LISPE (DIPTERA, MUSCIDAE) OF THE PALAEARCTIC REGION

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Abstract. The Palearctic fauna of Lispe is reviewed. The paper consists of 4 parts. (1) The alphabetical list of 65 taxa of the Palearctic fauna is given with references, distribution data and, where necessary, taxonomic remarks. (2) A complete identification key for Lispe of the Palearctic region. (3) Review of the L. caesia group and key for the Palearctic species of the group. (4) Separate key for the Palearctic species of the L. palposa and L. rigida groups. The paper is illustrated with 50 figures. Lispe astakhovi sp. nov. is described. Four new synonymies are offered: Coenosia atra Meigen, 1830 = Lispe armeniaca Canzoneri & Meneghini, 1972, syn. nov.; L. leucospila Wiedemann, 1830 = L. albipuncta Shinonaga, 2010, syn. nov.; L. ochracea Becker, 1910 = L. subbivittata Mou, 1992 syn. nov.; L. patellitarsis Becker, 1914 = L. hirsutipes Mou, 1992, syn. nov.

Keywords: Diptera, Muscidae, Lispe, Palearctic, identification key, review, new species, synonymy.

LISPE (DIPTERA, MUSCIDAE) ПАЛЕАРКТИЧЕСКОГО РЕГИОНА

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Ключевые слова: Diptera, Muscidae, Lispe, Палеарктика, ключ, обзор, новый вид, синонимия.
INTRODUCTION

There are about 150 species of *Lispe* Latreille 1796 worldwide. The genus probably originated in the southern part of the Palaeartic region, where it shows the most impressive diversity. In my previous papers on *Lispe* (Vikhrev 2012a; 2012b; 2012c; 2014; 2015; 2016; Vikhrev, Ge, Zhang 2016 (available in open access here: https://archive.org/details/PapersOnDiptera), most part of the world fauna was revised. In the above cited publications, I made taxonomic revisions of species-groups of the genus worldwide, while in the present paper I address the more familiar geographical approach and offer the review of *Lispe* of the Palaearctic region. It is time to do that because the only revision and a complete key for the Palaearctic *Lispe* was published almost 60 years ago (Hennig 1960). Hennig's revision included 44 taxa (41 species and 3 subspecies). Catalogue of Palaearctic Diptera (Pont 1986) includes 52 taxa (48 species and 4 subspecies), of which only 39 species I regard as valid presently. Since then, several species were described, synonymized, renamed or recorded for the region; as a result, the total number of Palaearctic taxa considered in the present publication rises to 65 (57 valid species and 2 subspecies; 4 new synonymies; 2 species excluded from the Palaearctic fauna). In the list, species and subspecies included in the identification key are shown in bold italics, while those not included are shown in plain italics. The Palaearctic region as assumed in this paper includes: Europe; N Africa (from Morocco to Egypt) and most of Asia: Central Asia northwards of the southern foothills of the Himalayas at 2000 m asl, SW Asia westward of the Indus River, with most of Arabian Peninsula included except for Yemen, East Asian lowlands northwards of 31°N.

The paper consists of 4 parts:
I. The alphabetical list of species. The majority of them are only briefly mentioned in the list with references to previous papers, where discussions of taxonomy and examined material were given. In some cases, new examined material with new records from the Palaearctic region added. The minority of the listed species (the greater part of the *Lispe caesia* group in a broad sense), which I have not considered before, are presented in more detail.
II. Identification key for *Lispe* of the Palaearctic region.
III. Discussion of the taxonomy of the *L. caesia* group and identification key for the group.
IV. An identification key for *L. palposa* and *L. rigida* groups.

MATERIAL AND METHODS

The specimens examined are deposited in the following museums:
BMNH—Natural History Museum, London, UK;
MBFU—Museum of Beijing Forestry University, Beijing, China;
MNHN—Muséum national d’Histoire naturelle, Paris, France;
TAUI—Tel-Aviv University, Israel;
ZIN—Zoological Institute, Saint Petersburg, Russia;
ZMHU—Museum für Naturkunde, Humboldt–Universität zu Berlin, Germany;
ZMUM—Zoological Museum of Moscow University, Russia.

Geographical coordinates are given in the decimal degrees format.

