft 3.* Thüringische Botanische Gesellschaft, Weimar, pp. 1–484.

Borchsenius, N.S. (1966) *A catalogue of the armoured scale insects (Diaspidoidea) of the world.* Nauka, Moscow and Leningrad, 449 pp. [in Russian]

Börner, C. (1908) 5. Systematik und Biologie der Chermiden. *Zoologischer Anzeiger*, 32, 413–428.

Börner, C. (1952) Europae centralis Aphides die Blattläuse Mitteleuropas, Namen, Synonyme, Wirtspilanzen, Generationszyklen. *In:* Branco, K. (Ed.), *Schriften der Thüringischen Landesarbeitsgemeinschaft für Heilpflanzenkunde und Heilpflanzenbeschaffung in Weimar. Heft 4. und Mitteilungen der Thüringischen Botanischen Gesellschaft (ehemals Thüringischer Botanischer Verein) Beiheft 3*. Gebrüder Knabe Verlags, Weimar, pp. 1–488.

Börner, C. & Schilder, F.A. (1932) Aphidoidea, Blattläuse. *In:* Sorauer, P. (Ed.), *Handbuch der Pflanzenkrankheiten Fünfter Band Tierische Schädliche an Nutzpflanzen Zweiter Teil Vierte, neubearbeitete Auflage.* Paul Parey, Berlin, pp. 551–696.

Boyer de Fonscolombe, E.L.J.H. (1841) Description des pucerons qui se trouvent aux environs d'Aix. *Annales de la Société entomologique de France*, 10, 157–198.

Buckton, G.B. (1883) *Monograph of the British Aphides. Vol. IV.* Printed for the Ray Society, London, 228 pp.

Burckhardt, D. (2008) The psyllid collection of Theodor Hartig in the Bavarian State Collection of Zoology, Munich (ZSM). *Spixiana*, 31, 207–213.

