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## Review of the genus *Ilione* (Diptera, Sciomyzidae)

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**Abstract.** A review of a mostly West Palaearctic genus *Ilione* is offered. It includes eight species of *Ilione* regarded as valid after the last revision of the genus (Verbeke 1964) and one here described species from North India (*I. bindata* sp. nov.). The publication is divided into two parts. Part 1 is devoted to five common species which comprise about 99% specimens of *Ilione* in insect collections. We examined representative material of these species and provide new illustrations and a revised identification key for them. Part 2 is devoted to three rare sub-Mediterranean species of *Ilione* and one newly described species. In in each part we offer descriptions of available specimens and taxonomic comments.

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**Keywords:** Diptera, Sciomyzidae, *Ilione*, review, identification key

## Обзор рода *Ilione* (Diptera, Sciomyzidae)

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**Аннотация.** Предложен обзор преимущественно западно-палеарктического рода *Ilione*. Наш обзор включает все восемь видов *Ilione*, признанных валидными после последней ревизии рода (Verbeke 1964), и один описанный здесь вид из Северной Индии (*I. bindata* sp. nov.). Публикация разделена на две части. Часть I посвящена пяти распространенным видам, которые составляют около 99% экземпляров *Ilione* в коллекциях насекомых и репрезентативный материал которых мы изучили. Мы предлагаем новые иллюстрации и пересмотренный идентификационный ключ для этих видов. Часть II посвящена трем малоизвестным субсредиземноморским видам *Ilione* и одному описываемому здесь виду. В каждом случае мы предлагаем описание имеющихся экземпляров и даем таксономические комментарии.

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**Ключевые слова:** Diptera, Sciomyzidae, *Ilione*, обзор, определительный ключ

## Introduction

*Ilione* Haliday, 1837 is a genus of the tribe Tetanocerini. *Ilione* is endemic to the Palaearctic and clearly originated from the West Palaearctic. The genus was also known as *Knutsonia* Verbeke, 1964. The reasons for changing its name to *Ilione* were discussed in Steyskal et al. (Steyskal et al. 2003). The synonymy of the species of *Ilione* is given in accordance with the catalog (Rozkošný, Elberg 1984).

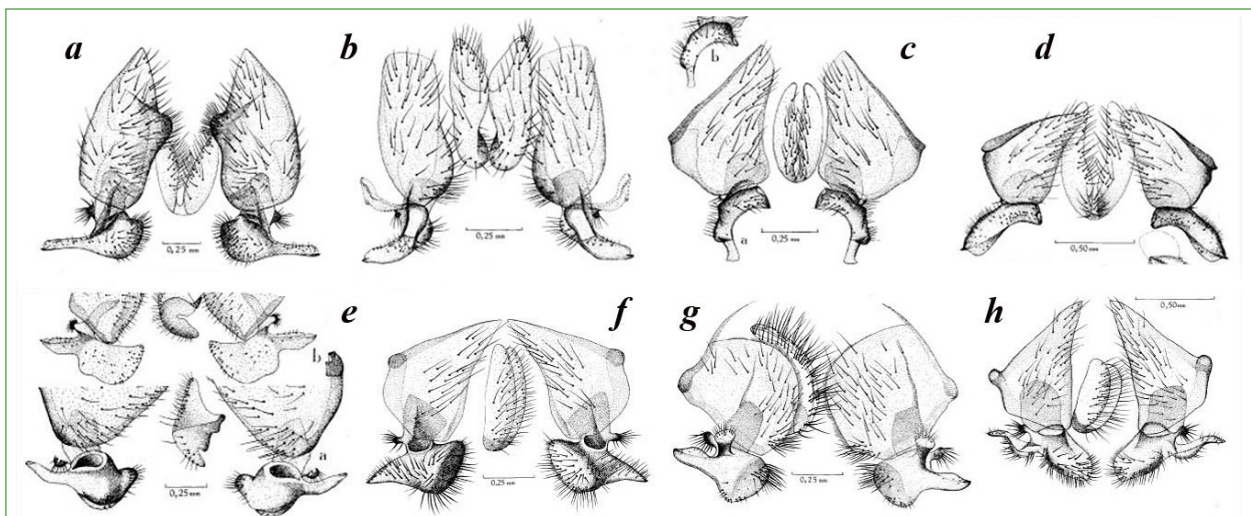
*Ilione* is characterised by the following characters: two pairs of orbital setae; pedicel rectangular, postpedicel triangular, both elongated; arista with short, dense, entirely or partly white hairs; anepisternum and anepimeron setulose; subalar setae usually present; scutellum with two pairs of setae; wing without dark pattern, but crossveins may be darkened and dark spots along  $M_{1+2}$  may be present, hind coxa with setulae on inner posterior margin.

The phylogenetic relationship of *Ilione* to other Tetanocerini is unclear. According to the molecular analysis (Chapman et al. 2012), *I. albiseta* is related to the Nearctic *Hedrina mixta* Steyskal, 1954. According to Tóthová et al., *Ilione* is a paraphyletic genus partly related to *Dichetophora* (*I. lineata*) and partly to

*Limnia* + *Pherbina* + *Trypetoptera* (Tóthová et al. 2012). Another reason to suspect that the genus *Ilione* is not monophyletic, is the biology of *I. lineata* larvae. In contrast with other *Ilione* and vast majority of Sciomyzidae, it parasitises not in Gastropoda but Bivalvia (Sphaeriidae) molluscs (Foote, Knutson 1970). All these possibilities may have sense, but here we consider *Ilione* in the old classical volume offered by Verbeke (Verbeke 1964).

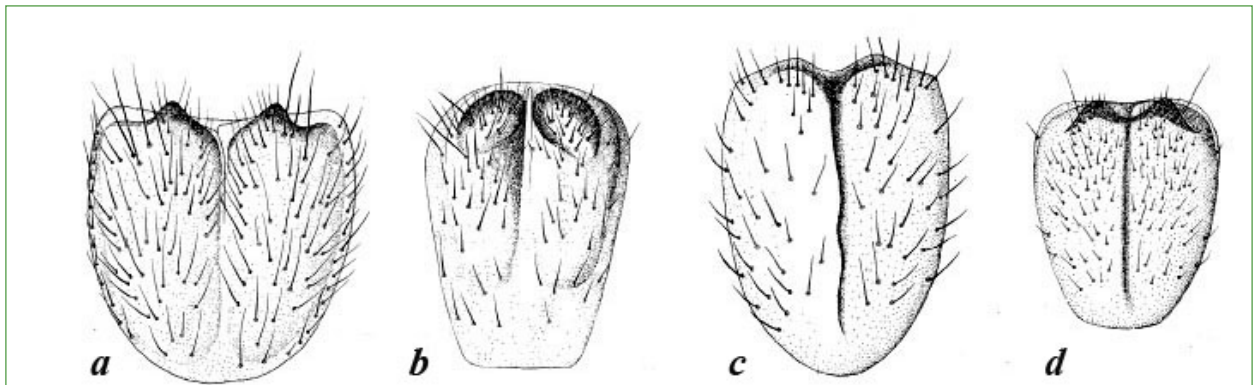
In our opinion, there are two interesting and original sources on the taxonomy of *Ilione*. The genus was revised by Verbeke, who established several synonymies, illustrated the remaining eight species, and offered keys for them (a detailed key in French, in which each couplet has descriptive notes, and a shorter key in English) (Verbeke 1964).

The second important source is Rozkošný, who gave original and very comprehensive drawings of the male terminalia of the Scandinavian species of *Ilione* (Rozkošný 1987: 222–224). Rozkošný also offered a short key for the genus *Ilione*, which is well-known among those working with Sciomyzidae. In order to save the readers from a search for illustrations from the above-mentioned publications, we partly reproduced them below (Figs 1, 2, 3).