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).

The abbreviation for the tarsi as *tar* followed by a pair of digits separated by a hyphen was proposed by Vikhrev (2011): the first digit (1 to 3) gives the leg number and the second digit (1 to 5) the number of the tarsal segment. For example, \(tar1-4\) = 4-th segment of fore tarsus; \(tar3-1\) = hind basitarsus.

Illustrations are original unless otherwise indicated. Since I have to reference numerous figures of this paper as well as those from lit-
erature (some of the latter reproduced in the former, with different numeration), to avoid confusion I capitalize the first letter (Fig. or Figs) for figures in this paper but use the lower case letter (fig. or figs) in literature references to figures published elsewhere.

I. Alphabetic list of Lispe of the Palaearctic region with references and comments

**Lispe aceponti** Vikhrev, 2015
**Lispe aceponti** Vikhrev, 2015 (Vikhrev 2015)
**Material examined:** see Vikhrev (2015).

**Distribution.** Described from the western part of India: Goa, Gujarat, Orissa, Rajasthan states and Sri Lanka, probably present in southern Pakistan and Iran.

**Lispe aquamarina** Shinonaga & Kano, 1983
**Lispe aquamarina** Shinonaga & Kano, 1983 (Shinonaga 2003; Zhang et al. 2016)
**Material examined:** CHINA, Liaoning prov., Dalian, 38.864°N 121.549°E, D. Zhang, 11 August 2003, 5♂, 2♀ (MBFU and ZMUM).

**Distribution.** S Japan and China, Liaoning prov.

**Lispe apicalis** Mik, 1869
**Lispe comitata** Becker, 1904 (Hennig 1960; Vikhrev 2015)
**Lispe apicalis** Mik, 1869 (Vikhrev 2015)
**Material examined:** see Vikhrev (2015).

**New records:** KAZAKHSTAN, Almaty reg., Kapchagay Reservoir env., 43.7°N 77.2°E, 22–28 May 2016, N. Vikhrev, 5♂ (ZMUM). UZBEKISTAN, Bukhara reg.: 25 km SE of Bukhara, 39.574°N 64.72°E, 21 June 2019, E. Makovets-kaya, 3♂, 1♀; Tudakul Lake, 39.80°N 64.74°E, 21 June 2019, E. Makovetskaya, 1♂ (ZMUM).

**Distribution.** Palaearctic region from Morocco to Central Asia. The westernmost and southernmost record is 28.528°N 10.947°W (SW Morocco); the easternmost records are China: Inner Mongolia prov., Ejin Banner (≈41.7°N 100.3°E) and Xinjiang prov., Burqin (≈48.7°N 87.0°E) (Zhang et al. 2005); the northernmost — 51.21°N (NW Kazakhstan).

**Lispe armeniaca** Canzoneri & Meneghini, 1972
Figs 1–3

**Synonymy.** Type locality: Armenia, eastern vicinities of Yerevan (≈40.1°N 44.6°E). The species was described from 2 females; according to the authors, it is related to *L. kowarzi* (Canzoneri, Meneghini 1972). Due to kind help of Dr. Marco Uliana, the curator of the Entomology section at the Natural History Museum of Venice, Italy, I received the quality images of the holotype (Figs 1–3), which show that it is female of *Coenosia atra*. So, *Coenosia atra* Meigen, 1830 = *Lispe armeniaca* Canzoneri & Meneghini, 1972, **syn. nov**, this taxon is excluded from the Palaearctic *Lispe*.

**Lispe assimilis** Wiedemann, 1824
**Lispe cyrtoneurina** Stein, 1900 (Vikhrev 2012b)
**Lispe modesta** Stein, 1913 (Vikhrev 2012b)
**Lispe inexpectata** Canzoneri & Meneghini, 1966 (Pont 1986)

Figs 1–3. *Lispe armeniaca* Canzoneri & Meneghini, 1972, female holotype = *Coenosia atra* Meigen, 1830: 1 — dorsal view; 2 — lateral view; 3 — labels (photo: Marco Uliana)

**Lispe assimilis** Wiedemann, 1824 (Vikhrev 2012b; Pont 2019)

**Material examined:** see Vikhrev (2012b).

**Distribution.** Palaearctic: S Europe, N Africa, Western Asia, Pakistan. Also: Afrotropical region; Oriental region except for NE part, Australia.