Burdon, E.R. (1907) Notes on the origin of the name Chermes or Kermes. *Journal of the Linnean Society, London*, 30, 5–9. https://doi.org/10.1111/j.1096-3642.1907.tb02118.x
Burmeister, H (1835) *Handbuch der Entomologie. 2. Band. Besondere Entomologie. 1. Abth. Schnabelkerfe. Rhynchota*. Enslin, Berlin, 400 pp.
Burmeister, H. (1839) n.k. *In*: *Handbuch der Entomologie. 2. Band. Besondere Entomologie. 2. Abth. Kaukerfe. Gymnognatha. (2. Hälfte; vulgo Neuroptera).* Enslin, Berlin, pp. 757–1050.
Cholodkovsky, N.A. (1898) Explanatory catalogue of aphid collections (Aphidae). *Izvestiya S.-Petersburgskogo Lesnogo Instituta*, 1, 31–54. [in Russian]
Curtis, J. (1835) Cinara roboris. The clouded-winged Oak-louse. *In*: *British entomology: being illustrations and descriptions of the genera of insects found in Great Britain and Ireland: containing coloured figured from nature of the most rare and beautiful species and in many instances of the plants upon which they are found*. *Vol. 7*. Ellis and Co., Simpkin and Marshall, and J.B. Bailliere, London, pl. 576.
Cuvier, G. (1817) *Le règne animal distribué d'après son organisation, pour servir de base a l'histoire naturelle des animaux et d'introduction a l'anatomie comparée. Vol. 3*. A. Belin, Paris, 653 pp.
Danzig, E.M. & Kerzhner, I.M. (1984) *Leucaspis* Signoret, 1869 (Insecta, Homoptera, Diaspididae): Proposed conservation by the suppression of *Leucaspis* Burmeister, 1835 (Insecta, Hymenoptera, Leucopsidae), Z.N.(S.)2448. *Bulletin of Zoological Nomenclature*, 41, 101–104.
De Geer, C. (1773) *Mémoires pour servir à l'histoire des insectes*. *Tome troisième*. Pierre Hesselberg, Stockholm, 698 pp.
Diller, E. (1992) Die Sektion Hymenoptera der Zoologischen Staatssammlung München. *Spixiana*, Supplement 17, 83–100.
Doncaster, J.P. (1973) G. B. Buckton's works on Aphidoidea (Hemiptera). *Bulletin of the British Museum (Natural History) Entomology*, 28, 25–110.
Dreyfus, L. (1888) 3. Neue Beobachtungen bei den Gattungen Chermes L. und Phylloxera Boyer de Fonsc. *Zoologischer Anzeiger*, 12, 65–91.
Eastop, V.F. (1974) Plea for the conservation of *Aphis pyri* Boyer De Fonscolombe, 1841 and the suppression of *Aphis pyri* Vallot, 1802, *Aphis pyri* Kittel, 1827 and seven other binomials proposed by Kittel in 1827. Z.N.(S.) 2062. *Bulletin of Zoological Nomenclature*, 31, 164–166.
Eastop, V.F. & Hille Ris Lambers, D. (1976) *Survey of the world's aphids*. Dr. W. Junk, The Hague, 573 pp.
Essig, E.O. (1948) Mounting aphids and other small insects on microscopic slides. *The Pan-Pacific Entomologist*, 24, 9–22.
Evenhuis, H.H. (1982) A study of Hartig's *Xystus* species with type designations and synonyms (Hymenoptera: Cynipidae Alloxystinae and Charipinae). *Spixiana*, 5, 19–29
