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Charipinae (Hymenoptera: Cynipoidea: Figitidae) present in the Museum of Natural History of the University of Wroclaw, with an identification key for Polish species

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Abstract: Charipinae (Cynipoidea: Figitidae) deposited in the Museum of Natural History of Wroclaw University (Poland) have been studied. Seven species are recorded for the first time from Poland: *Alloxysta brachyptera* (Hartig, 1840), *A. castanea* (Hartig, 1841), *A. citripes* (Thomson, 1862), *A. consobrina* (Zetterstedt, 1838), *A. mullensis* (Cameron, 1883), *A. nottoni* Ferrer-Suay & Pujade-Villar, 2015 and *Phaenoglyphis heterocera* (Hartig, 1841). The presence of previously recorded species is confirmed and new records are specified. A key to all Charipinae species ever recorded in Poland is given.

Keywords: Charipinae, Figitidae, Poland, new localities

Introduction

The Charipinae (Cynipoidea, Figitidae) are small wasps (0.8–2.0 mm). They are mainly characterized by their smooth and shining body. Members of the subfamily Charipinae are widely distributed around the world (Ferrer-Suay *et al.* 2012). They are biologically characterized as hyperparasitoids of aphids via Aphidiinae (Ichneumonoidea, Braconidae) and Aphelininae (Chalcidoidea, Aphelinidae) and hyperparasitoids of psyllids via Encyrtidae (Chalcidoidea) (Menke & Evenhuis 1991). *Alloxysta* and *Phaenoglyphis* (Förster, 1869) are the most numerous, and widely distributed genera within this subfamily.

The knowledge of Charipinae is continuously improving, when new material is collected and identified, new records usually appear. Recent records from Austria and the Paelearctic region proved that Charipinae are well represented in both, Paelearctics and central Europe (Ferrer-Suay *et al.* 2012, 2018a).

In this study material recently collected and deposited in the Museum of Natural History in the University of Wroclaw (Poland) was examined. Many species were previously recorded from Poland by Kierych (1979b), Barczak (1991) and Krawczyk *et al.* (2009). In total, in this study, 155 specimens have been examined, from three Charipinae genera (*Alloxysta*, *Dilyta* (Förster, 1869) and *Phaenoglyphis*). The following species have been identified: *Alloxysta arcuata* (Kieffer, 1902), *A. brachyptera* (Hartig, 1840), *A. brevis* (Thomson, 1862), *A. castanea* (Hartig, 1841), *A. citripes* (Thomson, 1862), *A. consobrina* (Zetterstedt, 1838), *A. fracticornis* (Thomson, 1862), *A. macrophadna* (Hartig, 1841), *A. mullensis* (Cameron, 1883), *A. nottoni* Ferrer-Suay & Pujade-Villar, 2015, *A. obscurata*

