

Illustrated key to the Palaearctic genera of the sawfly family Argidae (Hymenoptera: Symphyta), with taxonomic notes

Иллюстрированный определитель палеарктических родов пилильщиков семейства Argidae (Hymenoptera: Symphyta) и таксономические заметки

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КЛЮЧЕВЫЕ СЛОВА: Палеарктика, Argidae, Arginae, Sterictiphorinae, Athermantinae, роды, определитель, жилкование.

ABSTRACT. An illustrated key is provided for the identification of the 16 genera of Argidae so far known to occur in the Palaearctic region. A brief overview of all these genera and the most important publications after the World Catalogue of Symphyta [2010] are given. Morphological terms and a revised wing venation nomenclature of Argidae are explained and illustrated. Available keys for species identification within discussed genera are indicated.

РЕЗЮМЕ. Представлен иллюстрированный ключ для идентификации 16 родов Argidae, известных на сегодняшний день в Палеарктике. Приведен краткий обзор родов и основных статей, опубликованных позже мирового каталога Symphyta. Объяснены и проиллюстрированы морфологические термины и обновленное обозначение жилкования крыльев Argidae. Указаны имеющиеся ключи для идентификации видов в пределах родов.

Introduction

The Argidae is the second largest family in the suborder Symphyta, with almost 1,000 world known species. The Palaearctic region, which is notable for its high species diversity, is home to more than a third of the family's species and 16 genera. Over half of the Palaearctic argid species are placed in *Arge*, the largest genus of the family and also its type genus. However, the identification of a number of smaller and comparatively rarer genera is often challenging.

All extant keys either include only part of the Palaearctic region [Zhelochovtsev, 1988; Lee *et al.*, 2015; Lacourt,

2020] or are inconsistent with the current family system as proposed by Gussakovskij [1935] or Wei [1997]. A significant proportion of the existing keys are either outdated or contain inaccuracies. The absence of photographic illustrations renders the identification of individual genera challenging, and the status of characters for a number of rare taxa requires elucidation. This frequently results in discrepancies in the interpretation of characters, which in turn gives rise to erroneous definitions even at the genus level. The most recent molecular genetic data serve to substantiate only the classification at subfamily level and partly at tribal level [Wutke *et al.*, 2024]. It is notable that the modern genus boundaries do not always align with the data yielded by molecular genetic studies.

Furthermore, the data on the number of species described since the publication of the World Catalogue of Sawflies has been supplemented, and other significant publications which have appeared over the past decade and a half have also been noted. A succinct diagnosis is provided for each genus, accompanied by the most comprehensive existing keys for species identification. It is regrettable that not all the taxa could be studied, necessitating recourse to the original descriptions. It is important to develop a comprehensive key covering the entire Palaearctic region to allow alignment between its eastern and western parts. It is likely that the key will be updated in the future, based on additional data, primarily molecular data.

Methods and terminology

In this study, the Palaearctic region is defined according to the boundaries proposed in the World Catalogue of Symphyta [Taeger *et al.*, 2010].

General morphology and wing venation are applied according to Lacourt [2020]. The wing venation of Argidae differs from that of Tenthredinidae, which often serve as an example in illustrations, including the labelling of veins and cells important for determination. Different authors in their publications often propose original interpretations, which have their own advantages and disadvantages. The designations of Argidae wing venation and cell features used in this study, based in part on Lee *et al.* [2015], are shown in Fig. 1.

The diagnostic characters of the genera were studied using collections of the Zoological Institute of the Russian Academy of Sciences (ZISP, St. Petersburg, Russia), as well as original descriptions. Photos were taken using Nikon DS-Ri2 digital microscopy camera via Nikon SMZ25 stereomicroscope and Olympus SZX10 stereomicroscope with an Olympus OM-D EM1 camera, and processed with Helicon Focus 5.0 software.

In this paper, the synonymy and generic concepts of Argidae as outlined by Taeger *et al.* [2010] are adhered to. The position of some taxa is currently somewhat unclear and requires further clarification; genera are distinguished according to the morphological characters they exhibit (i.e., the characters interpreted and used in this key), although it can be expected that their position may be revised in the future. This is largely due to the fact that the 'weighting' (meaning) of certain morphological characters is still unclear. Some genera have very similar morphological structures and are separated only by a single character, while other groups of taxa that share similar structures are still classified within the larger genus *Arge*. To address this issue, it is hoped that future research will use molecular data to assess the significance of different characters in order to align the family's classification with its phylogeny. However, it is important to remember that identification keys should be practical tools for researchers, and the focus on creating phylogenetic keys sometimes results in ambivalent determinations because of numerous exceptions.

Separately, it is worth noting that individual variation in morphology is often observed in sawflies, including those of the family Argidae, particularly in wing venation. In a large number of specimens studied, individual aberrations were observed, sometimes asymmetric. Additionally, some veins may be absent or present on the wings of isolated specimens, spurs on the tibiae may be absent in some individuals, even within one species, and the shape of the head sometimes depends on the generation and seasons. Often such variations also affect the key characters of the genus, leading to misidentifications even at this level. In such questionable situations it is much better to study longer series of specimens than single individuals.