Fabricius, J.C. (1775) *Systema entomologiae: sistens insectorum classes, ordines, genera, species, adiectis synonymis, locis, descriptionibus, observationibus.* In Officina Libraria Kortii, Flensbvrgi et Lipsiae, 832 pp. https://doi.org/10.5962/bhl.title.36510
Fabricius, J.C. (1777) *Genera insectorum: eorumque characters naturales secundam numerum, figuram, situm et proportionem, omnium partium oris adiecta mantissa specierum nuper detectarum*. M. F. Bartschii, Chilonii, 310 pp. https://doi.org/10.5962/bhl.title.119827
Fabricius, J.C. (1781) *Species insectorum, exhibentes eorum differentias specificas, synonyma auctorum, loca natalia, metamorphosin, adjectis observationibus descriptionibus.* C.E. Bohnii, Hamburg et Kilonii, 517 pp. https://doi.org/10.5962/bhl.title.36509
Favret, C., Meshram, N.M., Miller, G.L., Nieto Nafria, J.M. & Stekolschikov, A.V. (2017) The mealy plum aphid and its congeners: a synonymic revision of the *Prunus*-infesting aphid genus *Hyalopterus* (Hemiptera: Aphididae). *Proceedings of the Entomological Society of Washington*, 119, 565–574. https://doi.org/10.4289/0013-8797.119.4.565
Favret, C. (2023) Aphid Species File. Version 5.0/5.0. Available from: http://aphid.archive.speciesfile.org/ (accessed 14 August 2023)
Fernald, M.E. (1903) *A catalogue of the Coccidae of the world*. Press of Carpenter & Morehouse, Amherst, Massachusetts, 360 pp.
Fernie, T.P. (1852) On a new insect, a parasite on the sycamore. *Naturalist, Morris*, 2, 265.
Ferrari, P.M. (1872) Aphididae Liguriae. *In:* Doria, G. (Ed.), *Annali Del Museo Civico Di Storia Naturale Di Genova. Vol. II.* R. Istituto Sordo-Muti, Genova, pp. 49–85.
Garcia Morales, M., Denno, B.D., Miller, D.R., Miller, G.L., Ben-Dov, Y. & Hardy, N.B. (2016) ScaleNet: A literature-based model of scale insect biology and systematics. Available from: https://scalenet.info/ (accessed 2022 August 31)
Geoffroy, M.E.-L. (1762) *Histoire abregée des insectes qui se trouvent aux environs de Paris; dans laquelle ces animaux sont rangés suivant un ordre méthodique*. C. Durand, Paris, 523 pp. https://doi.org/10.5962/bhl.title.14710
Gmelin, J.F. (1789) *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species; cum characteribus, differntiis, synonymis, locis. Tom. I. Pars. IV*. J.B. Delamolliere, Lugduni, pp. 1517–2224.
Goeze, J.A.E. (1778) *Entomologische Beyträge zu des Ritter Linné, Zwölften Ausgabe des Natursystems. Zweiter Theil.* Weidmanns Erben und Reich, Leipzig, 352 pp. https://doi.org/10.5962/bhl.title.45974
Hartig, G.L. & Hartig, T. (1834) *Forstliches und forstnaturwissenschaftliches Conversations-Lexikon*. Rauschen Buchhandlung, Berlin, 1038 pp.