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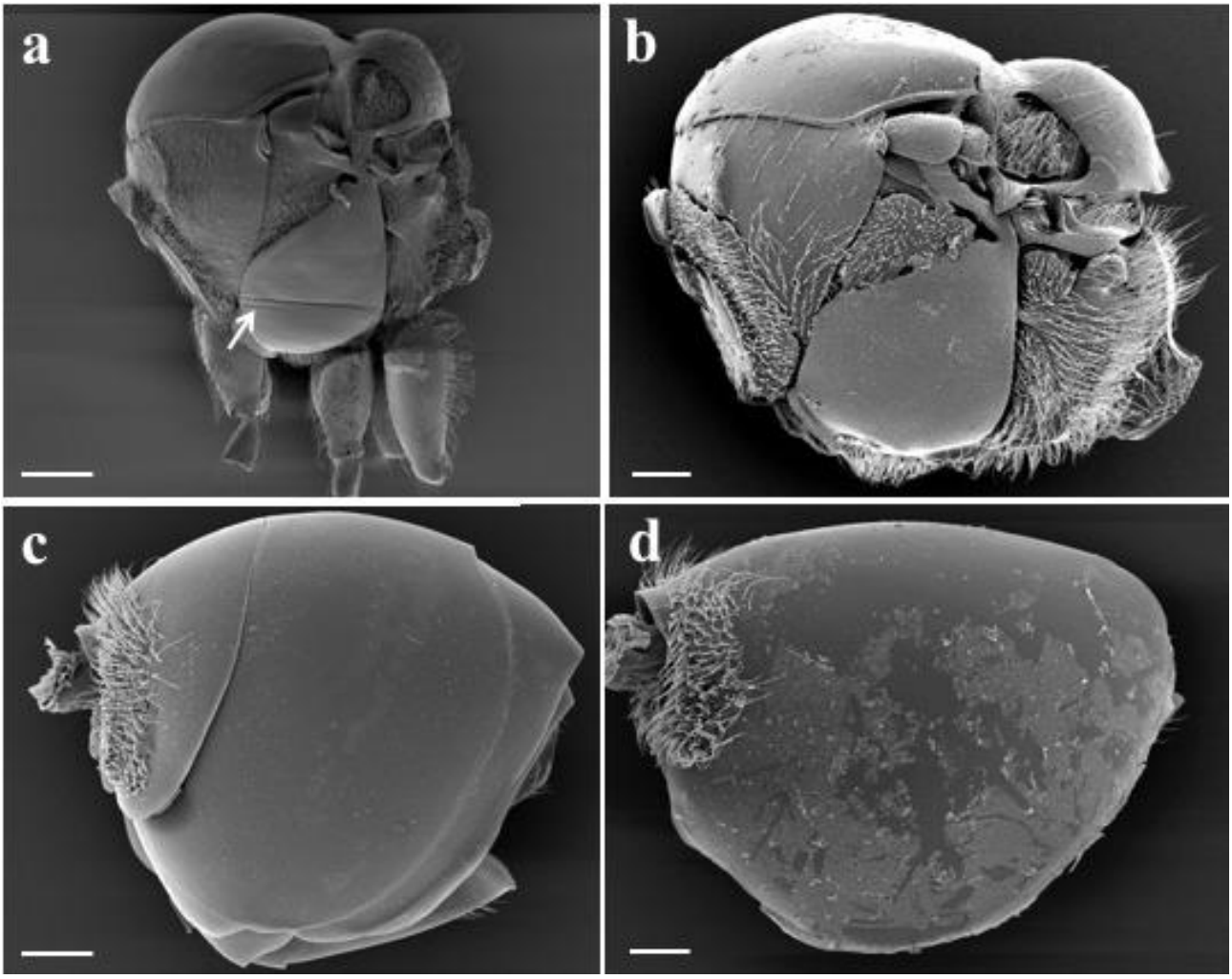

Fig. 1. Some general body features: a) lower part of mesopleuron in *Phaenoglyphis*; b) lower part of mesopleuron in *Alloxysta*; c) metasoma of *Alloxysta*; d) metasoma of *Dilyta* (scale bar = 50µm).

(Hartig, 1840), *A. pilipennis* (Hartig, 1840), *A. pleuralis* (Cameron, 1879), *A. ramulifera* (Thomson, 1862), *A. sawoniewiczi* (Kierych, 1988), *A. victrix* (Westwood, 1833), *Dilyta subclavata* Förster, 1869, *Phaenoglyphis heterocera* (Hartig, 1841) and *P. villosa* (Hartig, 1841).

Seven new records from Poland are established, six species of *Alloxysta* and one of *Phaenoglyphis*. Information about these records and a key are given below.

Material and Methods

Specimens were mostly collected by a sweeping net; some were killed by ethyl acetate, and some put directly into 75% ethanol. Some specimens were pin-mounted directly from ethanol, but some were chemically dried (with hexamethyldisilazane).

All specimens mounted on cardboards, have been studied with a stereomicroscope (ZSM-2 Optika). The field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM) was used for high-resolution imaging without gold-coating of the specimens.

Morphological terms used are taken from Paretas-Martínez *et al.* (2007). Measurements include abbreviations from F1–F12 (first and subsequent flagellomeres). The width of the forewing radial cell is measured from the margin of the wing to the base of Rs vein. Females and males are morphologically identical except where indicated.