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**Lispe astakhovi** sp. nov.

http://zoobank.org/Nomenclatura lActs/FA0E722D-7C9B-43CF-9A84-CA8572B896C9

Figs 4–7

**Type material.** Holotype, ♂, INDIA, Rajasthan state, Sambhar salt lake, 26.92°N 75.19°E, 24 February 2011, N. Vikhrev. Paratypes 3♂, 9♀: INDIA, same data as the holotype, 1♂, 9♀; UZBEKISTAN, Bukhara reg.: 25 km SE of Bukhara, 39.574°N 64.72°E, 21 June 2019, E. Makovetskaya, 1♂; 65 km SW of Bukhara, 39.305°N 63.873°E, 22 June 2019, E. Makovetskaya, 1♂ (all ZMUM).

**Description.** Male (Fig. 4), body length 5.5–6 mm.

*Head.* Frontal triangle broad, with convex margins, densely white dusted, the rest of interfrontalia dark, with thin whitish dusting (Fig. 5). Fronto-orbital plates whitish, dusted, with 5 inclinate and 5–7 setulae in outer row. Parafacials with 4–5 fine hairs in lower part. Face and parafacials white, occiput grey. Antenna black, postpedicel falling of mouth margin by almost its own length. Aristal hairs hardly longer than half width of antenna. Vibrissae weak, slightly shorter than distance between them. Palpi yellow with outer surface densely whitish dusted.

*Thorax.* Evenly grey dusted with rather indistinct presutural whitish median vitta. dc 2+3, all strong. Meron bare, anepimeron with 10–12 setulae. Wing clear, calypters white, halter yellow.

*Legs.* Dark with yellowish knees and bases of tibiae. Femora with distinct ventral spines

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![Figures 4-9: L. astakhovi sp. nov. (4-7): 4 — the holotype, general view, lateral; 5 — the holotype, head, anterior view; 6 — cercal plate; 7 — sternite 5; L. marina, male (8-9): 8 — head, anterior view; 9 — mid tarsus, anterior view (from Bergerard 1995)](image-url)
placed in 1–2 irregular rows. Hind coxa with seta on posterior surface. \( f1 \) with a row of fine \( av \) setae. \( t1 \) without \( p \) seta. \( f2 \) with \( a \) setae at basal half, 2 preapical \( pd \), 5 fine \( v \) setae in basal half. \( t2 \) with 1 \( ad \) and 1 \( p \) setae. \( f3 \) with 4 strong \( av \) setae at apical half and 3–4 long \( pv \) setae in basal half. \( t3 \) in apical third with 1 strong \( ad \) and 2 shorter \( av \), ground setulae slightly elongated on \( a \) surface. \( tar3-1 \) unmodified, about 3 times as long as wide; with a typical dense brush of hairs on \( pv \) surface and with a row of 6 \( av \) setae, these 2 times as long as \( tar3-1 \) width.

**Abdomen** evenly light grey dusted, without typical for \( L. caesia \) group dark pattern. Cercal plate—Fig. 6; sternite 5—Fig. 7.

**Female** differs from male as follows: body length 5–7 mm. Dusting of frons and face yellowish, dusting of thorax more yellowish-grey. Spines on femora stronger. \( f3 \) with 2–3 \( av \) in apical half. Out of 9 females, 4 specimens have \( p \) seta on right or left \( t1 \), but never on both fore tibiae.

**Diagnosis.** Male genitalia and general appearance are similar to those of W Palearctic \( L. halophora \), the differences are as follows:

- \( t3 \) with 1 \( ad \) and 2 \( av \) \( t1 \) without \( p \) seta. Abdomen evenly light grey dusted, without dark pattern. Palpi yellow .

**astakhovi sp. nov.**

- \( t3 \) without \( ad \), with 3–4 \( a \), 8–9 \( av \) spinulose setae. \( t1 \) with \( p \) seta. Abdomen with typical for \( L. caesia \) group dark pattern: black dorsal spots on posterior part of tergite 4 fused with antero-lateral spots on tergite 5. Palpi dirty brown .