**Fig. 1.** Male terminalia of *Ilione* from Verbeke (Verbeke 1964: 9–16): *a* — *albiseta*; *b* — *lineata*; *c* — *trifaria*; *d* — *turcestanica*; *e* — *rossica*; *f* — *truquii*; *g* — *corcyrensis*; *h* — *unipunctata*

**Рис. 1.** Терминалии самцов *Ilione* по Verbeke (Verbeke 1964: 9–16): *a* — *albiseta*; *b* — *lineata*; *c* — *trifaria*; *d* — *turcestanica*; *e* — *rossica*; *f* — *truquii*; *g* — *corcyrensis*; *h* — *unipunctata*



**Fig. 2.** Male sternite 4 of *Ilione* from Verbeke (Verbeke 1964: 17, 18, 20, 24): *a* — *albiseta*; *b* — *turcestanica*; *c* — *lineata*; *d* — *rossica*

**Рис. 2.** Стернит 4 самцов *Ilione* по Verbeke (Verbeke 1964: 17, 18, 20, 24): *a* — *albiseta*; *b* — *turcestanica*; *c* — *lineata*; *d* — *rossica*

We had some difficulties in identifying *Ilione*, therefore we decided that it would be useful to make a new review of the genus. While working on the review we found significant variability of non-genitalic characters, so to compose an identification key was not an easy task. Another problem was the lack of Western European material. After some hesitation we decided to divide the present publication in two parts. Part 1 is devoted to the five common species of *Ilione* of which we examined a representative material, namely:

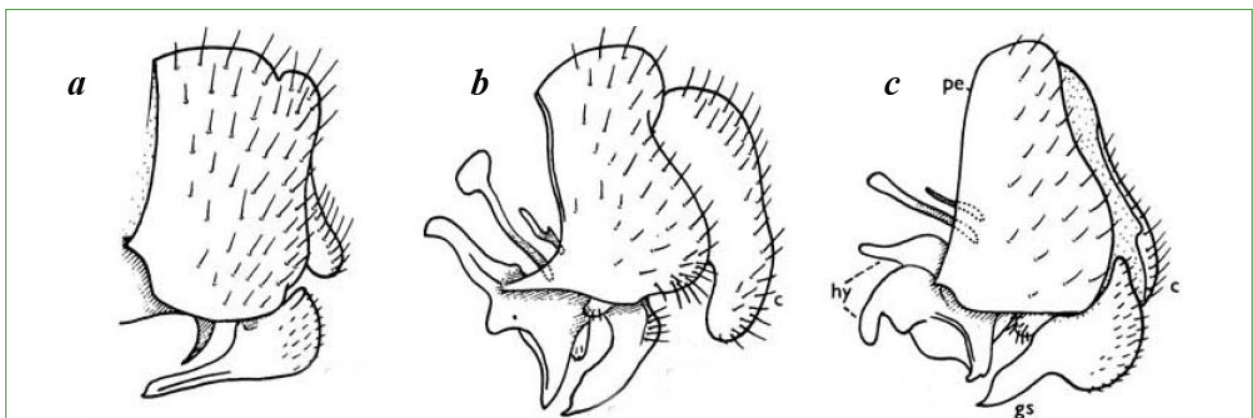
- Ilione albiseta* Scopoli, 1763;
- I. lineata* Fallen, 1820;
- I. rossica* Mayer, 1953;
- I. trifaria* Loew, 1847;
- I. turcestanica* Hendel, 1903.

These five species cover about 99% of *Ilione* specimens in insect collections. We offer new illustrations and a revised identification key for them.

Part 2 is devoted to the three rare sub-Mediterranean species and one newly described Indian species, namely:

- I. unipunctata* Macquart, 1849, 1♂ examined;
- I. corcyrensis* Verbeke, 1964, 1♀ examined;
- I. truquii* Rondani, 1863, no specimens examined;
- Ilione bindata* **sp. nov.**, described from a single male.

In each case we offer the description of available specimens and our taxonomic comments.



**Fig. 3.** Male terminalia of *Ilione* from Rozkošný (Rozkošný 1987: 222–224): *a* — *albiseta*; *b* — *lineata*; *c* — *rossica*

**Рис. 3.** Терминалии самцов *Ilione* по Rozkošný (Rozkošný 1987: 222–224): *a* — *albiseta*; *b* — *lineata*; *c* — *rossica*

## Material and methods

Localities are given as follows: country, region/state/province (in italics), and geographical coordinates in decimal-degree format. The full names of regions of Russian administrative subdivisions are an entangled result of political and historical events of no interest for zoology, so they are listed as a name and the word 'region'.

Illustrations are original unless otherwise credited. When referring to figures, to avoid confusion we capitalise the first letter (Fig. or Figs.) for those appearing in this paper and use lowercase (fig. or figs.) for those published elsewhere.

The specimens examined are deposited in the following museums:

ZIN — Zoological Institute, Saint Petersburg, Russia;

ZMUM — Zoological Museum of Moscow University, Russia (not indicated in the text).

The following generally accepted abbreviations for morphological structures are used: *f1*, *t1*, *f2*, *t2*, *f3*, *t3* = fore-, mid-, hind- femur or tibia respectively; *ac* — acrostichal setae; *dc* — dorsocentral setae; *prst* — presutural; *post* — postsutural; *a*, *p*, *d*, *v* = anterior, posterior, dorsal, ventral seta(e). Other abbreviations: L. — lake; R. — river; Reg. — region; vill. — village.

Part I. Five common species of *Ilione*

## Annotated list of examined material with distributional data, taxonomic remarks and identification key

*Ilione albiseta* Scopoli, 1763

Figs. 1a, 2a, 3a, 4, 12, 15, 19

*Musca albiseta* Scopoli, 1763

*Musca crocus* Harris, 1780

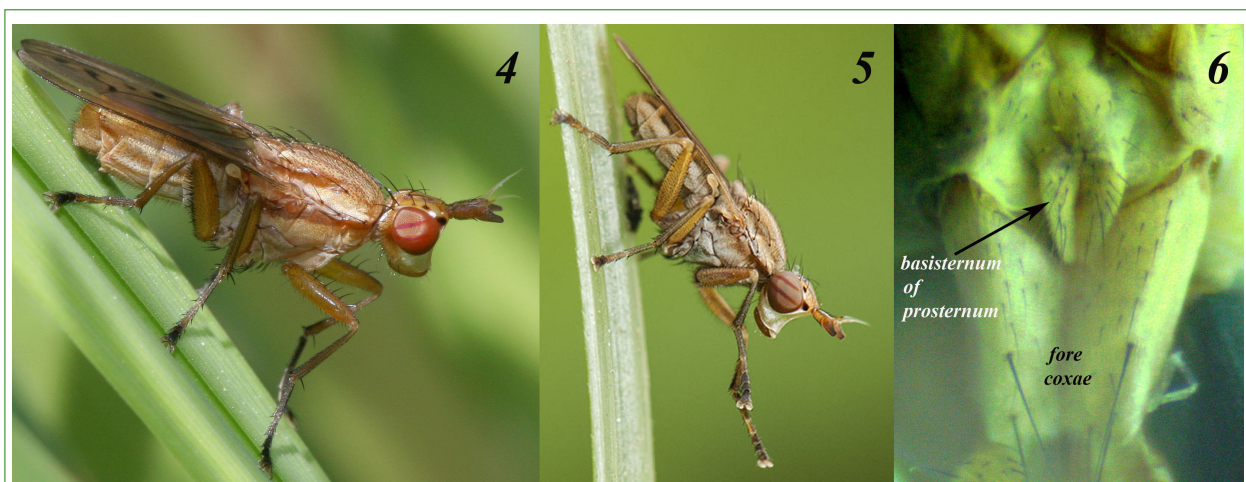
*Musca aratoria* Fabricius 1794

*Tetanocera interstincta* Fallen, 1820

*Chione communis* Robineau-Desvoidy, 1830

*Chione sepedonoidea* Robineau-Desvoidy, 1830

**Material examined:** AZERBAIJAN: 10 km N to Yashny [unclear locality], salt marshes, 26.05.1972, V. Rikhter, 1♂; Astara [38.45°N, 48.85°E], 09.05.1911, L. Mlokosevich, 1♂ (all ZIN); BELARUS, *Brest* Reg.: Pinsk u., Minsk. g., Gaidamashka [now Pinsk, ≈ 52.12°N, 26.08°E], 02.06.1905: A. Bartenev, 2♂, 1♀; B. Gindtse, 1♂; Zvanets Res., Novoselki env., 52.066°N, 24.834°E, 21.06.2018, P. Prokhorchik, A. Semeniak, 1♀; ESTONIA, Saaremaa Isl., Viidumae Nature Reserve [58.31°N, 22.08°E], 21.09.1975, K. Gorodkov, 2♂, 2♀ (ZIN); HUNGARY: 45 km S of Budapest, Domsod, Apajpuszta [47.09°N, 19.11°E], 25.06.1970, K. Gorodkov, 1♂, 2♀; Monor [47.38°N, 19.41°E], 1900, Schluter, 8♂, 4♀ (all ZIN); KAZAKHSTAN: *Akmola* Reg., Shortandy [51.687°N, 70.990°E],