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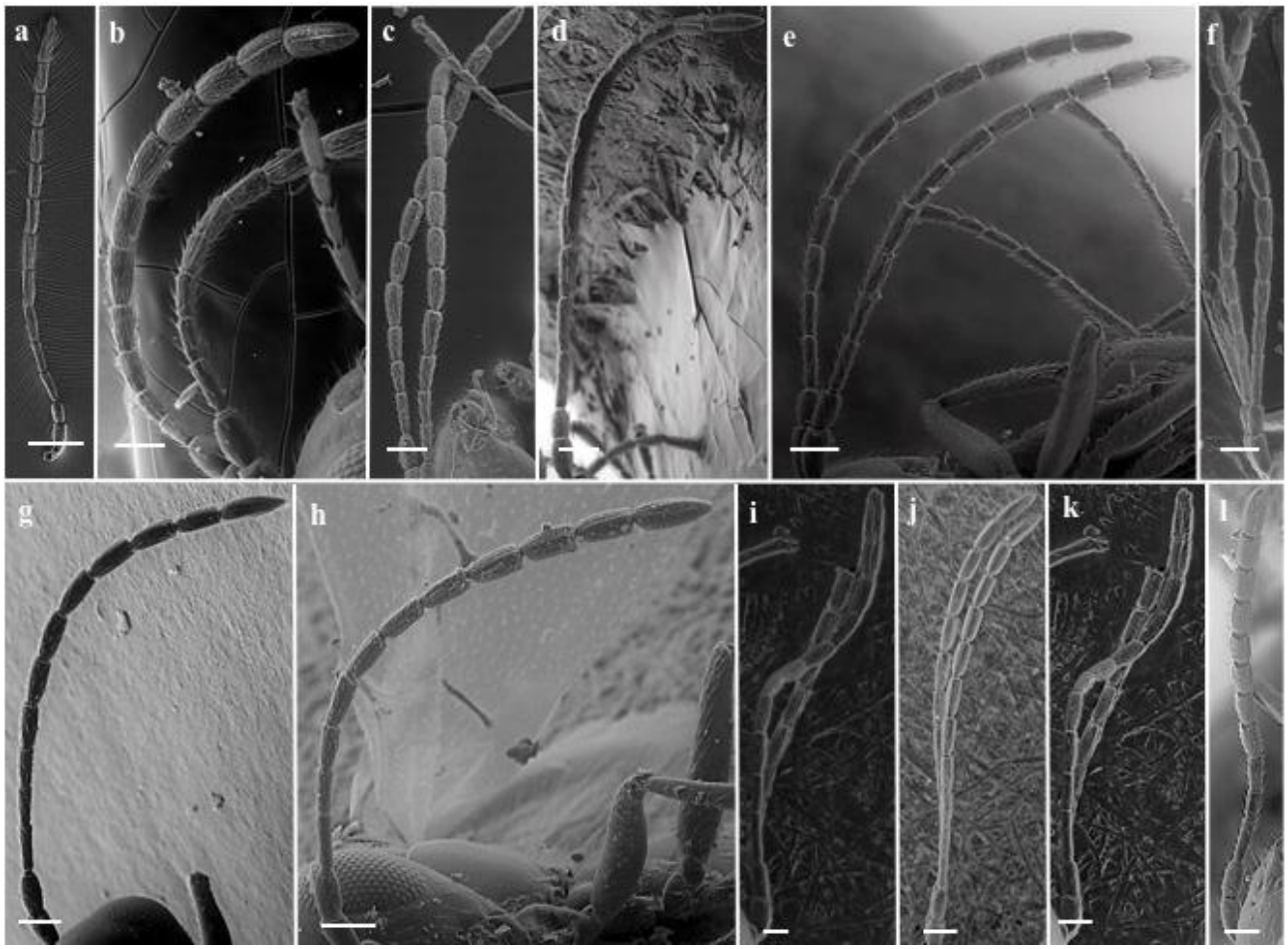

Fig. 2. Types of antennae: a) *Phaenoglyphis villosa*; b) *Alloxysta citripes*; c) *A. castanea*; d) *A. macrophadna*; e) *A. obscurata*; f) *A. circumscripta*; g) *A. consobrina*; h) *A. ramulifera*; i) *A. pilipennis*; j) *A. arcuata*; k) *A. fracticornis*; l) *A. mullensis* (scale bar = 50μm).

Results

Figure 1 shows the shape of *Alloxysta* and *Dilyta* metasoma, as well as *Alloxysta* and *Phaenoglyphis* mesopleura. For better comparison, antennae of all the *Alloxysta* species cited here are grouped in Fig. 2a–l and all radial cells in Fig. 3a–l. Information on the distribution, description and hosts of each species is available on www.charipinaedatabase.com.

- *Alloxysta arcuata* (Kieffer, 1902)

Material studied. (3♀) Poland, Wrocław, Świniary, decid. forest 20.08.2016, leg. P. Jałoszyński: 1♀; Poland, Włocławek, pine forest with *Padus*, W of city, 4.08.2017, leg. P. Jałoszyński: 1♀; Poland, Wrocław ante herbarium, 16.07.2017, leg. P. Jałoszyński: 1♀.

Distribution. Paelearctic, Oriental and Neotropical. Already cited in Poland by Ferrer-Suay *et al.* (2018a).