Results

KEY TO THE PALAEARCTIC GENERA OF ARGIDAE

1. Cell R of fore wing closed (Figs 2, 4). Vein Sc present (Fig. 12). Antenna of males simple (Fig. 5) 2
 - Cell R of fore wing open (Fig. 3). Vein Sc absent or incomplete (Fig. 13). Antenna of male bifurcate (Fig. 6) (Sterictiphorinae) 10
2. Middle and often also hind tibiae with preapical spurs (Fig. 7) (Arginae, part) 3
 - All tibiae without preapical spurs (Fig. 8) 5
3. Cell 2A of fore wing open (Fig. 9) 4
 - Cell 2A of fore wing closed (Fig. 10) 4
4. Abdominal tergites of males and females without long medial process or triangular swelling. Hind tibia always with preapical spur *Arge* Schrank, 1802
 - Fifth abdominal tergite of male with long medial process (Fig. 17), in females with slightly noticeable triangular swelling and inconspicuous median groove on tergites 4–6 (Fig. 18). Hind tibia with or without preapical spur *Spinarge* Wei, 1998
5. Cell 2A of fore wing open or absent, vein 2A+3A barely distinguishable or without clear apex (as in Figs 9, 11) (Arginae, part) 6
 - Cell 2A of fore wing closed, vein 2A+3A distinctly sclerotised (as in Fig. 10) (Athermatinae) 7
6. Fore wing with three cells Rs. Vein 2r–m absent (Fig. 4). Face below base of antenna not convex (Fig. 14) *Kokujewia* Konow, 1902
 - Fore wing with four cells Rs. Vein 2r–m present (as in Fig. 2). Face below base of antenna strongly convex (Fig. 15) *Asiarge* Gussakovskij, 1935
7. Vein B of fore wing joins vein R well before (longer than vein Sc) junction point of vein M (as in Fig. 13) 8
 - Veins B and M of fore wing join up at same point on vein R (as in Fig. 12) 9
8. Hind tibia and apical spurs flattened; head strongly enlarged behind eyes in dorsal view (see fig. 11 in Luo *et al.*, 2019) *Athermantus* W.F. Kirby, 1882
 - Hind tibia and spurs non flattened (as in Figs 7, 8); head not enlarged behind eyes in dorsal view (as in Fig. 16) *Cibdela* Konow, 1899
9. Width of head only slightly less than width of thorax in dorsal view (see Figs 38, 43, 45, 49 in Liston *et al.*, 2017). Sheath obtuse in lateral view, width of its base in dorsal view almost 2.0 times its length (see Figs 4, 5 in Liston *et al.*, 2017) *Pampsilota* Konow, 1899
 - Width of head considerably less than width of thorax in dorsal view (Fig. 16). Sheath with acute apex in lateral view (Fig. 24), width of its base in dorsal view equal to or slightly larger than length (Fig. 23) *Tanyphatnidea* Rohwer, 1912
10. Vein Sc of fore wing present (as in Fig. 12, also see Fig. 1 in Wei, 1997). Labial palps with 3 segments, maxillary palps with 5 segments. Right mandible simple, without basal tooth *Ortasiceros* Wei, 1997
 - Vein Sc of fore wing absent (Fig. 13). Labial palps with 4 segments, maxillary palps with 6 segments (Fig. 19). Right mandible with basal tooth (Fig. 21) 11
11. Cell A of hind wing closed (Figs 22, 23) 12
 - Cell A of hind wing widely open (Fig. 26) 14
12. Veins B and M of fore wing join up at same point on vein R (as in Fig. 12, also see Fig. 1C in Choi *et al.*, 2015). Claws with angular basal lobe (see Fig. 2C in Choi *et al.*, 2015). Process of cell A of hind wing almost 3.0 times its width (see Fig. 1C in Choi *et al.*, 2015) *Yasumatsua* Togashi, 1970
 - Vein B of fore wing joins vein R well before (longer than vein Sc) junction point of vein M (as in Fig. 13). Claws without angular basal lobe (Fig. 20). Petiole of cell A of hind wing less than 3.0 times its width (Figs 22, 23) 13
13. Cell 2A of fore wing open (as in Fig. 11). Petiole of cell A of hind wing 2.0 times longer than its width (Fig. 23) *Aprosthemina* Konow, 1899
 - Cell 2A of fore wing closed (as in Fig. 10). Petiole of cell A of hind wing shorter than its width (Fig. 22) *Sterictiphora* Billberg, 1820

14. Veins B and M of fore wing join up at same point on vein R (as in Fig. 12) *Aproceros* Malaise, 1931
 – Vein B of fore wing joins vein R well before (longer than vein Sc) junction point of vein M (as in Fig. 13) 15
15. Cell 2A of fore wing absent (as in Fig. 11)
 *Pseudaprosthemis* Gussakovskij, 1935
 – Cell 2A of fore wing closed (as in Fig. 10)
 *Schizocerella* Forsius, 1927