**Figs 4–6.** *Ilione*: 4 — ♂ *albiseta*; 5 — ♂ *trifaria* (photo: Paco Moreno); 6 — prosternum of *lineata*

**Рис. 4–6.** *Ilione*: 4 — ♂ *albiseta*; 5 — ♂ *trifaria* (фото: Paco Moreno); 6 — простернум *lineata*

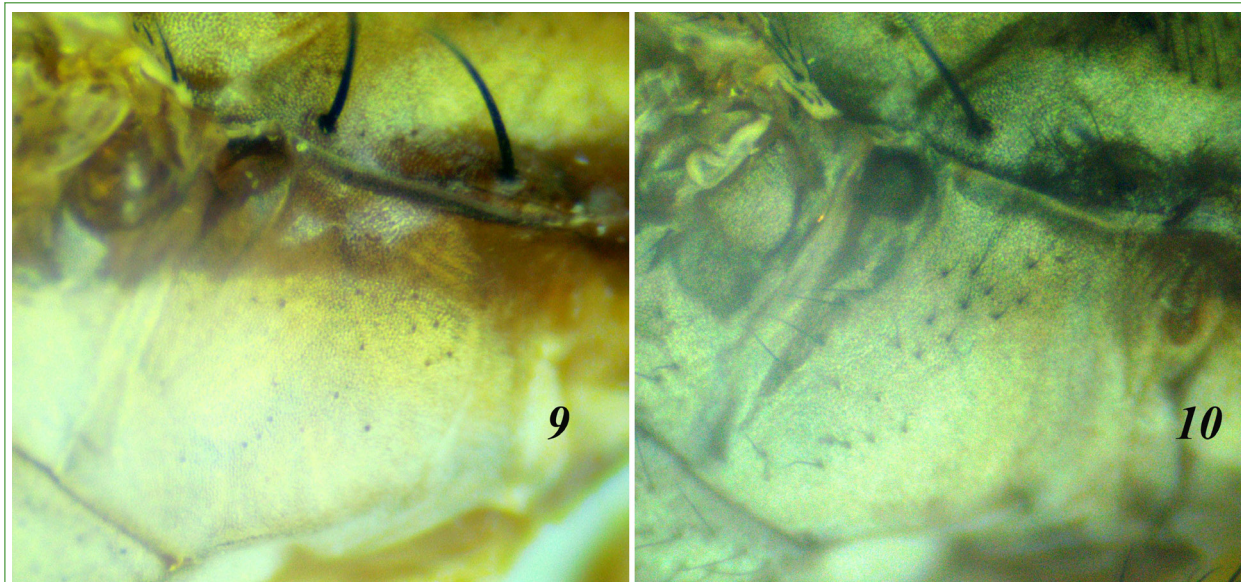


**Figs. 7–8.** Males *Ilione*: 7 — *lineata*; 8 — *turcestanica*

**Рис. 7–8.** Самцы *Ilione*: 7 — *lineata*; 8 — *turcestanica*

24.06.1952, B. Kuzin, 1♂; *East-Kazakhstan* Reg.: Altay Mts, Katon-Karagay env., middle course of Bukhtarma R., 2000 m [49.124°N, 85.972°E], 03.09.1970, V. Tanasiychuk, 1♀ (ZIN); Kyzylkum on Irtysh R., 30 km S of Samarskoe [48.72°N, 83.41°E], 03–04.08.1978, E. Narchuk, 1♂ (ZIN); *Karaganda* Reg., Atasu [48.67°N, 71.62°E], 07.08.1959, Keleynikova, 1♀; *West Kazakhstan* Reg. [Zelenovsky Distr.], Yanvartsevo env., floodplain of Ural R. [51.44°N, 52.22°E], 18.07.1949, K. Romadina, 2♂, 1♀ (ZIN); *KYRGYZSTAN*: *Issyk-Kul* Reg., S of Rybachje (= Balykchy), 1609 m, shore of

*Issyk-Kul* L. [42.43°N, 76.19°E], 16.08.1969, E. Narchuk, 2♂, 3♀ (ZIN); *Osh* reg., Irkeshtam [39.68°N, 73.90°E], 20.05.1924, N. Filippov, 1♂; 03.06.1924, N. Filippov; 1♂. *LITHUANIA*, [70 km NW of] Kowno [now Kaunas], Georgenburg [now Jurbarkas, 55.08°N, 22.79°E], 15.06.1903, P. Winogradoff[-Nikitin], 1♂ (ZIN); *MONGOLIA*: *Khovd* aimak, ur. Elkhon, 20 km SE of Altay on Bodonch [≈ 45.684°N, 92.448°E], 27.07.1970, E. Narchuk, 1♀; *Dornogovi* aimak, Barun-Bayan, 20 km ESE Tala-Khongoryn-Khuduk [unclear locality, presumably Airag, 45.8°N, 109.3°E],



**Figs 9–10.** *Ilione*, anepisternum: 9 — *rossica*, with weak setulae; 10 — *turcestanica*, with stronger setulae

**Рис. 9–10.** *Ilione*, анэпистернум: 9 — *rossica*, со слабыми щетинками; 10 — *turcestanica*, с сильными щетинками



**Figs 11–14.** *Ilione*, hairing of arista: 11 — *corcyrensis*; 12 — *albiseta*; 13 — *turcestanica*; 14 — *rossica*

**Рис. 11–14.** *Ilione*, опушение аристы: 11 — *corcyrensis*; 12 — *albiseta*; 13 — *turcestanica*; 14 — *rossica*

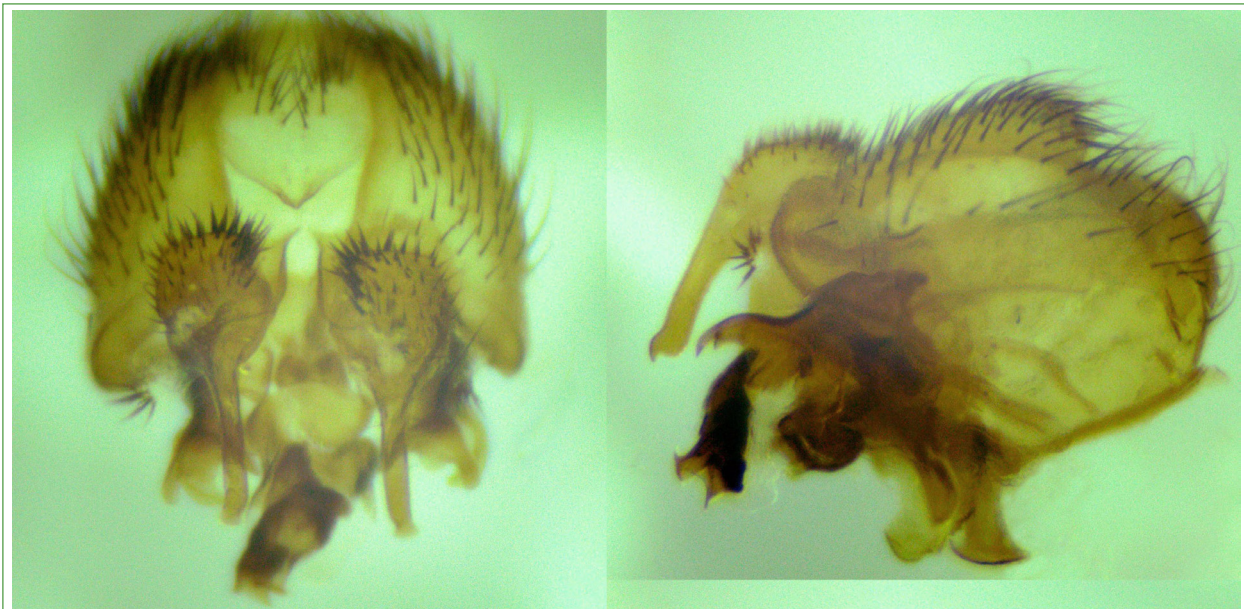
29.06.1971: M. Kozlov, 2♂; B. Kerzhner, 3♂ (all ZIN); NETHERLANDS, Nijmegen, Ooijpolder [51.862°N, 5.908°E], AC 189–429, 08.06.2008, G. Pennards, 1♀; Wageningen [51.957°N, 5.684°E]: 15.06.2001, G. Pennards, 2♂; 09.06.2002, G. Pennards, 1♀; RUSSIA: *Krasnodar* Reg.: Adler env., 43.4766°N, 39.9067°E, 29.10.2009, D. Gavryushin, 1♀; *Dakhovskaya* env., valley of Belaya R., 44.199°N, 40.170°E, ≈ 465 m, 18–31.08.2009, K. Tomkovich, 1♂; *Crimea* Reg., Feodosia [45.1°N, 35.4°E], 25.08.1927, Wiolowitsh, 1♂; *Kursk* Reg., Central Chernozemny NR, Psyol R. [51.191°N, 36.313°E], 21.07.2007, N. Vikhrev, 1♀; *Mordovia* Reg., Smolny National Park,