Hartig, T. (1839) *Jahresberichte über die Fortschritte der Forstwissenschaft und forstlichen Naturkunde im Jahre 1836 und 1837 nebst Original-Abhandlungen aus dem Gebiete dieser Wissenschaften.* A. Förstner, Berlin, 646 pp.
Hartig, T. (1841) IX. Versuch einer Eintheilung der Pflanzenläuse (Phytophthires Burm.) nach der Flügelbildung. *Zeitschrift für die Entomologie*, 3, 359–376.
Hartig, T. (1851) *Vollständige Naturgeschichte der Forstlichen Culturpflanzen Deutschlands.* A. Förstner'sche Verlagsbuchhandlung, Berlin, 580 pp.
https://doi.org/10.5962/bhl.title.49844
Hartig, T. (1857) Verehrter Freund. *Verhandlungen des Hils-Solling-Forstvereines*, 1856, 52–57.
Hartig, T. (1870) *Der Herzogliche Forstgarten bei Riddagshausen*. Krampe, Braunschweig, 48 pp.
Hausmann, F. (1802) XIV. Beiträge zu den Materialien für eine künftige Bearbeitung der Gattung der Blattläuse. *In*: Illiger, J.K.W. (Ed.), *Magazin für Insektenkunde. Erster Band*. K. Reichard, Braunschweig, pp. 426–445.
Higuchi, H. (1972) A taxonomic study of the subfamily Callipterinae in Japan (Homoptera: Aphididae). *Insecta Matsumurana*, 35, 19–126.
Hille Ris Lambers, D. (1950) On mounting aphids and other soft-skinned insects. *Entomologische Berichten*, 13, 55–58.
Hottes, F.C. (1930a) Aphid homonyms. *Proceedings of the Biological Society of Washington*, 43, 179–184.
Hottes, F.C. (1930b) The name *Cinara* versus the name *Lachnus. Proceedings of the Biological Society of Washington*, 43, 185–188.
Hottes, F.C. (1953) Notes on some species of *Cinara*, with descriptions of two new species from pinon pine. *Proceedings of the Biological Society of Washington*, 66, 153–158.
International Commission on Zoological Nomenclature (1999) *International code of Zoological Nomenclature. 4th Edition.* International Trust for Zoological Nomenclature, London, 306 pp.
Kaltenbach, J.H. (1843) *Monographie der Familien der Pflanzenläuse (Phytophthires). I. Theil. Die Blatt- und Erdläuse (Aphidina et Hyponomeutes)*. In commission der Roschütz'schen Buchhandlung, Aachen, 265 pp.
https://doi.org/10.5962/bhl.title.51483
Kittel, M. (1827) Sur les Pucerons, suivi de la description de quelques espèces nouvelles. *Mémoires de la société linnéenne de Paris*, 5, 133–155.
Koch, C.L. (1854) IV. Gattung. Blattlaus. Genus IV. Aphis. *Die Pflanzenläuse Aphiden getreu nach dem Leben abgebildet und beschrieben*, 2, 49–72.
https://doi.org/10.5962/bhl.title.77523
Koch, C.L. (1855) VII. Gattung. Blattlaus. Genus IV. Aphis. *Die Pflanzenläuse Aphiden getreu nach dem Leben abgebildet und beschrieben*, 7, 197–236.
https://doi.org/10.5962/bhl.title.77523
Koch, C.L. (1857) XX. Gattung Flockenlaus. Genus XX. Prociphilus. *Die Pflanzenläuse Aphiden getreu nach dem Leben abgebildet und beschrieben*, 9, 279–284.
Latreille, P.A. (1796) *Précis des caractères génériques des insectes, disposés dans un ordre naturel.* F. Bourdeaux, Brive, 210 pp.
https://doi.org/10.5962/bhl.title.58411
Leonardi, G. (1908) Seconda contribuzione alla conoscenza delle cocciniglie Italiane. *Bolletino del Laboratorio di zoologia generale e agraria della R. Scuola superiore d'agricoltura in Portici*, 3, 150–192.
Linnaeus, C. (1740) *Systema naturae in quo natureae regna tria, secundum classes, ordines, genera, species, systematice, proponuntur*, *Editio Secundo*. G. Kiesewetter, Stockholmiae, 83 pp.
https://doi.org/10.5962/bhl.title.159405
Linnaeus, C. (1758) *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species; cum characteribus, differntiis, synonymis, locis. Tomus I. Editio Decima, Reformata*. Laurentii Salvii, Holmiae, 824 pp.
https://doi.org/10.5962/bhl.title.542
Linnaeus, C. (1761) *Fauna svecica: sistens animalia sveciae regni: mammalia, aves, amphibia, pisces, insecta, vermes, distributa per classes & ordines, genera & species, cum differentiis specierum, synonymys auctorum, nominibus incolarum, locis natalium, descriptionibus insectorum, Editio Altera, Auctior.* Laurentii Salvii, Stockholmiae, 578 pp.
https://doi.org/10.5962/bhl.title.46380
Löw, F. (1882) Revision der paläarktischen Psylloden in Hinsicht auf Systematik und Synonymie. *Verhandlungen der kaiserlich-königlichen zoologisch-botanischen Gesellschaft in Wien*, 32, 227–254.
Marchal, P. (1913) Contribution à l'étude de la biologie des Chermes. *Annales des Sciences Naturelles Zoologie et Biologie Animale*, 18, 153–385.
Melville, R.V. (1981) Opinion 1188 *Aphis pyri* Boyer de Fonscolombe, 1841 (Insecta: Hemiptera) conserved. *Bulletin of Zoological Nomenclature*, 38, 239–242.
Miller, G.L. & Foottit, R.G. (2017) The Taxonomy of Crop Pests: The Aphids. *In*: Foottit, R.G. & Adler, P.H. (Eds.), *Insect Biodiversity*. John Wiley & Sons Ltd., Hoboken, New Jersey, pp. 627–639.
https://doi.org/10.1002/9781118945568.ch20
Mordwilko, A. (1909) Tableaux pour servir à la détermination des groupes et des genres des Aphididae Passerini. *Annuaire du Musée zoologique de l'Académie des sciences de St. Pétersbourg*, 13, 353–384. [in Russian]
Mróz, E., Trela, J. & Depa, Ł. (2015) Taxonomic analysis of *Lachnus pallipes/longirostris–roboris* complex (Hemiptera, Aphi-