- *Alloxysta brachyptera* (Hartig, 1840)

Material studied. (37♀, 27♂) Poland, Wrocław, Świniary, 23.08.2018, meadows, grass & *Tanacetum*, leg. P. Jałoszyński: 5♀, 4♂; Poland, Wrocław, Świniary, 23.08.2018, meadows, grass & *Tanacetum*, leg. P. Jałoszyński: 32♀, 22♂; Poland, Włocławek, pine forest W of city, 7–8.09.2018, leg. P. Jałoszyński: 1♂.

Distribution. Paelearctic. NEW RECORD from Poland.

- *Alloxysta brevis* (Thomson, 1862)

Material studied. (11♀) Poland, Promno ad Poznań, 14.09.2014, leg. P. Jałoszyński: 1♀; PL

27.06.2015, FV08, 49.544N/22.514E NE of Ropieńka, meadow/slope, 580 m, leg. P. Jałoszyński: 1♀; Poland, Wrocław, Świniary, 10.07.2016, leg. P. Jałoszyński: 1♀; Poland, Włocławek, pine forest W of city, 22.05.2017, leg. P. Jałoszyński: 1♀; Poland, Wrocław ante herbarium, 16.07.2017, leg. P. Jałoszyński: 1♀; Poland, Wrocław ante herbarium, 16.07.2017, leg. P. Jałoszyński: 1♀; PL, 22.5.2018, YR14, 50.057N/17.995E, Gipsowa Góra ad Kietrz, leg. P. Jałoszyński: 1♀; Poland, Wrocław, Świniary, 23.08.2018, meadows, grass & *Tanacetum*, leg. P. Jałoszyński: 1♀; Poland, Włocławek, pine forest W of city, 7–8.09.2018, leg. P. Jałoszyński: 2♀; Japan, Ibaraki Pref., Tsukuba city, central and northem àrks, suburbs, 6.06.2018, leg. P. Jałoszyński: 1♀.

Distribution. Eastern Paelearctic and Holarctic. Already cited in Poland by Barczak (1991).

- *Alloxysta castanea* (Hartig, 1841)

Material studied. (16♀, 4♂) Poland, Wrocław, Świniary, 17.08.2014, leg. P. Jałoszyński: 1♂; PL 24.06.2015 FV07/EV97, 49.428N/22.395E, 350 m, Zwierzyń ad Lesko meadows at San river, leg. P. Jałoszyński: 3♀; Poland, Wrocław, Świniary, decid. forest, 20.08.2016, leg. P. Jałoszyński: 1♀; Poland, Wrocław, Świniary – Widawa, 11.06.2017, forest & meadows along river, leg. P. Jałoszyński: 2♀, 1♂; Poland, Włocławek, pine forest with *Padus*, W of city, 4.08.2017, leg. P. Jałoszyński: 1♀; Poland, Promno ad Poznań, 10.07.2017, mixed shady forest, leg. P. Jałoszyński: 3♀; PL, 22.5.2018, YR14, 50.057N/17.995E, Gipsowa Góra ad Kietrz, leg. P. Jałoszyński: 1♀; Poland, Włocławek, *Pinus* forest, 22.06.2018, leg. P. Jałoszyński: 1♀; PL 8-929.6.2018, XS36, 51.149N/16.951E, Wrocław (Maślice), ul. Gosławicka, wał Ślęży, czerpak, leg. M. Wanat: 1♀; Poland, Wrocław, Świniary, 23.08.2018, meadows, grass & *Tanacetum*, leg. P. Jałoszńynski: 1♀; PL 24.7.2018, XS36, 51.149N/ 16.951E, Wrocław (Maślice), ul. Gosławicka, wał Ślęży, czerpak, leg. M. Wanat: 1♂; Japan, Ibaraki Pref., Tsukuba city, central and northern àrks, suburbs, 6.06.2018, leg. P. Jałoszyński: 1♀; Japan, Kanagawa Pref., Arashiyama ad Sagamiko, *Magnolia* forest, 5.05.2018, leg. P. Jałoszyński: 1♂; Japan, Emime Pref. Keyakidaira, Kumakogen, 33°28’37.4”N 132°58’38”E, 11.05.2018, primeval dec. forest, leg. P. Jałoszyński: 1♀.

Distribution. Paelearctic and Neotropic region. NEW RECORD from Poland.

- *Alloxysta circumscripta* (Hartig, 1841)

Distribution. Europe. Already cited from Poland by Kierych (1979b). No material examined at the Museum of Natural History of the University of Wroclaw.

- *Alloxysta citripes* (Thomson, 1862)

Material studied. (1♂) Poland, Wrocław, Świniary, decid. forest, 20.08.2016, leg. P. Jałoszyński: 1♂.