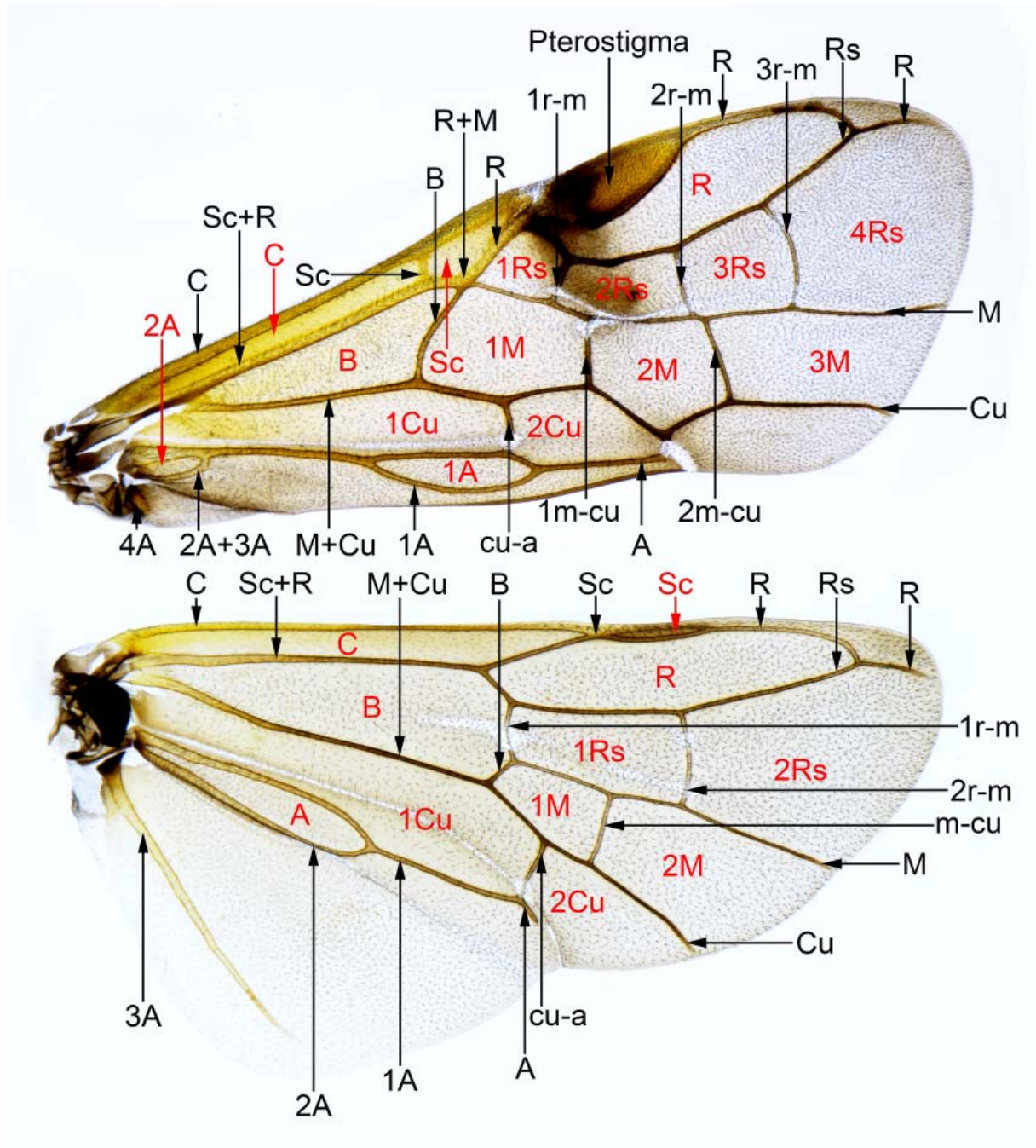


Fig. 1. Venation of wings of *Arge ustulata* (Linné, 1758). Cells (in red): R — radial; 1Rs, 2Rs, 3Rs, 4Rs — 1st, 2nd, 3rd, 4th subradial; Sc — subcostal; B — basal; 1M, 2M, 3M — 1st, 2nd, 3rd medial; 1Cu, 2Cu — 1st, 2nd cubital; 1A — apical anal; 2A+3A — basal anal. Veins (in black): C — costal; Sc — subcostal; R — radial; Rs — subradial; M — medial; B — basal; Cu — cubital; 1A, 2A, 3A, 4A — 1st, 2nd, 3rd, 4th anal; 1r-m, 2r-m, 3r-m — 1st, 2nd, 3rd radio-medial; 1m-cu, 2m-cu — 1st, 2nd medial-cubital; cu-a — cubital-anal.

Рис. 1. Жилкование крыльев *Arge ustulata* (Линне, 1758). Ячейки (красным цветом): R — радиальная; 1Rs, 2Rs, 3Rs, 4Rs — 1-я, 2-я, 3-я, 4-я субрадиальные; Sc — субкостальная; B — базальная; 1M, 2M, 3M — 1-я, 2-я, 3-я медиальные; 1Cu, 2Cu — 1-я, 2-я кубитальные; 1A — апикальная анальная; 2A+3A — базальная анальная. Жилки (черным цветом): C — костальная; Sc — субкостальная; R — радиальная; Rs — субрадиальная; M — медиальная; B — базальная; Cu — кубитальная; 1A, 2A, 3A, 4A — 1-я, 2-я, 3-я, 4-я анальные; 1r-m, 2r-m, 3r-m — 1-я, 2-я, 3-я радиально-медиальные; 1m-cu, 2m-cu — 1-я, 2-я медиально-кубитальные; cu-a — кубитально-анальная.

Notes on the genera of Argidae known from the Palaearctic region (in alphabetical order)

Aproceros Malaise, 1931

Figs 3, 11, 19–21, 26.

Type species: *Aproceros umbricola* Malaise, 1931.