didae, Lachninae), with the redescription of sexual morphs and new synonymy. *Zoologischer Anzeiger—A Journal of Comparative Zoology*, 254, 51–61.
https://doi.org/10.1016/j.jcz.2014.11.002
Nye, W.P. (1947) A simple method for mounting aphids. *The Pan-Pacific Entomologist*, 23, 73–74.
Passerini, G. (1860) *Glie afidi con un prospetto dei generi ed alcune specie nuove italiane.* Carmignani, Parma, 40 pp.
Quednau, W. (1954) Die Junglarven des ersten Stadiums der mitteleuropäischen Callaphididae: Monographie der mitteleuropäischen Callaphididae (Zierläuse [Homoptera, Aphidina]) unter besonderer Berücksichtigung des ersten Jugendstadiums. *In*: *Mitteilungen aus der Biologischen Zentralanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, Heft 78*. Paul Parey, Berlin und Hamburg, 55 pp.
Ratzeburg, J.T.C. (1843) Bericht über einige neue, den Waldbäumen schädliche Rhynchoten. *Entomologische Zeitung*, 4, 201–204.
Ratzeburg, J.T.C. (1844) *Die Forst-Insecten oder Abbildung und Beschreibung der in den Wäldern Preussens und der Nachbarstaatenals schädlich oder nützlich bekannt gewordenen Insecten; In systematischer Folge und mit besonderer Rüksicht auf die Vertilgung der Schädlichen. Dritter Theil. Die Ader-, Zwei-, Halb-, Netz- und Geradflügler.* Nicolaischen Buchhandlung, Berlin, 314 pp.
Rudow, F. (1875) Die Pflanzengallen Norddeutschlands und ihre Erzeuger. *In*: Arndt-Bützow, C. (Ed.), *Archiv des Vereins der Freunde der Naturgeschichte in Mecklenburg. Vol. 29. Jahr, Mit 3 Tafeln.* C. Brünslow, Neubrandenburg, pp. 1–96.
Schrank, F. von P. (1776) *Beyträge zur Naturgeschichte*. Gebrüdern Veith, Augsburg, 137 pp.
Schrank, F. von P. (1801) *Fauna Boica. Durchgedachte Geschichte der in Baiern einheimischen und zahmen Thiere, Zweyter Band, erste Abtheilung.* J.W. Krüll, Ingolstadt, 374 pp.
Schouteden, H. (1900) Catalogue raisonné des pucerons de Belgique. *Annales de la Société entomologique de Belgique*, 44, 113–139.
Signoret, V. (1868) Essai sur les cochenilles (Homoptères—Coccides), 2e Partie (2). *Annales de la Société entomologique de France*, Série 4, 8, 829–876.
Szelegiewicz, H. (1962) Materialy do poznania mszyc (Homoptera, Aphididae) Polski I. Podrodzina Lachninae. *Fragmenta Faunistica*, 10, 63–98.
https://doi.org/10.3161/00159301FF1962.10.6.063
Theobald, F.V. (1927) *The Plant Lice or Aphididae of Great Britain. Vol. 2*. Headley Brothers, London, 411 pp.
Vallot, J.N. (1802) *Concordance systématique, Servant de table de matières à l'ouvrage de Réaumur, intitulé: Mémoires pour servir à l'histoire des insectes.* Grégoire and Thouvenin, Paris, 201 pp.
Vallot, J.N. (1836) Observations sur deux insectes hémiptères qui vivent, l'un sur le mélèze et l'autre sur le cafier. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences, Publiés Conformément a une Décision de l'Académie*, 3, 72–73.
van der Goot, P. (1913) Zur Systematik der Aphiden. *Tijdscrift voor entomologie*, 56, 69–155.
van der Hoeven, J. (1863) Over Een Klein Hemipterum, Dat Op De Bladen Van Verschillende Soorten Van *Acer gevonden* Wordt. *Tijdscrift voor entomologie*, 6, 1–7.
von Heyden, C.H.G. (1837) Entomologische Beiträge. *Museum Senckenbergianum: Abhandlungen aus dem Gebiete der beschreibenden Naturgeschichte. Zweiter Band*. J.D. Sauerländer, Frankfurt am Main, 310 pp.
Walker, F.L.S. (1848) X. Descriptions of Aphides. *Annals and Magazine of Natural History*, Series 2, 2, 95–109.
https://doi.org/10.1080/03745485809494659
Walker, F.L.S. (1858) *List of the specimens of homopterous insects in the collection of the British Museum. Supplement*. E. Newman, London, 370 pp.
Walker, F.L.S. (1870) Notes on Aphides. *The Zoologist*, Series 2, 5, 1996–2001.
Zetterstedt, J.W. (1828) *Fauna Insectorum Lapponica. Pars I.* Libraria Schulziana, Hammone, 563 pp.

Supplementary Material 1: High resolution image of Figure 1.

Supplementary Material 2: Scanned PDF of Hartig's field notes.