Distribution. Paelearctic. NEW RECORD from Poland.

- *Alloxysta consobrina (Zetterstedt, 1838)*

Material studied. (4♀, 1♂) Poland, Promno ad Poznań, 1.06.2015, leg. P. Jało-szyński: 1♀; Poland, Wrocław, Świniary – Widawa, #3, 12.05.2017, along railway, leg. P. Jałoszyński: 1♀; Poland, Włocławek, pine forest W of city, 22.05.2017, leg. P. Jałoszyń-ski: 1♂; Poland, Włocławek, pine forest W of city, 7–8.09.2018, leg. P. Jałoszyński: 1♀; PL 24.7.2018, XS36, 51.149N/16.951E, Wrocław (Maślice) ul. Gosławicka, wał Ślęży, czerpak, leg. M. Wanat: 1♀.

Distribution. Cosmopolitan. NEW RECORD from Poland.

- *Alloxysta fracticornis* (Thomson, 1862)

Material studied. (1♀, 4♂) PL 19.7.2014, WS64, 50.924N/15.941E, Wojcieszów ad. Góra Miłek Res., Leg. P. Jałoszyński: 1♂; Poland, Biebrza NP, Barwik, 53.3652N/22.5439E, sifted, river bank, leg. M. Wanat: 1♂; Poland, Promno ad Poznań, 1.06.2015,

leg. P. Jałoszyński: 1♂; PL 27.06.2015, FV08, 49.544N/22.514E NE of Ropieńka meadow/ slope, 580 m, leg. P. Jałoszyński: 1♀, 1♂.

Distribution. Paelearctic. Already cited in Poland (Kierych 1979b).

- *Alloxysta macrophadna* (Hartig, 1841)

Material studied. (1♀, 2♂) PL 19.7.2014, WS64, 50.924N/15.941E, Wojcieszów ad. Góra Miłek Res., Leg. P. Jałoszyński: 1♂; Poland, Wrocław, ante herbarium 28.09.2014, leg. P. Jałoszyński: 1♂; Poland, Promno ad Poznań, 10.07.2017, meadow with *Cirsium oleraceum*, leg. P. Jałoszyński: 1♀.

Distribution. Holarctic. Already cited from Poland (Kierych 1979b, Krawczyk *et al.* 2009).

- *Alloxysta mullensis* (Cameron, 1883)

Material studied. (7♀) Poland, Wrocław, Świniary – Wisława, 18.05.2017 along railway, leg. P. Jałoszyński: 1♀; Poland, Wrocław ante herbarium, 6.06.2017, leg. P. Jałoszyński: 2♀; PL 8-929.6.2018, XS36, 51.149N/16.951E, Wrocław (Maślice), ul. Gosławicka, wał Ślęży, czerpak, leg. M. Wanat: 1♀; Poland, Wrocław Świniary, 23.08.2018, meadows, grass & *Tanacetum*, leg. P. Jałoszyński: 2♀; Poland, Wrocław, Świniary, 23.08.2018, meadows, grass & *Tanacetum*, leg. P. Jałoszyński: 1♀.

Distribution. Paelearctic and Neotropical. NEW RECORD from Poland.

- *Alloxysta obscurata* (Hartig, 1840)

Material studied. (1♀) PL 8-929.6.2018, XS36, 51.149N/16.951E, Wrocław (Maślice), ul. Gosławicka, wał Ślęży, czerpak, leg. M. Wanat: 1♀.

Distribution. Holarctic. Already cited in Poland by Kierych (1979b) and Ferrer-Suay *et al.* (2018b).

- *Alloxysta pilipennis* (Hartig, 1840)

Material studied. (1♀) Poland, Wrocław, Świniary – Widawa, #1, 12.05.2017, along railway, leg. P. Jałoszyński: 1♀.

Distribution. Holarctic and Neotropical. Already cited in Poland by Kierych (1979b).

- *Alloxysta pleuralis* (Cameron, 1879)

Material studied. (4♀) PL 27.06.2015 FV08, 49.548N/22.521E, Ropieńka – Wojkówka meadow along road, 620 m, leg. P. Jałoszyński: 2♀; Poland, Wrocław, Świniary, decid. forest 20.08.2016, leg. P. Jałoszyński: 1♀; Poland, Wrocław, ante herbarium, 6.06.2017, leg. P. Jałoszyński: 1♀.

Distribution. Palaearctic. Already cited in Poland by Barczak (1991).