Body size 4.5–7.0 mm. Labial palps with 4 segments, maxillary palps with 6 segments. Right mandible with basal tooth. Antennae of males bifurcate. Fore wings with 4 cells Rs; cell R open; vein Sc absent; vein 2r–m present; veins B and M join up at same point on vein R; cell 2A absent. Cell A of hind wing widely open. All tibiae without preapical spurs. The colour is usually black or brownish–red, without a metallic sheen.

The genus is distributed in the Palaearctic (East and West) and Oriental regions. Number of species: World — 10; Palaearctic — 9. The larvae feed on the leaves of elms (*Ulmus* spp.). *Aproceros leucopoda* Takeuchi, 1939 is an invasive pest of elms (*Ulmus* spp.) that has spread widely over the last decade in central Europe (e.g., Blank *et al.* [2010, 2014]; Matosevic, Pernek [2011]; Zandigiacomo [2011]; Csoka *et al.* [2012]; Boeve [2013]; Glavendekic *et al.* [2013]; Pimpl [2014]; Sobczyk, Nuss [2014]; Doychev [2015]; Mol, Vonk [2015]; Véték *et al.* [2017; 2022]; Denton [2018]; Hölling [2018]; Burton *et al.* [2019]; Sinchuk *et al.* [2021]) and Russia (e.g., Artokhin *et al.* [2012]; Lengsova [2012]; Shchurov *et al.* [2012]; Gninenko *et al.* [2013]; Lengsova, Mischenko [2013]; Sorokin [2013]; Blummer [2015]; Martynov, Nikulina [2017]; Kondratyeva *et al.* [2023]), and has also been accidentally introduced to North America [Martel *et al.*, 2021; Oten *et al.*, 2023]. Males of *Aproceros pallidicornis* (Mocsáry, 1909) are further described in Choi *et al.* [2015]. The most complete identification key of *Aproceros* species is presented in Togashi [2003].

Aprosthemata Konow, 1899

Figs 6, 23.

Type species: *Hylotoma brevicornis* Fallén, 1808.

Body size 4.5–8.5 mm. Labial palps with 4 segments, maxillary palps with 6 segments. Right mandible with basal tooth. Antennae of males bifurcate. Fore wings with 4 cells Rs; cell R open; vein Sc absent; vein 2r–m present; vein B of fore wing joins vein R well before (longer than vein Sc) junction point of vein M; cell 2A absent. Petiole of cell A of hind wing about 2.0 times its width. Claws simple. All tibiae without preapical spurs. The colour often yellow with black and without metallic sheen.

The genus is distributed in the Palaearctic, Nearctic and Oriental regions. Number of species: World — 55; Palaearctic — 50. The life history of *Aprosthemata tardum* (Klug, 1814) was investigated by Liston *et al.* [2018]. The most complete key to the genus for the Palaearctic region was compiled by Gussakovskij [1935], but it is now considerably out of date and requires substantial revision and correction. Key to Chinese species see in Wu *et al.* [2021], European — in Lacourt [2020].

Arge Schrank, 1802

Figs 1–2, 10, 12.

Type species: *Tenthredo enodis* Linné, 1767.

Body size 6.5–12.0 mm. Right mandible without basal tooth. Antennae of males simple. Fore wings with 4 cells Rs; cell R closed; vein Sc present; vein 2r–m present; veins B and M join up at same point on vein R; cell 2A closed. Cell A of hind wing closed. Claws simple. Middle and hind tibiae with preapical spurs. The colour is varied, often with a metallic sheen.

The genus is widely distributed in the Palaearctic, Nearctic, Oriental, Neotropical, Afrotropical and Australasian regions. Number of species: World — 396; Palaearctic — 187. Since the publication of the world catalogue of sawflies [Taeger *et al.*, 2010], 46 valid species have been described, of which 17 are noted in the Palaearctic [Koch, Goergen, 2010; Vasilenko, 2010; Wei, Niu, 2010; Koch, 2011, 2013; Koch, Eardley, 2011; Shinohara *et al.*, 2011a, b, 2015; Hara *et al.*, 2012; Hara, Shinohara, 2012a, b, 2013, 2014; Koch, Liston, 2012a, b; Shinohara, Hara, 2012, 2013, 2017, 2018; Wei *et al.*, 2013; Choi *et al.*, 2016; Du *et al.*, 2018; Chen *et al.*, 2020; Hara *et al.*, 2020; Kaplan, Harris, 2021; Wan *et al.*, 2022; Basov, Vasilenko, 2024]. Another 11 species, *A. laticincta* Wei, 2010; *A. renemalaisei* Wei, 2010; *A. qini* Wei, 2010; *A. nigroharpa* Wei, 2010; *A. shenae* Wei, 2010; *A. xini* Wei, 2010; *A. longiflagella* Wei, 2010; *A. fanae* Wei, 2010; *A. striatitergita* Wei, 2010; *A. rugosipleura* Wei, 2010; and *A. stenolutea* Wei et Niu, 2010, have been reported as new [Wu *et al.*, 2010] but their descriptions have not been published to date, and they should be treated as *nomina nuda*.

Asiarge Gussakovskij, 1935

Fig. 15.

Type species: *Asiarge shnitnikovi* Gussakovskij, 1935.

Body size 10.5–13.5 mm. Face below base of antenna strongly convex. Antennae of males simple. Fore wings with 4 cells Rs; cell R closed; vein Sc present; vein 2r–m present; cell 2A of fore wing absent, vein A2+A3 barely distinguishable, straight, without clear apex. All tibiae without preapical spurs. For additional generic characters, see Blank and Taeger [1998].