16 km NE of Kemlya, 54.76°N, 45.47°E: 25.07.2021, G. Semishin, 1♂; 15.08.2022, G. Semishin, 1♀; *Moscow* Reg.: Golitsyno [55.62°N, 36.99°E], 20.08.1977, A. Shatalkin, 1♀; Dmitrov Distr., Kostino env. [56.31°N, 37.75°E], 20–27.06.2007, N. Vikhrev, 3♀, 1♂; Kosino [now Moscow, 55.717°N, 37.950°E], 1926, B. Dodonov, 1♀; Moscow, Izmaylovo [55.79°N, 37.78°E]: 28.05.1983, A. Ozerov, 1♂; 05.06.1983, A. Ozerov, 1♂; 18.06.1983, 1♂; 02.07.1983, A. Ozerov, 1♂; Naro-Fominsk [55.39°N, 36.73°E], 03.07.2007, D. Gavryushin, 1♀; Shakhovskoy Distr., Stepankovo env., 55.996°N, 35.620°E, 03.06.2007, A. Ozerov, 2♂, 2♀; Serpukhov Distr., Zibrovo [54.846°N,



**Figs 15–18.** Sternite 4 of males *Ilione*: 15 — *albiseta*; 16 — *turcestanica*; 17 — *lineata*; 18 — *rossica*

**Рис. 15–18.** Стернит 4 самцов *Ilione*: 15 — *albiseta*; 16 — *turcestanica*; 17 — *lineata*; 18 — *rossica*



**Fig. 19.** *I. albiseta*, postabdomen ventral and lateral

**Рис. 19.** *I. albiseta*, постабдомен снизу и сбоку

37.71°E], 31.05.1903, P. Datskevich, 1♂; *Novosibirsk* reg., Zaeltsovsky Park, Ob R. left bank [55.046°N, 82.840°E], 15.09.2007, O. Kosterin, 2♂, 1♀; *Orenburg* Reg., Zhetkol L., 25 km NNE of Svetly vill. [51.045°N, 60.856°E], 10–12.08.2004: V. Krivokhat'sky, O. Ovchinnikova, 1♂, 2♀; E. Narchuk, 3♀ (all ZIN); *Ryazan* Reg., Ryazan env., Khrapovo [54.60°N, 39.64°E], grove near a river bank, poplars, elms, alders, 06.07.1975, V. Kovalev, 1♀; *Samara* Reg., Samara (53.24°N, 50.12°E), 13.08.1910, 2♂; Samarskiy u. [now Samara env., ≈ 53.24°N, 50.12°E], 13.08.1910, V. Bostanzhoglo, 1♀; *Volgograd* Reg.: Sarepta [48.518°N, 44.510°E], 1866, A. Bekker, 3♂; 1868, A. Bekker, 3♂; Tsatsa [48.20°N, 44.67°E], lake shore, 16.06.2005, E. Narchuk, 1♀; Upper Balykley [49.53°N, 45.16°E], meadow, 09.08.2012, D. Astakhov, 2♀ (all ZIN); *Voronezh* Reg.: Khopersky Nat. Res., “Dubovaya Khata” cordon [51.24°N, 41.80°E], 06.08.2022, K. Tomkovich, 1♂; Ramon [51.916°N, 39.350°E], 12–15.09.1978, A. Shatalkin, 3♂; *Yakutia* Reg.: Yakutsk [62.0°N, 129.73°E], V. Zlobin, 21.07.1987, 1♂; Yakutsk env., Chochur-Muran L., swampy shore [62.016°N, 129.605°E], 20.07.1974, K. Gorodkov, 2♂, 1♀; Turanakh, path towards Amga R. [61.99°N, 130.73°E], 18.07.1925, V. Bianki, 1♂; Olyok-

minsk Distr.: Biryuk R. near mouth of Melichan R. [60.5°N, 119.4°E], 17.07.2008, A. Ovchinnikov, 1♂, 1♀; Olyokma mouth [60.371°N, 120.685°E], floodplain meadow, 03.08.1974, E. Narchuk, 1♀; Olyokmink airport [60.4°N, 120.5°E], 31.08.1988, K. Gorodkov, 1♂ (all ZIN); *Yaroslavl* Reg., Berditsyno [57.46°N, 40.12°E], A. Yakovleva: 01.07.1906, 1♂; 29.08–08.09.1906, 8♂, 2♀; 01–05.10.1907, 2♂, 1♀ (all ZIN); *TURKEY*, *Sakarya* Reg., Karasu env. [41.08°N, 30.74°E], 27.08.2009, N. Vikhrev, 7♂, 1♀. *UK*: *South East England* Reg., Oxford, 05–20.09.1998, A. Ozerov & M. Krivosheina, 1♂; *UKRAINE*: *Odessa* Reg., Odessa, 13.08.1978, Yu. Verves, 1♂, 2♀ (ZIN); *Poltava* Reg., Poltava env., 1894, V. N. Rodzyanko, 1♂; *UZBEKISTAN*, *Samarkand* Reg., Kattakurgan Distr., Kumak [39.99°N, 66.12°E], L. Zimin: 07–20.05.1929, 7♂, 8♀; 10.07.1929, 1♀ (all ZIN).

**Distribution.** The Palaearctic, except for the Far East. Most common in Europe; Asian records are sporadic: Kazakhstan from west to east, Kyrgyzstan, Mongolia, Russia: Orenburg, Novosibirsk, and Yakutia regions (the easternmost record is at 130°E). Recorded south of 60°N and north of 40°N.

Was also reported by Li et al. from Chinese provinces Xinjiang and Inner Mongolia, but



**Fig. 20.** *I. lineata*, postabdomen: lateral, lateral, and semiventral  
**Рис. 20.** *I. lineata*, постабдомен: сбоку; сбоку; снизу и сбоку

without specifying the exact localities in these vast regions (Li et al. 2019).

***Ilione lineata*** Fallen, 1820

Figs 1b, 2c, 3b, 6, 7, 17, 20

**Material examined:** BELARUS: *Gomel* Reg., Mozyr env., Knyaz L. [now Chervonoe L., 52.38°N, 28.045°E], 19.06.1905, B. Gindtse, 1♂, 1♀; *Minsk* Reg., Barisaw Distr., Velikaje Stachava env., 54.149°N, 28.636°E, 07.07.2013, D. Gavryushin, 1♀; *Vitebsk* Reg., Lepel Distr., Kraytsy [54.67°N, 28.287°E], 09.08.1969, A. Antonova, 1♂; ESTONIA, Peedu [59.19°N, 25.66°E], A. Stackelberg, 06–24.08.1951, 16♂, 3♀ (ZIN); KAZAKHSTAN, *Akmola* Reg., Borovoe [53.08°N, 70.32°E], 17–25.07.1932, V. Popov, 2♂, 1♀ (ZIN); RUSSIA: *Arkhangelsk* Reg.: Arkhangelsk, 64.546°N, 40.568°E, 04.08.2011, D. Gavryushin, 1♂; Solvychevodsk, 61.342°N, 46.914°E, 13.08.2010, D. Gavryushin, 1♂; *Bashkortostan* Reg., Abzakovo-Murakaevo env., Kryktytau Mts, steppe, birch [≈ 53.56°N, 58.39°E], 02–8.08.2008, K. Tomkovich, 1♂, 1♀; *Chelyabinsk* Reg., near Zlaltoust, Taganay Mts [≈ 55.25°N, 59.77°E], 18–24.07.2008, K. Tomkovich, 1♂; *Karelia* Reg., 30 km E of Chupa [66.3°N, 33.6°E], 23.07.1975, K. Gorodkov, 2♂, 1♀ (ZIN); *Mordovia* Reg., Purdoshki env., 54.689°N, 43.533°E, 6.09.2020, N. Vikhrev, 1♂; *Moscow* Reg.: Katuar [56.1°N, 37.5°E], 21.07.1954, B. Rodendorf, 1♂; 29.08.1954, B. Rodendorf, 1♂ (all ZIN); Dmitrov Distr., Kostino env. [56.31°N, 37.75°E],