- *Alloxysta ramulifera* (Thomson, 1862)

Material studied. (4♀) Poland, Wrocław, Świniary, decid. forest, 20.08.2016, leg. P. Jałoszyński: 1♀; Poland, Włocławek, pine forest with *Padus*, W of city, 4.08.2017, leg. P. Jałoszyński: 1♀; Poland, Włocławek, pine forest W of city, 22.05.2017, leg. P. Jałoszyński: 1♀; Poland, Włocławek, *Pinus* forest, 22.06.2018, leg. P. Jałoszyński: 1♀.

Distribution. Paelearctic. Already cited in Poland by Kierych (1979b).

- *Alloxysta sawoniewiczi* (Kierych, 1988)

Material studied. (3♀) Japan, Ibaraki Pref., Tsukuba city, central and northem àrks, suburbs, 6.06.2018, leg. P. Jałoszyński: 1♀; Japan, Ibaraki, Pref. Shishitsuka (halfway Tsukuba – Tsuchiura), 1.05.2018, dec. forest & bomboo, leg. P. Jałoszyński: 2♀.

Distribution. Paelearctic. Already cited from Poland (Kierych 1988).

- *Alloxysta victrix* (Westwood, 1833)

Material studied. (11♀, 3♂) Switzerland, Geneva, Banks of Arve Riv. near route de Florissant, 23–24.07.2018, leg. P. Jałoszyński: 1♀; Poland, Wrocław, Świniary, 11.06.2016, leg. P. Jałoszyński: 1♀; Poland, Wrocław, Świniary, decid. forest 20.08.2016, leg. P. Jałoszyński: 1♀; Poland, Włocławek, pine forest W of city, 22.05.2017, leg. P. Jałoszyński: 1♂; Poland, Wrocław, Świniary – Widawa, 11.06.2017, forest & meadows along river, leg. P. Jałoszyński: 1♀, 1♂; Poland, Wrocław, ante herbarium, 16.07.2017, leg.

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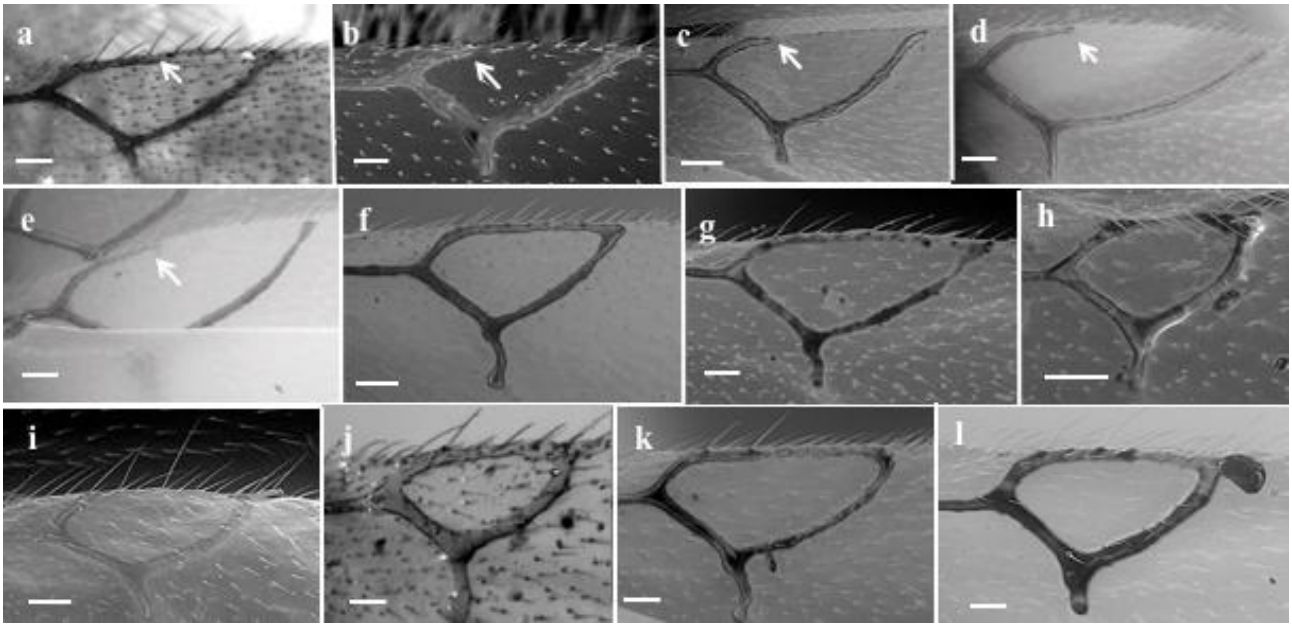

Figure 3. Types of radial cell: a) *P. villosa*; b) *A. citripes*; c) *A. castanea*; d) *A. macrophadna*; e) *A. obscurata*; f) *A. circumscripta*; g) *A. consobrina*; h) *A. ramulifera*; i) *A. pilipennis*; j) *A. arcuata*; k) *A. fracticornis*; l) *A. mullensis* (Scale bar = 50μm).