The genus is distributed in the Palaearctic region (East). Number of species: World and Palaearctic — 3. A small genus, all members of which are distributed in Middle and Central Asia. Members of the genus are rare, and data are extremely scarce. For an identification key for the three known species, see Blank and Taeger [1998].

Athermantus W.F. Kirby, 1882

Type species: *Hylotoma imperialis* F. Smith, 1860.

Body size 13.0–16.0 mm. Head strongly enlarged behind eyes in dorsal view. Face roundly and strongly elevated, without middle ridge. Fore wings with 4 cells Rs; cell R closed; vein Sc present; vein 2r–m present; vein B of fore wing joins vein R well before (longer than vein Sc) junction point of vein M. All tibiae without preapical spurs. Hind tibiae and apical spurs flattened. Saw sheath short and very broad, round at apex in dorsal view. Body black with strong metallic purplish tinge. For additional generic characters see Luo *et al.* [2019].

This small genus is distributed in the Palaearctic (East) and Oriental regions. Number of species: World — 3; Palaearctic — 1. The body size of *Athermantus* species is the largest among the members of Argidae. Recently, a description of a new species from China was published with an identification key to the species of the genus [Luo *et al.*, 2019].

Cibdela Konow, 1899

Type species: *Hylotoma janthina* Klug, 1834.

Body size 8.0–10.0 mm. Head not enlarged behind eyes in dorsal view. Antennae of males simple. Fore wings with 4 cells Rs; cell R closed; vein Sc present; vein 2r–m present; vein B of fore wing joins vein R well before (longer than vein Sc) junction point of vein M; cell 2A closed. All tibiae without preapical spurs. Hind tibiae and spurs simple.



Figs 2–15. Argidae, details of morphology: 2, 10, 12 — *Arge ustulata* (Linné, 1758); 3, 11 — *Aproceros leucopoda* Takeuchi, 1939; 4, 8, 14 — *Kokujewia ectrapela* Konow, 1902; 5 — *Spinarge metallica* (Klug, 1834); 6 — *Aprosthemella melanurum* (Klug, 1814); 7, 9 — *Pseudarge rubicunda* Gussakovskij, 1935; 13 — *Sterictiphora geminata* (Gmelin, 1790); 15 — *Asiarge regeli* Gussakovskij, 1935. 2–4 — veins R and Rs of fore wing, dorsally; 5–6 — male antenna, dorsally; 7–8 — hind tibia, ventrally; 9–11 — cells 1A and 2A of fore wing, dorsally; 12–13 — vein R+M of fore wing, dorsally; 14–15 — head, laterally.

Рис. 2–15. Argidae, детали морфологии: 2, 10, 12 — *Arge ustulata* (Линней, 1758); 3, 11 — *Aproceros leucopoda* Такеучи, 1939; 4, 8, 14 — *Kokujewia ectrapela* Конов, 1902; 5 — *Spinarge metallica* (Клюг, 1834); 6 — *Aprosthemella melanurum* (Клюг, 1814); 7, 9 — *Pseudarge rubicunda* Гуссаковский, 1935; 13 — *Sterictiphora geminata* (Гмелин, 1790); 15 — *Asiarge regeli* Гуссаковский, 1935. 2–4 — жилки R и Rs переднего крыла, дорсально; 5–6 — антенна самца, дорсально; 7–8 — задние голени, вентрально; 9–11 — ячейки 1A и 2A переднего крыла, дорсально; 12–13 — жилка R+M переднего крыла, дорсально; 14–15 — голова, латерально.

The genus is distributed in the Palaearctic (East), Oriental and Australasian regions. Number of species: World — 14; Palaearctic — 8. *C. janthina* (Klug, 1834) has been introduced to La Réunion (France, Indian Ocean) in an attempt at biological control of an invasive species of *Rubus* (e.g., Bourgeois *et al.* [2011]; Dumont *et al.* [2013]; Mathieu *et al.* [2014]; Florens *et al.* [2017]).

***Kokujewia* Konow, 1902**

Figs 4, 8, 14.

Type species: *Kokujewia ectrapela* Konow, 1902.

Body size 10.0–12.0 mm. Fore wings with 3 cells Rs; cell R closed; vein Sc present; vein 2r–m absent; veins B and M join up at same point on vein R; cell 2A cell 2A absent or open, vein A2+A3 barely distinguishable, straight, without clear apex. Cell