**halophora** Becker

Males of sympatric \( L. caesia \) and \( L. odessae \) have modified hind tarsus, while in \( L. astakhovi \) sp. nov. \( tar3-1 \) is simple.

Females are similar to sympatric \( L. odessae \), see the key below to distinguish these species.

**Etymology.** Named in the memory of Russian dipterologist (Asilidae expert) Dmitry Astakhov, who tragically died in a car accident in September 2019.

**Lispe bengalensis** Robineau-Desvoidy, 1830

Figs 18–20, 48

**Lispe tetraastigma** Schiner, 1868 (Hennig 1960)

**Lispe armipes** Becker, 1903 (Hennig 1960)

**Lispe berlandi** Seguy, 1940 (Pont 1986)

**Lispe bengalensis** Robineau-Desvoidy, 1830

(Pont 1986; Pont 1991; Pont 2019)

**Type material examined:** Syntypes, 6♂ and 3♀ of \( L. armipes \) Becker, 1903: **EGYPT, Damiettie (31.4°N 31.9°E), 24 March 1899 (ZMHU). Holotype **♂ and 2♀ paratypes of **Lispe berlandi** Seguy, 1940: **MOROCCO, Rio de Oro (Dakhla-Oued Ed-Dahab prov.), Villa Cisneros (= Dakhla, 23.8°N 15.9°W), June 1939, M. L. Berland (MNHN).**

**Distribution.** In Palaearctic is known from Egypt and Morocco. Widespread near seashores from Africa to Australia.

*Lispe baluchistanensis* Shinonaga, 2010

**Type locality:** Pakistan, Balochistan reg., Khuzdar (27.8°N 66.6°E)

**Remarks.** The difference between *L. baluchistanensis* and *L. nana* is not clear from the description. The species is not included in the key.

*Lispe bivittata* Stein, 1909

*Lispe nigrificacies* Becker, 1914

*Lispe hafa* Snyder, 1965

**Remarks.** As discussed in Vikhrev (2012c; 2014), the Palaearctic records of *Lispe bivittata* Stein, 1909 (Hennig 1960; Pont 1991) were misidentifications of *Lispe ochracea* Becker, 1910 = *Lispe subbivittata* Mou, 1992 syn. nov. New synonymy is discussed below under *L. ochracea*. Here I stress the fact that *Lispe bivittata* is excluded from the Palaearctic list as an Oriental species.

**Distribution.** Widespread in the Oriental region: India: Assam and Uttarakhnad; Myanmar, Shan; Thailand: Kanchanaburi, Mae Hong Son, Nakhon Ratchasima and Phuket; Cambodia; Vietnam, Lao Cai; Indonesia, Java; Taiwan; Japan, Bonin Islands.

*Lispe brunnicosa* Becker, 1904

*Lispe brunnicosa* Becker, 1904 (Hennig 1960; Vikhrev 2012c)

**Material examined:** see Vikhrev (2012c).


*Lispe caesia* Meigen, 1826

Figs 10–15

*Lispe microchaeta* Seguy, 1940

*Lispe caesia microchaeta* Seguy, 1940 (Hennig 1960)


**Material examined:** see Vikhrev et al. (2016).

**New record:** RUSSIA, Tuva reg., Dus-Khol salt lake, 700 m asl, 51.36°N 94.45°E, 2–5 July 2017, N. Vikhrev, 6♂, 7♀ (ZMUM), the easternmost record.

**Distribution.** Europe, N Africa, Near East, SE of European Russia and W Siberia, although rather uncommon in the north-eastern part of the range.

*Lispe candidans* Kowarz, 1892

**Fig. 49**

*Lispe obscurior* Strobl, 1883, type locality: Croatia, Zadar, 44.2°N 15.2°E, type specimens lost (Hennig 1960)

*Lispe uroleuca* Pandelle, 1899, type locality: France, Aude, 42.9°N 3.0°E, type in MNHN (Hennig 1960)

*Lispe simonyii* Becker, 1910, type locality: Yemen, Sokotra. Status of this taxon is doubtful as discussed in Remarks below.