P. Jałoszyński: 1♀; Poland, Włocławek, *Pinus* forest, 22.06.2018, leg. P. Jałoszyński: 3♀; PL 8-929.6.2018, XS36, 51.149N/16.951E, Wrocław (Maślice), ul. Gosławicka, wał Ślęży, czerpak, leg. M. Wanat: 1♀; PL 5.7.2018, XS36, 51.149N/16.9516E, Wrocław (Maślice), ul. Gosławicka, wał Ślęży, czerpak, leg. M. Wanat: 1♀, 1♂; PL 24.7.2018, XS36, 51.149N/16.951E, Wrocław (Maślice), ul. Gosławicka, wał Ślęży, czerpak, leg. M. Wanat: 1♀.

Distribution. Cosmopolitan. Already cited in Poland by Kierych (1979b) and Krawczyk *et al.* (2009).

- *Dilyta subclavata* Förster, 1869

Material studied. (2♀, 1♂) Switzerland, Geneva, Banks of Arve Riv. near route de Florissant, 23–24.07.2018, leg. P. Jałoszyński: 1♀; Poland, Włocławek, pine forest with *Padus*, W of city, 4.08.2017, leg. P. Jałoszyński: 1♂; Poland, Włocławek, pine forest W of city, 7–8.09.2018, leg. P. Jałoszyński: 1♀.

Distribution. Holarctic. Already cited in Poland by Kierych (1979a).

- *Phaenoglyphis heterocera* (Hartig, 1841)

Material studied. (2♀) Poland, Wrocław, ante herbarium, 6.06.2017, leg. P. Jałoszyński: 1♀.

Distribution. Paelearctic. NEW RECORD from Poland.

- *Phaenoglyphis villosa* (Hartig, 1841)

Material studied. (2♀, 2♂) Spain, Catalonia, Barcelona, 21–25.04.2015, 41.390283, 2.102205, xeroth. hilside, leg. P. Jałoszyński: 1♀; PL 16.7.2018, XS36, 51.149N/16.951E, Wrocław (Maślice), ul. Gosławicka, wał Ślęży, czerpak, leg. M. Wanat: 1♂; PL 19.07.2014, WS64, 50.924N/15.941E, Wojcieszów ad. Góra Miłek Res., leg. P. Jałoszyński: 1♀; Poland, Wrocław, Świniary – Widawa, 11.06.2017, forest & meadows along river, leg. P. Jałoszyński: 1♂.

Distribution. Cosmopolitan. Already cited in Poland by Kierych (1979b).

- *Phaenoglyphis xanthochroa* Förster, 1869

Distribution. Paelearctic. Already cited from Poland by Krawczyk *et al.* (2009). No material examined from Museum of Natural History of the University of Wroclaw.

Discussion

Taking into account the difficulty of Charipinae taxonomy (Ferrer-Suay *et al.* 2019), it is important to notice that previous records by Kierych (1979b), Barczak (1991) and Krawczyk *et al.* (2009) from Poland were correct, as they have been cross-checked with the material recently collected and deposited in the Museum of Natural History of Wrocław University (Poland).

Charipinae is a worldwide distributed subfamily, well represented in the Paelearctic region and particularly in the Central Europe, where it has been extensively studied. However, as it was stated in our previous works, it is important to examine more material in other collections in order to improve the distribution records of Charipinae. By doing so, their distributional patterns become more precise every time.