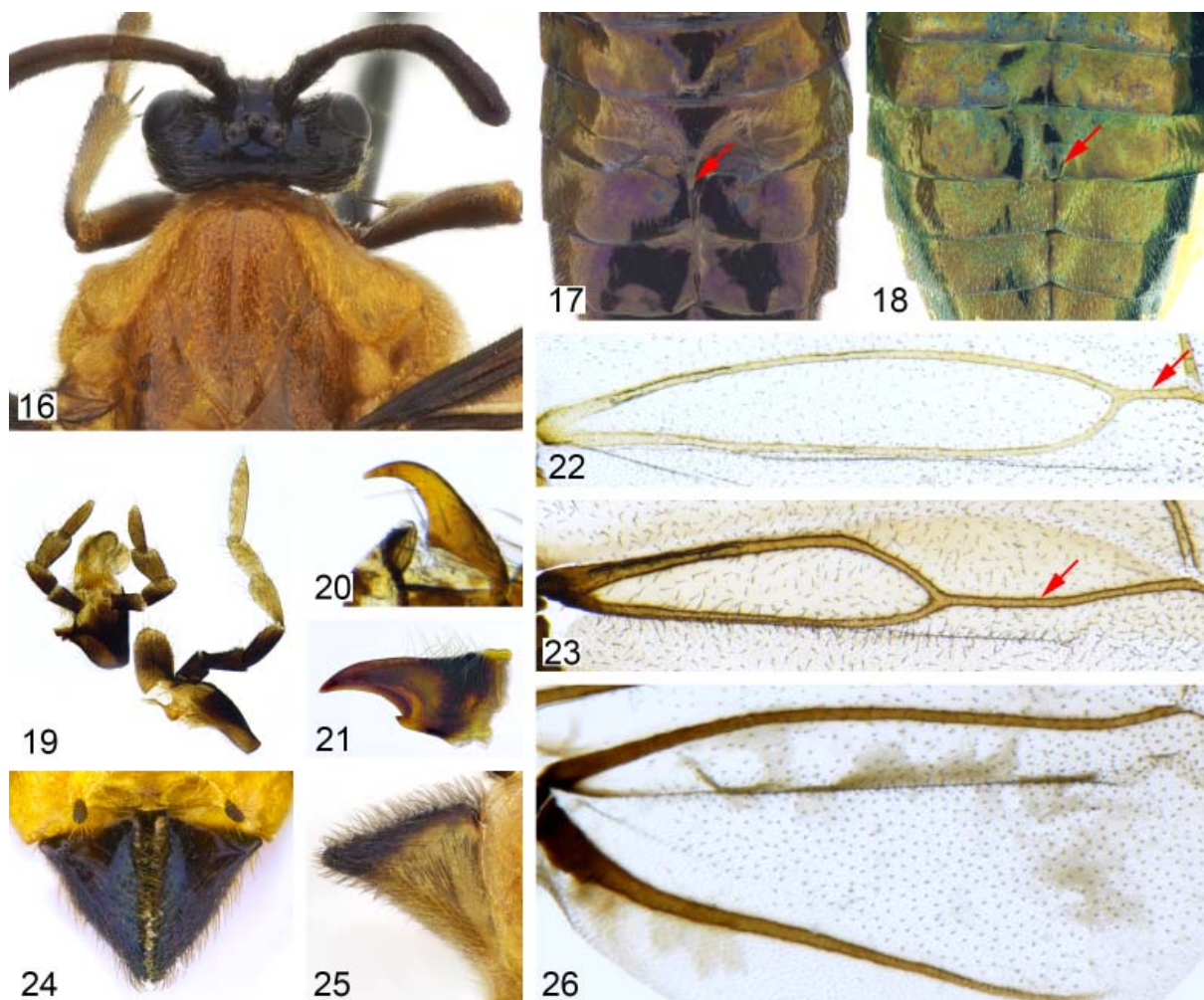
A of hind wing closed. All tibiae without preapical spurs. For additional generic characters, see Blank and Taeger [1998].

The genus is distributed in the Palaearctic (West) region. Number of species: World and Palaearctic — 3. A small genus, whose representatives are mainly distributed in West Asia. Biology and host specificity of *Kokujewia ectrapela* Konow, 1902 was treated in Karimpour [2015]. For an identification key to the three known species, see Blank and Taeger [1998].

***Ortasiceros* Wei, 1997**

Type species: *Ortasiceros zhengi* Wei, 1997.

Body size 4.2–6.1 mm. Right mandible simple, without basal tooth. Labial palps with 3 segments, maxillary palps with 5 segments. Antennae of males bifurcate. Fore wings with 4 cells Rs;



Figs 16–24. Argidae, details of morphology: 16, 24, 25 — *Tanyphatnidea sinensis* (W.F. Kirby, 1882); 17, 18 — *Spinarge metallica* (Klug, 1834); 19, 20, 21, 26 — *Aproceros leucopoda* Takeuchi, 1939; 22 — *Sterictiphora geminata* (Gmelin, 1790); 23 — *Aprosthema melanurum* (Klug, 1814); 16 — head and thorax, dorsally; 17–18 — medial tergites of abdomen, dorsally; 19 — labrum and right mandible, dorsally; 20 — claw, laterally; 21 — right mandible, dorsally; 22, 23, 26 — cell A of hind wing, dorsally; 24 — saw sheath, dorsally; 25 — saw sheath, laterally.

Рис. 16–26. Argidae, детали морфологии: 16, 24, 25 — *Tanyphatnidea sinensis* (W.F. Kirby, 1882); 17, 18 — *Spinarge metallica* (Klug, 1834); 19, 20, 21, 26 — *Aproceros leucopoda* Takeuchi, 1939; 22 — *Sterictiphora geminata* (Gmelin, 1790); 23 — *Aprosthema melanurum* (Klug, 1814); 16 — голова и грудь, дорсально; 17–18 — медиальные тергиты брюшка, дорсально; 19 — нижняя губа и правая мандибула, дорсально; 20 — коготок, латерально; 21 — правая мандибула, дорсально; 22, 23, 26 — ячейка A заднего крыла, дорсально; 24 — ножны пилки, дорсально; 25 — ножны пилки, латерально.

cell R open; vein Sc present; vein B of fore wing joins vein R well before (longer than vein Sc) junction point of vein M; cell 2A of fore wing obliterate. Cell A of hind wing widely open. Cenchri very large. Fore tibial spurs about two thirds the length of fore basitarsus; claw simple. For additional generic characters, see Wei [1997].