N. Vikhrev: 01.07.2007, 1♀; 16.07.2007, 4♂, 1♀; 14.08.2007, 1♀; Shakhovskoy Distr. Burtsevo env. [55.981°N, 35.607°E], 01.08.2007, A. Ozerov, 1♂; Odintsovo Distr., Golitsyno [55.62°N, 36.99°E], A. Shatalkin: 09.07.1977, 1♀; 20.07.1977, 3♂; 06–09.08.1977, 3♂; 04.10.1981, 5♂; 13.08.1983, 1♂; 05.08.1988, 1♂; Mamontovka [Pushkino, 56.00°N, 37.82°E], 05.07.1956, E. Smirnov, 1♀; Stupino Distr., Sokolova Pustyn [54.842°N, 38.04°E], 04.07.1937, B. Rodendorf, 1♀; *Murmansk* Reg., Khibiny railway station [67.67°N, 33.22°E], 27.08.1928, N. Cheburova, 10♂, 3♀ (ZIN); *Saint Petersburg* Reg., Luga distr., Yashchera [59.15°N, 29.91°E], A. Stackelberg: 09–27.08.1957, 14♂, 3♀; 27.08.1957, 1♀; 26.08.1960, 1♂ (all ZIN); *Yaroslavl* Reg., Kozmodemyansk [57.498°N, 39.694°E], 14.08.1977, A. Shatalkin, 2♂, 1♀.

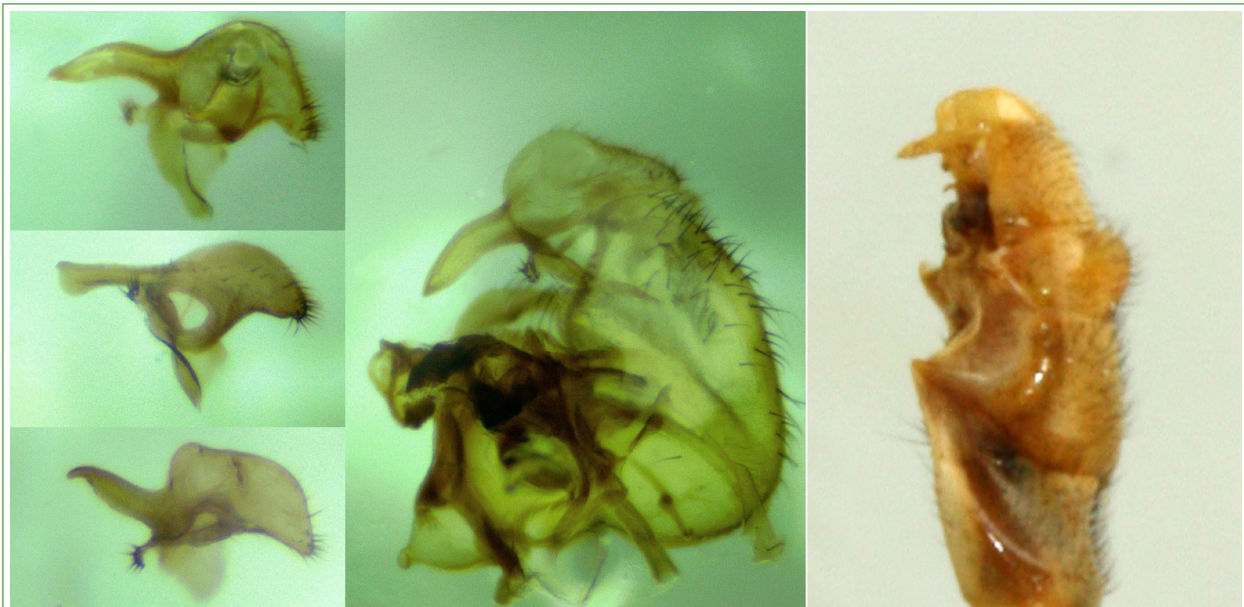
**Distribution.** Common in Europe, present in the Urals. One Asian record only: Kazakhstan (70°E). In Eastern Europe known from cold (north to 67°N) and temperate (south till 52°N) latitudes.

***Ilione rossica*** Mayer, 1953

Figs 1e, 2d, 3c, 9, 14, 18, 21

**Material examined:** BELARUS, *Vitebsk* Reg., Ambrosovichy [55.19°N, 29.64°E], 01.08.1924, Birulya, 1♀ (ZIN); ESTONIA, Peedu [59.19°N, 25.66°E], A. Stackelberg, 23.08.1951, 2♂ (ZIN); KAZAKHSTAN: *North Kazakhstan* Reg., Petropavlovsk, 54.93°N, 69.22°E, 27.06.2015, O. Kosterin, 1♂; *Kokshetau* Reg., Akmola R.





**Fig. 21.** *I. rossica*, lateral views: of separated surstylus from different angles, of dissected postabdomen, of bent postabdomen of an intact specimen

**Рис. 21.** *I. rossica*, вид сбоку: отделенный сурстиль под разными углами зрения; препарированный постабдомен; изогнутый постабдомен на интактном экземпляре

[53.26°N, 69.45°E], V. Popov, 3♂, 6♀ (ZIN); West-Kazakhstan Reg., Solyanka R., left tributary of Ural R. [51.266°N, 52.348°E], 04.07.1949, L. Arnoldi, 1♀ (ZIN); RUSSIA: Bashkortostan Reg., Beloretsk Distr., Makhmutovo env., Belaya R., 550 m, 54.330°N, 58.807°E, 15.07.2015, D. Gavryushin, 2♂; Chelyabinsk Reg., S Ural, Miass, SW Turgoyak L. [55.138°N, 60.032°E], 26–31.07.2008, K. Tomkovich, 1♀; Ekaterinburg Reg., Uktus [56.76°N, 60.64°E], 15.06.1910, G. Yakobson, 1♂ (ZIN); Irkutsk Reg. [Ust-Udin Distr.], Molka [53.91°N, 103.35°E], 29.06.1931, I. Rubtsov, 1♂ (ZIN); Karelia Reg., 30 km E to Chupa, Medvejia Guba [66.26°N, 33.73°E], 23.07.1975, K. Gorodkov, 1♂ (ZIN); Kemerovo Reg., Tisul [55.75°N, 88.28°E], 16.06.1911, A. Gorchakovskiy, 1♂ (ZIN); Mordovia Reg.: Smolny National Park, 16 km NE of Kemlya, 54.76°N, 45.47°E: 26.07.2021, G. Semishin, 1♂; 07–15.08.2022, G. Semishin, 1♂, 3♀; Alatyry, 54.740°N, 45.377°E, 14.07.2022, K. Tomkovich, 1♀; Moscow Reg.: Kalistovo, 08.07.1935, N. Filippov, 1♀; [Odintsovo Distr.] Golitsyno [55.62°N, 36.99°E], A. Shatalkin: 04.10.1981, 3♂; 26.06.1982, 1♂, 2♀; 09.07.1983, 1♂; Novosibirsk Reg., Istikim, Koynikha R. [54.57°N, 83.26°E], 13.07.1977, K. Gorodkov, 6♂, 2♀ (ZIN); Omsk Reg., Omsk, left bank of Irtysh R.