Comprehensive and updated information about this subfamily can be found in Ferrer-Suay *et al.* (in prep), and complete worldwide identification key in Ferrer-Suay *et al.* (2019). Here a key of the Charipinae species of Poland is presented:

1.	Metasoma with a single tergal plate (Fig. 1d)	*D. subclavata*
1A.	Metasoma with two large visible terga, subequal in length along middorsal line, but basal tergite 1/4–1/3 smaller than second in lateral view (Fig. 1c)	2
2.	Lower part of mesopleuron with horizontal sulcus (Fig. 1a)	***Phaenoglyphis*** 3
2A.	Mesopleuron lacks horizontal sulcus (Fig. 1b)	***Alloxysta*** 5
3.	Radial cell partially open along anterior margin (Fig. 3a)	*P. villosa*
3A.	Radial cell closed	4
4.	head, mesosoma and metasoma yellowish brown; notauli deeply excavated, rounded scutellar foveae but with interior side straight. Male unknown	*P. xanthochroa*
4A.	Head, mesosoma and metasoma dark brown; notauli present but not deeply excavated; different shape of scutellar foveae	*P. heterocera*
5.	Brachypterous species; forewing reaching the beginning of the metasoma; without radial cell visible	*A. brachyptera*
5A.	Fully winged species, usually longer than mesosoma and metasoma	6
6.	Radial cell partially open	*7*
6A.	Radial cell closed	*11*
7.	Propodeal carinae present	*8*
7A.	Propodeal carinae absent	*10*
8.	Propodeum with two carinae well defined, reaching the base independently, thick and with the sides curved; rhinaria and club shaped begin in F3 in female	*A. pleuralis*
8A.	Propodeum with two carinae forming a plate or only joining at the base	*9*
9.	Propodeal carinae not protruding; F1 subequal to pedicel in both sexes (Fig. 2b); radial cell 2.1 times as long as wide (Fig. 3b)	*A. citripes*
9A.	Propodeal carinae well defined and protruding; F1 longer than pedicel (Fig. 2c); radial cell 2.3 times as long as wide (Fig. 3c) (sometimes the club shaped begin in F3)	*A. castanea*
10.	Female: F1 subequal to F2, F2 longer than F3, F3 subequal to F4 (Fig. 2d). Male: F2 and F3 curved, F1 subequal to F2, F2 longer than F3, F3 longer than F4; radial cell very big, 3.0 times as long as wide in both male and female (Fig. 3d)	*A. macrophadna*
10A.	Female: F1 longer than F2, F2 shorter or subequal to F3, F3 shorter than F4 (Fig. 2e). Male: without any flagellomere curved, F1 longer than F2, F2 longer than F3, F3 shorter than F4; radial cell 2.7 times as long as wide in both male and female (Fig. 3e)	*A. obscurata*
11.	Propodeal carinae present	*12*
11A.	Propodeal carinae absent	*14*
12.	Head yellow; F1 longer than F2, F2–F4 subequal; radial cell 3.0 times as long as wide; propodeum without setae where they are usually present in other species	*A. victrix*
12A.	Head brown; without the combination of features explained above	*13*
13.	Female: rhinaria and club shaped begin in F3; F1 longer than pedicel, F1 subequal to F2, F2 shorter or subequal to F3 (Fig. 2f). Male: F1–F3 not curved	*A. circumscripta*

13A.	Female: rhinaria and club shaped begin in F3 or F4; F1 longer than pedicel and F2, F2 subequal to F3 (Fig. 2g). Male: F1–F3 curved	*A. consobrina*
14.	Rhinaria and club shaped begin in F5; propodeal carinae narrow and well defined at upper half, wide and forming a plate at lower half with sharp margins	*A. sawoniewiczi*
14A.	Rhinaria and club shaped begin in F3 or F4; propodeal carinae form a complete plate with curved or slightly curved margins	*15*
15.	Pronotal carinae present	*16*
15A.	Pronotal carinae absent	*18*
16.	Rhinaria and club shaped begin in F4; F1 longer than F2, F2 subequal to F3 (Fig. 2h); with two small carinae on the pronotum, sometimes difficult to see; propodeum with two carinae separated by setae on the first third and forming a plate in the two last thirds; radial cell 2.0 times as long as wide (Fig. 3h)	*A. ramulifera*
16A.	Rhinaria and club shaped begin in F3; without the combination of features explained above.	*17*
17.	F1 longer than pedicel (Fig. 2i)	*A. pilipennis*
17A.	F1 shorter or subequal to pedicel (Fig. 2j)	*A. arcuata*
18.	F1 longer than pedicel. Female: F3 shorter than F4 (Fig. 2k). Male: rhinaria and club shaped begin in F3, F1–F3 subequal in length, F3 shorter than F4, F3 curved in male	*A. fracticornis*
18A.	F1 shorter or subequal to pedicel; without the combination of features explained above	*19*
19.	F1 subequal to pedicel; F1 longer than F2, F2 subequal to F3 (Fig. 2l)	*A. mullensis*
19A.	F1 shorter than pedicel, F1–F3 subequal in length, sometimes F1 slightly longer	*A. brevis*

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