The genus is distributed in the Palaearctic (East) region. Number of species: World and Palaearctic — 6. For a key to *Ortasiceros* species, see Wei [1997].

***Pampsilota* Konow, 1899**

Type species: *Pampsilota afer* Konow, 1899.

Body size 5.3–15.3 mm. Eyes not convex, inner margins of eyes nearly parallel. Width of head slightly less than width of thorax. Antennae of males simple. Third segment of antennae distinctly compressed and expanded. Fore wings with 4 cells Rs; cell R closed; vein Sc present; vein 2r–m present; veins B and M join up at same point on vein R; cell 2A closed; upper margin of cell 3Rs almost 2.0 times as large as lower. All tibiae without preapical spurs. Saw sheath obtuse in lateral view, width at the base view almost 2.0 times its length in dorsal.

Representatives of the genus *Pampsilota* have a very large morphological diversity of genital structures, which raises doubts about the monophyly of the genus. Liston *et al.* [2017] suggested that *Pampsilota* might reasonably be treated as merely a species group within *Arge*.

The genus is distributed in the Palaearctic (East), Oriental and Afrotropical regions. Number of species: World — 8; Palaearctic — 2. Within the Palaearctic, members of *Pampsilota* have been found only in northern China. For a key to Afrotropical *Pampsilota* species, see Liston *et al.* [2017].

***Pseudaprosthema* Gussakovskij, 1935**

Type species: *Pseudaprosthema barbara* Gussakovskij, 1935.

Body size about 5.0 mm. Labial palps with 4 segments, maxillary palps with 6 segments. Right mandible with basal tooth. Antennae of males bifurcate. Fore wings with 4 cells Rs; cell R open; vein 2r–m present; vein Sc present; vein B of fore wing joins vein R well before (longer than vein Sc) junction point of vein M; pterostigma large; cell 2A open. Cell A of hind wing open. All tibiae without preapical spurs.

The genus is distributed in the Palaearctic (West) region. Number of species: World and Palaearctic — 1. Lacourt [2020] synonymized all three species with each other, but noted that this requires further verification with a re-examination of the type material.

***Pseudarge* Gussakovskij, 1935**

Figs 7, 9.

Type species: *Pseudarge rubicunda* Gussakovskij, 1935.

Body size 8.0–11.5 mm. Supraclypeal area of face conspicuously, roundly protruding in lateral view. Antennae of males simple. Fore wings with 4 cells Rs; cell R closed; vein Sc present; vein 2r–m present; veins B and M join up at same point on vein R; cell 2A open; cell 3Rs shorter than in height. Cell A of hind wing closed. Middle and hind tibiae with preapical spurs. For additional generic characters, see Koch and Goergen [2008].

The genus is distributed in the Palaearctic and Oriental regions. Number of species: World — 7; Palaearctic — 4. Recently, the males of two species have been described for the first time [Basov, 2023] and a new species from the Crimean Peninsula described [Basov, 2025].

***Schizocerella* Forsius, 1927**

Type species: *Schizocerella axillaris* Forsius, 1927.

Body size 5.0–7.0 mm. Labial palps with 4 segments, maxillary palps with 6 segments. Right mandible with basal tooth. Antennae of males bifurcate. Fore wings with 4 cells Rs; cell R open; vein Sc absent; vein 2r–m present; vein B of fore wing joins vein R well before (longer than vein Sc) junction point of vein M; cell 2A closed. Cell A of the hind wing widely open. For additional generic characters, see Smith [1971].

The genus is distributed in the Palaearctic (East), Nearctic, Neotropical and Australasian regions. Number of species: World — 5; Palaearctic — 1. In the Palaearctic, the genus is known only from Japan, following synonymization of *Approceroides* Togashi, 1997 with *Schizocerella* [Blank *et al.*, 2009].

***Spinarge* Wei, 1998**

Figs 5, 17–18.

Type species: *Spinarge sichuanensis* Wei, 1998.

Body size 7.2–11.9 mm. Antennae of males simple. Fore wings with 4 cells Rs; cell R closed; vein Sc present; vein 2r–m present; cell 2A closed. Cell A of hind wing closed. Hind tibiae with or without preapical spurs. Fifth abdominal tergite of male has a long medial process, in females represented by a scarcely noticeable triangular swelling and inconspicuous median groove on tergites 4–6. Hind tibia with or without preapical spur.

Representatives of this genus are very similar to the closely related genus *Arge*. Furthermore, whereas the males have a pronounced process of the 7th tergite, which makes it possible to reliably place them in *Spinarge*, in females the corresponding character is very weak and in some cases can be confused with folds and deformations of the abdomen caused by drying. In collections, females significantly predominate, while males are rare, which in our experience leads to a large number of erroneous identifications.