[55.03°N, 73.19°E], 22.07.1912, N. Vydrina, 1♂; Severnaya, near Rybnoe L. [54.96°N, 71.90°E], 22.07.1922, A. Reykhardt, 1♀ (all ZIN); Orenburg Reg.: Troitsk [50.69°N, 54.62°E], 05.07.1902, Ya. P. Shchelkanovtsev, 1♀; 25 km N of Svetly, Zhetykol L. [51.1°N, 60.9°E], 10–12.08.2004, E. Narchuk, 1♂ (ZIN); Perm Reg., Kishert [(now Ust-Kishert, 57.375°N, 57.235°E], swampy shore of Sylva R., 27.07.1997, K. Gorodkov, 1♂ (ZIN); Ryazan Reg., Ranova R., 53.72°N, 39.93°E, 06.06.2012, N. Vikhrev, 2♂; Samara Reg., Samara, 13.08.1910, 1♀; Saratov Reg., Dyakovka [50.72°N, 46.78°E]: 23–24.06.2003, V. Krivokhatsky, O. Ovchinnikova, 1♂, 2♀; 27.06.2012, D. Astakhov, 2♀ (all ZIN); Saint-Petersburg Reg., Luga Distr., Yashchera [59.15°N, 29.91°E], A. Stackelberg: 06–15.08.1959, 15♂, 4♀; 29.08.1966, 1♂; 09.08.1967, 1♂, 1♀ (all ZIN); Volgograd Reg., Sarepta [48.518°N, 44.510°E], 1868, A. Bekker, 2♂ (ZIN); Voronezh Reg.: Borisoglebsk env., Tellerman forestry [51.353°N, 42.037°E], 03.08.1964, V. Kovalev, 1♀; Ramon [51.916°N, 39.350°E], 12–15.09.1978, A. Shatalkin, 6♂, 2♀; Yakutia Reg.: Olyokminsk Distr.: Biryuk R. near mouth of Melichan R. [60.5°N, 119.4°E], 15–17.07.2008, A. Ovchinnikov, 2♀; Olyokma mouth, steppe slope [60.371°N,



**Fig. 22.** Postabdomen of *I. trifaria*: ventral, semi-lateral and lateral

**Рис. 22.** Постабдомен *I. trifaria*: снизу; снизу и сбоку; снизу

120.685°E], 03.08.1974, E. Narchuk, 1♀; Yakutsk [62.0°N, 129.7°E]: 08.09.1927, I. Moskvina, 1♂; 03.08.2008, A. Ovchinnikov, 1♂; Olyokminsk airport [60.4°N, 120.5°E], 31.08.1988, K. Gorodkov, 2♂ (all ZIN); *Yaroslavl* Reg., Berditsyno [57.46°N, 40.12°E], A. Yakovlev: 01–5.07.1906, 3♀; 05–08.09.1906, 1♀; 17.06.1907, 1♀; 13.06.1908, 1♀ (all ZIN); UKRAINE: *Poltava* Reg. [Shishatsky Distr.], Yareski [49.85°N, 33.91°E], 05.08.1928, L. Gildbrandt, 1♂, 4♀ (ZIN).

**Distribution.** From E Europe to E Siberia recorded from 49°N to 66°N.

*Ilione trifaria* Loew, 1847

Figs 1c, 5, 22, 23

*Tetanocera trifaria* Loew, 1847

*Elgiva lateritia* Rondani, 1863

*Elgiva trivittata* Strobl, 1899

**Material examined:** FRANCE, Var depart, Hyeres [43.1°N, 6.1°E], E. Abeille de Perin, 2♂, 1♀ (Museum National d'Histoire Naturelle, Paris); MOROCCO, Azrou, 33.43°N, 5.215°W, 1400 m, 18.05.2021, O. Kosterin, 1♂, 1♀.

**Distribution.** Africa, Maghreb and S Europe, to the east till Serbia.

*Ilione turcestanica* Hendel, 1903

Figs 1d, 2b, 8, 10, 13, 16, 24, 29

**Material examined:** ARMENIA, Parakar [40.17°N, 44.41°E, 890 m], 09.10.1963, V. Rikhter, 12♂, 2♀ (ZIN); IRAN: *Markazi* Prov., Arak env. [34.03°N, 49.75°E], 2000 m, 18.05.2017, O. Kosterin, 2♂; Tegeran, N. V. Bogoyavlenskiy, 1♂; KYRGYZSTAN: *Issyk-Kul* Reg., Choktal env., 42.58°N, 76.75°E, 1600 m, 19–22.09.2013, N. Vikhrev, 1♂; *Osh* Reg., Uzgen [40.8°N, 73.3°E], 2.07.1924, N. Filippov, 1♀; RUSSIA: *Dagestan* Reg., 45 km S to Makhachkala [≈ 42.7°N, 47.7°E], 13.07.1983, E. Narchuk, 8♂, 1♀ (ZIN); Upper Gakvari vill. env., 42.54°N, 46.03°E, 2000 m, 06.08.2023, O. Kosterin, 1♀; Gergebil Reservoir, 42.45°N, 47.03°E, 795 m, 12.09.2022, O. Kosterin, 1♂; Samur Delta forest, 41.85°N, 48.55°E, 23–28.04.2023, N. Vikhrev, 1♂; *North Ossetia* Reg., Alagir env. [43.030°N, 44.236°E], A. Ozerov: 02.07.1988, 1♂; 18.05.1989, 1♀; TADJIKISTAN: Stalinabad [now Dushanbe,



**Fig. 23.** *I. trifaria*: the same surstylus from different angles of view

**Рис. 23.** *I. trifaria*: один и тот же сурстиль под разными углами зрения



**Fig. 24.** Postabdomen of *I. turcestanica*: ventral, semi-lateral and lateral

**Рис. 24.** Постабдомен *I. turcestanica*: снизу; снизу и сбоку; сбоку

38.5°N, 68.8°E], Botanical Garden, A. Stackelberg: 06.05.1943, 8♂, 3♀; 28.12.1944, 3♂; Dushanbinka (= Varzob) R. valley, 06–13.05.1943, A. Stackelberg, 8♂, 5♀ (all ZIN); Romit env., 38.709°N, 69.296°E, 1175 m, 14–16.06.2010, K. Tomkovich, 1♀; TURKEY, *Bolu* Reg., 1200 m, Kibricik env., 40.42°N, 31.854°E, 01.09.2009, N. Vikhrev, 1♀; UZBEKISTAN: *Fergana* Reg., Fergana, 24.08.1955, A. Zhelokhovtsev, 1♀; Shakhimardan [40.0°N, 71.8°E], 06.10.1955, V. Sychevskaya, 1♀; *Namangan* Reg., Namangan, 02.06.1924, N. Filippov, 1♀; *Navoiy* Reg., 25 km WSW of Langar [40.37°N, 65.73°E, 800 m], 27.05.1984, V. Tanasiychuk, 1♀ (ZIN); *Samarkand* Reg., Samarkand, 20–25.06.1927, N. Filippov, 2♂; Tashkent, 22.04.1925, F. Dobzhansky, 4♂, 3♀ (ZIN).

**Distribution.** From the Balkans to the Caucasus, Turkey, Iran, and Central Asia. A rather narrow range of latitudes from 43°N to 38°N. Was also reported from China, Xinjiang province (Li et al. 2019).

### Discussion

**1. Variability.** The genus *Ilione* is characterised by a remarkably high level of intraspecific variability in all species. The wing pattern is a good example here. *I. lineata* usually has wings with characteristic brownish longitudinal stripes as shown in Fig. 7, but some specimens miss them. Similarly, *I. rossica* normally has hyaline wings, but some specimens have wings with brownish longitudinal stripes. *I. albisetata* has a very variable wing pattern in the median section of vein  $M_{1+2}$  (between

crossveins): there are 0 or 1 or 2 dark spots in this section. Moreover, these spots can be usual or they surround 1 or 2 short stump veins. Moreover, right and left wings of the same specimen are often quite different. Even the most reliable diagnostic character of *I. albisetata* — the dark spot in the apical section of vein  $M_{1+2}$  — sometimes may be absent: one male among the examined material has this spot missing, although its identification is confirmed by the examination of genitalia.

Other important diagnostic characters like bare vs hairy prosternum or densely vs sparsely setulose anepimeron are sometimes difficult to apply because of wide variability in the number of setulae.

**2. Genitalic characters.** We have not found significant intraspecific variability of the structure of male genitalia, so the identification of the five above considered species based on the examination of a male postabdomen seems to us unmistakable. Rozkošný's drawings (shown here in Fig. 3) of the postabdomen of three Fennoscandian species (*I. albisetata*, *I. lineata*, *I. rossica*) are easily recognizable and correspond to our photographs (Rozkošný 1987: 222–224). Verbeke's drawings of the postabdomen (shown here in Fig. 1) are less understandable but still useful (Verbeke 1964: 9–16). Verbeke gave two drawings of the surstyli of *I. rossica* (Fig. 1e), which he indicated as a typical and an atypical form. We have quite a different interpretation of that: Fig. 21 shows that the same surstylus of *I. rossica* may look 'typical' or 'atypical' depending on the angle of view.

The surstylus of *I. trifaria* shows even more significant differences depending on the angle of view, as shown in Fig. 23. Once again, it is important to pay attention of colleagues that 3-dimensional sclerites may look very different in 2-dimensional projections (Vikhrev, Yanbulat 2019; Vikhrev 2022; 2023). In the present paper we tried to provide several projections for each illustrated postabdomen.