*Lispe candidans* Kowarz, 1892 (Hennig 1960; Zhang et al. 2016)


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**Distribution.** Palaearctic: the Mediterranean coast of Europe, Canary Islands, NW Africa, Middle East; Afrotropical: Yemen, Senegal, Mozambique; Oriental: India (Gujarat).

**Remarks.** In specimens of *L. candidans* from western localities (Spain, Morocco, Senegal), the frons is densely whitish dusted (usually silvery-white in males (Fig. 10), yellowish in females (Fig. 11)), so the borders between the fronto-orbital plates, the frontal vitta and frontal triangle are hardly distinct. Specimens with less dusted frons and clearer frontal borders are in minority. However, in the East (Middle East and India (Gujarat)) the overwhelming majority of specimens have a less dusted frons. The syntypes of *Lispe simonyii* Becker, 1910 described from Sokotra have “eastern” frontal pattern. I did not find any reliable character to distinguish West African and Indian females (which I have in large series), males differ as follows:

—Vibrissae weak. Surstylus longer and more curved as mammoth tusk (Fig. 14). Sternites 5–6 on internal view as on Fig. 12 ................. West African males

—Vibrissae stronger. Surstylus shorter and less curved as elephant tusk (Fig. 15). Sternites 5–6 on internal view as on Fig. 13 ................. Indian males

These differences would be enough to regard *L. simonyii* as a valid species, but there is a problem. Nobody examined the genitalia of the true *L. candidans* from the east part of Mediterranean coast (type locality Greece, Aegina Island, 37.7°N 23.5°E, type lost) or of the syntype of *L. simonyii*. It is unknown which form inhabits the Middle East. I was able to examine the genitalia of a single male from Nabq in S Sinai. Its sternites 5–6 are of Indian type, but the
surstyli are reduced to small protrusions, quite different from the tusk-shape of both Moroccan and Indian specimens. (Note that Nabq is 1500 km from Aegina and 4500 km from S Morocco.) So, at present our knowledge about the variability of the genitalic structures of this Lispe is absolutely insufficient. For the time being I prefer to regard L. candicans in a broad sense and postpone the decision on the taxonomic status of L. simonyii.

**Lispe cilitarsis** Loew, 1856

Fig. 26

*Lispe cilitarsis* Loew, 1856 (Vikhrev 2012b; Vikhrev 2014)

**Material examined:** see Vikhrev (2012b; 2014).


**Lispe cinifera** Becker, 1904

*Lispe seticincta* Becker, 1904 (Hennig 1960)

*Lispe cinifera* Becker, 1904 (Hennig 1960; Vikhrev 2015)

**Material examined:** see Vikhrev (2015).

**Distribution.** Palaearctic, Central Asia: China: Gansu, Qinghai, Sichuan and Xinjiang prov.; Kazakhstan, E Kazakhstan prov.; Kyrgyzstan, Naryn reg.; Turkmenistan, Ahal reg.

**Lispe consanguinea** Loew, 1858

*Lispe consanguinea* Loew, 1858 (Vikhrev 2014)

**Material examined:** see Vikhrev (2014).

**Distribution.** Throughout the Palaearctic between 62°N and 38°N, mainly sandy beaches of large rivers.

**Lispe draperi** Séguy, 1933

*Lispe draperi* Séguy, 1933 (Vikhrev 2011; 2014)

**Material examined:** see Vikhrev (2011; 2014).

**Distribution.** Algeria (type locality) and Morocco.

**Lispe elegantissima** Stackelberg, 1937

Figs 39–41

*Lispe elegantissima* Stackelberg, 1937 (Hennig 1960; Vikhrev 2012a; Vikhrev 2014)

**Material examined:** see Vikhrev, 2014.

**New records:** CHINA, Xinjiang prov., Beitun(zhen) (47.36°N 87.82°E), 21 July 2007, D. Zhang, 1♂, 1♀ (MNHN). UZBEKISTAN, Bukhara reg., Tudukul Lake, 39.80°N 64.74°E, 21 June 2019, M. Piwszynski, 1♀ (Nicolaus Copernicus University, Torun, Poland).

**Distribution.** Palaearctic, Central Asia, China, Xinjiang prov.; Kazakhstan, Kyrgyzda reg.; Tajikistan, Khatlon reg.; Turkmenistan: Dashoguz and Lebap reg.; Uzbekistan, Bukhara reg. Recorded from 58°E to 88°E, from 37°N to 48°N.