The genus is distributed in the Palaearctic and Oriental regions. Number of species: World — 13; Palaearctic — 10. Since the publication of the world catalogue of sawflies [Taeger *et al.*, 2010] two new species have been described [Liu *et al.*, 2021; Vasilenko, 2022]. New data on the distribution and biology of members of the genus were also published [Shinohara, Hara, 2012; Shinohara *et al.*, 2016]. *Spinarge acutithetica* Wei, 2010 and *Spinarge xanthofemorata* Wei, 2010 have been reported as new taxa [Wu *et al.*, 2010], but their descriptions have not been published to date. They should be considered as *nomina nuda*.

In the latest key to Argidae genera for Europe [Lacourt, 2020], the thesis “hind tibiae without preapical spurs” leads to the genus *Spinarge*. This is erroneous, because, as noted by Hara and Shinohara [2006], only two species actually do not have them, while the rest, including the only one inhabiting Europe, *Spinarge metallica* (Klug, 1834), have such spurs. This makes it impossible to correctly determine the genus according to that key. In all existing keys for Russia [Gussakovskij, 1935; Zhelochovtsev, 1988], the species of the genus *Spinarge* are considered as part of the genus *Arge*.

***Sterictiphora* Billberg, 1820**

Figs 6, 22.

Type species: *Hylotoma furcata* (Villers, 1789).

Body size 5.0–7.5 mm. Labial palps with 4 segments, maxillary palps with 6 segments. Right mandible with basal tooth. Antennae of males bifurcate. Fore wings with 4 cells Rs; cell R

open; vein Sc absent; vein 2r–m present; veins B of fore wing joins vein R well before (longer than vein Sc) junction point of vein M; cell 2A closed; petiole of cell A of hind wing shorter than its width. Cell A of hind wing closed. Claws simple.

The genus is distributed in the Palaearctic, Nearctic, and Oriental regions. Number of species: World — 42; Palaearctic — 37. Two new species have been recently described from South Korea [Wei *et al.*, 2017]. *Rosa multiflora* Thunb. (Rosaceae) was recorded as host plant for *S. nipponica* Takeuchi, 1939 [Hideho *et al.*, 2021] and *Amelanchier* Medik. (Rosaceae) for *S. sericea* (Norton, 1867) [Eiseman, Smith, 2020]. *S. brevinerva* Wei, 2010 and *S. nigrometathoracina* Wei, 2010 have been reported as new taxa [Wu *et al.*, 2010] but their descriptions have not been published to date. These species should be treated as *nomina nuda*.

Tanyphatnidea Rohwer, 1912

Figs 16, 24–25.

Type species: *Tanyphatnidea microcephala* Rohwer, 1912.

Body size 8.0–13.0 mm. Eyes convex, inner margins of eyes strongly inclined. Width of head considerably less than width of thorax. Antennae of males simple. Third segment of antennae long and thin, only slightly thickened toward apex, not compressed. Fore wings with 4 cells Rs; cell R closed; vein Sc present; vein 2r–m present; veins B and M join up at same point on vein R; cell 2A closed; upper margin of cell 3Rs almost 2.0 times as large as lower. Cell A of hind wing closed. Sheath with acute apex in lateral view, width of its base in dorsal view equal to or slightly greater than length. All tibiae without preapical spurs.

The genus is distributed in the Palaearctic (East) and Oriental regions. Number of species: World and Palaearctic — 2. *Tanyphatnidea sinensis* (W.F. Kirby, 1882) produces several generations per year; larva develops on *Polygonum* spp. [Wei *et al.*, 2006].

Yasumatsua Togashi, 1970

Type species: *Yasumatsua nigra* Togashi, 1970.

Body size about 5.0 mm. Antennae of males bifurcate. Fore wings with 4 cells Rs; cell R closed; vein Sc present; vein 2r–m present; veins B and M join up at same point on vein R; cell 2A closed; petiole of cell A of the hind wing almost 3.0 times its width. Tarsal claws with basal lobe. Coloration blackish-brown, without a metallic sheen. For additional generic characters see Lee *et al.* [2013] and Choi *et al.* [2015].

The genus is distributed in the Palaearctic (East) and Oriental regions. Number of species: World — 3; Palaearctic — 2. After the publication of the World catalogue of sawflies [Taeger *et al.*, 2010], a description of a new species from South Korea with an identification key for all species of the genus was published [Choi *et al.*, 2015].

Conclusion

In the current study, a comprehensive identification key was compiled for 16 Argidae genera recorded in the Palaearctic fauna. In this key, several different characters were used to delimit the genera, particularly traditional morphological features such as wing venation, saw sheath structure, and the presence or absence of tibial spurs. However, finding universal generic markers is challenging, due to the combination of significant

uniformity within the family and the high number of species. The genus *Arge* exhibits a variability of characters within the genus that is comparable to the differences between other genera. Conversely, the boundary between *Arge* and some genera such as *Pampsilota* or *Tanyphatnidea* remains rather obscure. The key may eventually become too large and complex because of the number of exceptions likely to be found during detailed examination of genera. Important key characters, like the number of preapical spurs in *Spinarge*, may vary between individuals of the same species. It is essential to prepare keys for the entire Palaearctic region to ensure consistency and compatibility, as the gap between the eastern and western parts, along with country-specific keys, can lead to inconsistencies in the general system.

It should be emphasized that it is likely that molecular genetic data obtained in the future will help to clarify the currently complex generic taxonomy of Argidae. Continued integration of molecular data with traditional morphological taxonomy is essential to resolve remaining ambiguities and ensure accurate genus-level classifications.

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