The shape of sternite 4 is also useful: our images (Figs 15–18) are similar to those from Verbeke (shown here on Fig. 2), except for sternite 4 of *I. lineata* which is actually much more elongated than in Verbeke's drawing (Verbeke 1964: 17–20). Sternites 4 of *I. albisetata* and *I. trifaria* + *I. turcestanica* are usually well recognizable in intact specimens.

**Key to common Palaearctic species of *Ilione*, ♂♀**

1. Vein  $M_{1+2}$  with a round spot in apical section (Fig. 4). Body length 6.5–9.0 mm. Prosternum bare. ♂: surstyli in basal half wide and covered with spinulose setulae, in apical half surstyli narrow and hooked at very apex (Figs 1a, 3a, 19); sternite 4 at posterior margin with a pair of hill-like protrusions (Figs 2a, 15). ♀:  $f\beta$  ventrally without rows of spinulose  $pv$  and  $av$  setae in apical part, usually with 1–3 irregularly placed  $pv$  setae near middle. (Arista with short, dense, white hairs, total width of hairing at most as wide as basal width of arista (Fig. 12). Vein  $M_{1+2}$  with 1(0–2) dark spot(s) in section between crossveins. Inner margin of hind coxa with about 4 setulae, of which one markedly longer and stronger than the others. Anepisternum and propleuron in upper third with subglossy brown stripe. Prescutellar  $ac$  and subalar setae strong. Tergite 5 with 1–3 pairs of strong latero-marginal setae.) ..... *albisetata* Scopoli  
 — Vein  $M_{1+2}$  without dark spot in apical section. Body length 5.0–7.5 mm. ♂: terminalia not as described above. Prosternum hairy or bare. ♀:  $f\beta$  in apical third to half with two rows of  $av$  and  $pv$  spinulose setae or  $f\beta$  without any ventral setae (*I. lineata*) ..... 2

2. Prosternum densely haired, with 4–12 pairs of hairs (Fig. 6). Anepisternum and propleuron in upper third with subglossy brown stripe (Fig. 7). Pleura with fine, sparse setulae (Fig. 9), usually 5–15 anepisternal setulae; anepimeron with 0–4 setulae. Arista with short, dense, white hairs, total width of hairing at most as wide as basal width of arista (Fig. 14). Inner posterior margin of hind coxa with minute setulae. ♂: sternite 4 posteriorly without rabbit-ears-like processes ..... 3  
 — Prosternum usually bare, in about one third specimens with 1–2 pairs of hairs. Upper part of anepisternum and propleuron not glossy, at most slightly darker than lower part (Fig. 8). Pleura densely covered with longer and stronger setulae (Fig. 10): 20–35 anepisternal setulae, 5–14 setulae on anepimeron. Arista with longer, sparse, mostly or partly brownish hairs, total width of hairing wider than basal width of arista (Fig. 13). Inner posterior margin of hind coxa with longer setulae, one of which is stronger and longer than the others. ♂: sternite 4 posteriorly with a pair of processes which look as hairy rabbit ears (Figs 2b, 16) ..... 4
3. Prescutellar  $ac$  setae distinct. Subalar setae long and strong. Prosternum haired on entire surface (Fig. 6). Wing usually with brownish longitudinal stripes (as in Fig. 7). ♂: cerci swollen and exposed, usually distinct on intact specimen as in Fig. 7; surstyli in the form of knives, deeply hidden under cerci (Figs 3b, 20); sternite 4 elongated (Fig. 17). ♀:  $v$  surface of  $f\beta$  without setae ..... *lineata* Fallen  
 — Prescutellar  $ac$  setae absent. Subalar setae minute. Lower 1/3 of prosternum bare. Wing usually hyaline. ♂: cerci not enlarged; surstyli in basal half swollen, in apical half narrow and curved (Figs 3c, 21); sternite 4 not elongated (Figs 2d, 18). ♀:  $f\beta$  in apical third with 2–5  $av$  and 2–5  $pv$  short spinulose setae ..... *rossica* Mayer
4. Distributed in SW Palaearctic from Spain to Greece and in Maghreb in N Africa. Aristal hairs mainly white, dark at most

apical 2/5 (Fig. 5). Occiput with broad dark vitta. ♂: surstyli with wide basal half and abruptly narrowed in apical half; this apical half directed ventrally, it looks straight or like bilobed horn depending on angle of view (Figs 1c, 5, 22, 23) . . . . *trifaria* Loew — Distributed more easterly; in Asia from Turkey to E Kyrgyzstan (77°E); in Europe reported from the Balkans. Arista hairs mainly black coloured, white hairs visible only at base (Figs 8, 13). Brown vitta on occiput blur if present. ♂: surstyli mostly evenly wide, only at very apex gradually narrowed (Figs 1d, 24, 29) . . . . . *turcestanica* Hendel

**Part 2. Notes on the four rare species of *Ilione***

Three uncommon sub-Mediterranean species of *Ilione* and one newly described species from North India are considered here.

***Ilione unipunctata* Macquart, 1849**

Figs 1h, 25

*Ilione plumosula* Becker, 1907

**Material examined:** SPAIN, *Almeria* Prov., Fuente de Cela, Tijola [37.37°N, 2.45°W], 13.03.1964, L. Knutson, 1♂, identification label by J. Verbeke, 1966: *Knutsonia unipunctata* Macquart (ZIN).

**Descriptive notes** (based on a single examined ♂ specimen). Body length: 6.5 mm, wing: 5.5 mm. *Head.* Spots at bases of orbital setae and orbito-antennal spot distinct. Occiput with brown median stripe surrounded by whitish stripes. Antenna of a short type. Arista hairs 2–2.5 times longer than width of arista base; hairs brown, only in basal quarter white. *Thorax.* Prosternum with 2 pairs of hairs: on presternum and on upper margin of basisternum. Scutum with a pair of indistinct greyish submedian vittae. Anepisternum in upper third with brownish stripe (more distinct than in *I. trifaria*, less than in *I. rossica*). Prescutellar acrostichals strong, subalar strong. Anepisternum with 10/15 (left/right) setulae, anepimeron with 4/5 setulae; setulae of ‘strong type’ (as in Fig. 10). *Wing* with costal spinules distinctly longer and stronger than in other *Ilione* (Fig. 25). Crossveins darkened, vein  $M_{1+2}$  with one spot between crossveins. Dark longitudinal stripes in cells  $r_{4+5}$  and  $m_{1+2}$  moderately distinct. *Legs.* Inner posterior margin of hind coxa with 5–6 long setulae, one of them stronger than others. Chaetotaxy of  $f\beta$  similar to that in *I. albisetata*: 10–11 *pv* in apical 2/3 and 8–9 *av* in apical half. *Abdomen* brownish-grey with 5 dark brown vittae: dorsal, lateral and ventro-lateral. Tergite 5 with 3–4



**Fig. 25.** *I. unipunctata*, male: general view; postabdomen; sternite 4

**Рис. 25.** *I. unipunctata*, самец: общий вид; постабдомен; стернит 4

pairs of strong latero-marginal setae. Sternite 4 similar to that of *I. albiseta* (Fig. 25). Surstyli characteristic, large and bilobed, one lobe wide and obtuse, the other lobe narrow, twisted, and with pointed apex (Fig. 25). The shape of surstyli matches Verbeke's drawing reproduced in Fig. 1h here (Verbeke 1964).

**Distribution.** Reliably known from S Europe from Spain to Italy and Maghreb from Morocco to Tunisia.

**Discussion.** The general habitus of the examined specimen is quite similar to *I. albiseta*, but without a dark spot in the apical third of vein  $M_{1+2}$ . The examined male also has a characteristic shape of the surstyli and several non-genital diagnostic characters: long costal spines on wing; arisal hairs long and sparse, mostly brown, only in basal quarter white; prosternum with two pairs of setulae. We are sure that it is a valid species and did not include it in the key because neither female nor variability are known to us.

*Ilione corcyrensis* Verbeke, 1964

Figs 1g, 11, 26

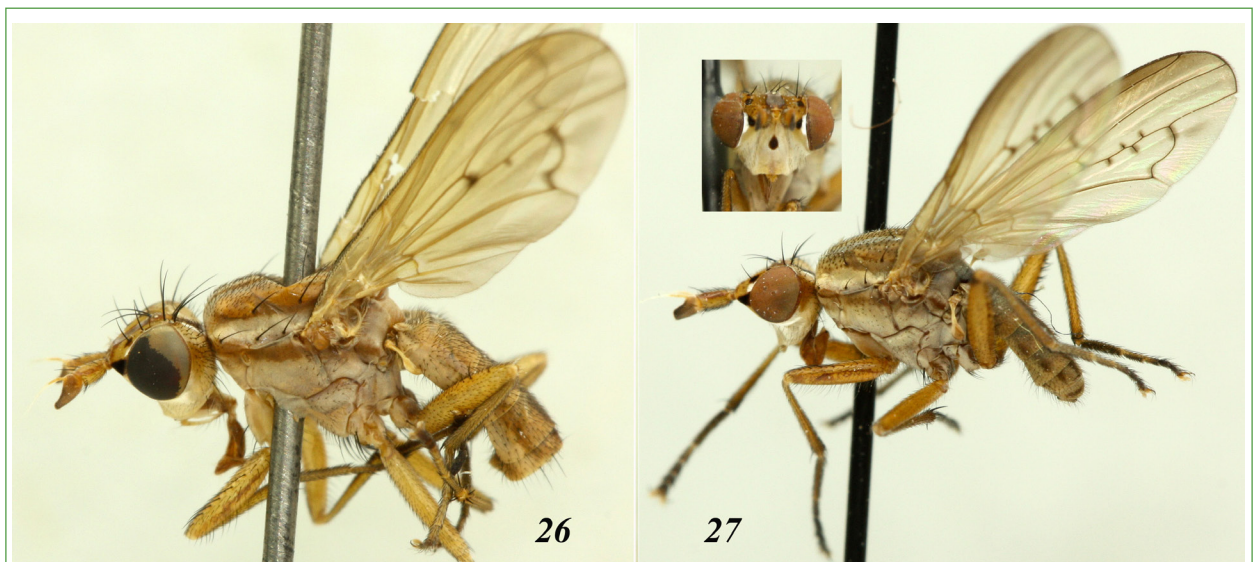
**Material examined:** GREECE, Corfu, Gardiki [39.476°N, 19.885°E], L. V. Knutson, 29.04.1963, paratype, J. Verbeke det., 1966, *Knutsonia corcyrensis*, 1 ♀ (ZIN).

**Descriptive notes** (based on a single examined ♀ paratype). Body length: 7.5 mm, wing:

7 mm. **Head.** Spots at bases of orbital setae and orbito-antennal spot distinct. Occiput with a brown median stripe surrounded by whitish stripes. Antenna of intermediate length. Arisal hairing about 3 times longer than width of arisal base; hairs entirely white. **Thorax.** Prosternum bare. Scutum with a pair of indistinct greyish submedian vittae. Anepisternum and propleuron in upper third with subglossy brown stripe. Prescutellar acrostichals strong, subalar strong. Anepisternum with 22/24 (left/right) setulae (setulae on posterior margin rather strong, on upper margin weak), anepimeron with 3/4 setulae. **Wing** with costal spinules slightly longer than in other *Ilione*. Crossveins darkened, vein  $M_{1+2}$  with one spot between crossveins. Dark longitudinal medial stripes in cells  $r_{4+5}$  and  $m_{1+2}$  indistinct. **Legs.** Inner posterior margin of hind coxa with 8 long setulae. Ventral surface of  $\beta$  without strong setae. **Abdomen** yellow-brown with dark brown dorsal vitta. Tergite 5 with distinct marginal setae.

**Distribution.** So far known only from the island of Corfu.

**Discussion.** The general habitus of the examined specimen is quite similar to *I. albiseta*, without a dark spot in apical third of vein  $M_{1+2}$ . The examined female also has remarkably long and entirely white arisal hairs. Male surstyli are known only from the original description of Verbeke's



**Figs 26–27.** *Ilione*, general view: 26 — female paratype *corcyrensis*; 27 — male holotype *I. bindata* sp. nov.

**Рис. 26–27.** *Ilione*, общий вид: 26 — самка *corcyrensis*, паратип; 27 — самец *bindata* sp. nov., ГОЛОТИП

drawing (see Fig. 1g here), they look rather similar to that of *I. albisetata* (Verbeke 1964). To obtain a reasonable conclusion on validity, it is necessary to study more material, at least a male specimen.

***Ilione truquii* Rondani, 1863**

Fig. 1f

This species was characterised by Verbeke mainly by negative characters: wing without dark spot in apical third of vein  $M_{1+2}$  (not *I. albisetata*) and without long costal spines (not *I. unipunctata*); arisal hairs not entirely white (not *I. corcyrensis*) and not short and dense as in *I. albisetata* (Verbeke 1964).

**Distribution.** So far known only from Syria.

**Discussion.** *I. truquii* was described from a female holotype from Syria. Verbeke has seen several more specimens again from Syria and his drawing of genitalia is based on the examination of these additional topotypes. Verbeke gave no verbal explanation as to which differences of the male genitalia are diagnostic (Verbeke 1964). Looking on Verbeke's drawing (Figs 1f, 1g, 1h) we can see that the surstyli of *I. truquii* are not similar to distinctive surstyli of *I. unipunctata*, but quite similar to those of *I. corcyrensis*. At the present political situation, it is unlikely that new Syrian material will be available. So far, we regard *I. truquii* as a doubtful species.

***Ilione bindata* sp. nov.**

Figs 27, 28

<https://zoobank.org/References/59BFC186-A536-4037-9CFA-47BD310C5A2D>

**Holotype:** INDIA, Uttarakhand state, Uttarkashi, 30.735°N, 78.458°E, 1200 m, walnut

oak forest, 01–02.05.2012, K. Tomkovich, 1♂, abdomen dissected, stored in ZMUM.

**Description.** Body length: 5.5 mm, wing: 5.5 mm. **Head.** Spots at bases of anterior orbital setae and orbito-antennal spot large, black, very distinct. Occiput with brown median stripe surrounded by whitish stripes. Antennal postpedicel darkened. Arisal hairing 2 times longer than width of arisal base; hairs white. Face with drop-like black spot (Fig. 27). **Thorax.** Prosternum with 2/3 setulae. Disc of scutum brownish, with a pair of greyish submedian vittae. Brownish stripe on upper third of anepisternum hardly distinct. Thoracic chaetotaxy: 0+2 *dc*; prescutular acrostichals strong; 1 pospronotal seta; 2 notopleural setae; 1 presutural seta; 1 subalar seta; 2 postalar setae; 2 weak subalar setae. Anepisternum with 29 setulae, anepimeron with 9 setulae; meron with 3 minute setulae near posterior margin. **Wing** with costal margin darkened; vein  $M_{1+2}$  with darkened short 3/4 stump veins in section between crossveins (Fig. 27). **Legs.** Inner posterior margin of hind coxa with 8–10 short setulae.  $f\beta$  with 7–8 *pv* in apical 1/2 and 5 *av* in apical 1/3. **Abdomen** brownish-grey, with distinct dark brown wide dorsal vitta and a pair of less distinct narrow lateral vittae. Tergite 5 without strong latero-marginal setae. Sternite 4 as in *I. turcestanica*. Surstyli similar to those in *I. turcestanica*, but narrower and medially curved in lateral view (Fig. 28).

**Etymology.** The species name is a Latinised adjective derived from 'bindi' — a coloured spot on a forehead often seen in India as a sign



**Figs 28–29.** *Ilione*, male postabdomen: 28 — *bindata* sp. nov., ventral and lateral; 29 — *turcestanica*, lateral

**Рис. 28–29.** *Ilione*, постабдомен самцов: 28 — *bindata* sp. nov., снизу и сбоку; 29 — *turcestanica*, сбоку

of belonging to the Brahmin varna. The characteristic spot on the face of the new species from India strongly resembles the bindi. In Latin 'bindata' means 'with a bindi'.

**Diagnosis.** *Ilione bindata* sp. nov. is closely related to *I. turcestanica*, these species differ as follows (♂♂):

— Face with drop-like black spot (Fig. 27). Arisital hairs entirely white. Surstyli in lateral view curved at middle and narrower (Fig. 28). Costal margin of wing darkened (Fig. 27) . . . . . ***bindata* sp. nov.**

— Face without black spot. Arisital hairs mainly dark coloured, white hairs visible only at base (Fig. 13). ♂: Surstyli in lateral view not curved and wider (Figs 24, 29). Costal margin of wing not darkened . . . . . ***turcestanica* Hendel**

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