**Lispe elkantarae** Becker, 1907

*Lispe elkantarae* Becker, 1907 (Hennig 1960; Vikhrev 2015)

**Material examined:** see Vikhrev (2015).

**Distribution.** SW Palaearctic: Algeria; Morocco; Turkey.

**Lispe emdeni** Vikhrev, 2012

*Lispe emdeni* Vikhrev, 2012 (Vikhrev 2012a; Vikhrev 2014)

**Material examined:** see Vikhrev (2014).

**Distribution.** Known from Ethiopia, Amhara region and India: Rajasthan, Madhya Pradesh and Gujarat states. Thus, *L. emdeni* may present as well between Ethiopia and India, i.e. in Middle East and Pakistan in proper habitats, which are big stones in or along slow, seasonally dried streams.

**Lispe ezensis** Shinonaga & Kano, 1983

*Lispe ezensis* Shinonaga & Kano, 1983 (Shinonaga 2003; Vikhrev 2015)

**Material examined:** see Vikhrev (2015).

**Distribution.** Japan, Hokkaido and Russia, Primorsky reg.

**Lispe flavicornis** Stein, 1909

Fig. 17

*Lispe flavicornis* Stein, 1909 (Pont 1991; Zhang et al. 2016)

**Material examined:** see Vikhrev (2015).

**New record:** KAZAKHSTAN, Almaty reg., Kapchagay Reservoir env., 43.7°N 77.2°E, 22–28 May 2016, N. Vikhrev, 1♂ (ZMUM).

**Distribution.** Known from Europe to Central Asia.

**Lispe flavicincta** Loew, 1847

*Lispe flavicincta* Loew, 1847 (Hennig 1960; Vikhrev 2015)

**Material examined:** see Vikhrev (2015).

**New record:** CAMBODIA, Kep prov., Kep env., former “salt fields”, 10.50°N 104.33°E, 7 December 2010, N. Vikhrev, 1♂.
Lispe (Diptera, Muscidae) of the Palaearctic region


Distribution. Palaearctic from E Europe to China, to the north till 55°N.

Lispe freidbergi Vikhrev, 2012

Lispe freidbergi Vikhrev, 2012 (Vikhrev 2012c)

Material examined: see Vikhrev (2012c).

Distribution. Known for Egypt (Sinai) and Israel (Negev).

Lispe frigida Erichson, 1851

Lispe canadensis Snyder, 1954 (Hennig 1960) Lispe frigida Erichson, 1851 (Vikhrev 2015)


Distribution. A Holarctic circumpolar species.

Lispe halophora Becker, 1903

Fig. 47

Lispe halophora Becker, 1903 (Hennig 1960; Zhang et al. 2016)

Type material examined: Syntypes 4♂, 1♀, EGYPT, Alexandria [near El Meks = Al Max, 31.15°N 29.86°E, on the bank of a salt lake, 3 May 1899] (ZMHU).


Distribution. SW Palaearctic from Morocco to Israel.
**Lispe hebeiensis** Ma & Tian, 1993

**Lispe hebeiensis** Ma & Tian, 1993 (Vikhrev 2015)

**Material examined:** see Vikhrev (2015).

**New record:** IRAN, Markazi prov., Arak env., Salt Lake S bank, 34.15°N 49.81°E, 1660 m asl, 18–30 May 2017, O. Kosterin, 3♂, 2♀ (ZMUM).

**Distribution.** Known from E Europe (the westernmost record in Greece) to Far East (China: Hebei, Liaoning prov., Russia, Zabaikalsky reg.) The northernmost record is 54.88°N.

**Lispe hydromyzina** Fallen, 1825

**Lispe hydromyzina** Fallen, 1825 (Hennig 1960; Vikhrev 2015)

**Material examined:** see Vikhrev (2015).

**Distribution.** Known only from the Atlantic seashore in W Europe.

**Lispe kowarzi** Becker, 1903

**Lispe kowarzi kowarzi** Becker, 1903 (Vikhrev 2014)

**Material examined:** see Vikhrev (2012c).

**Distribution.** S Palaearctic from Morocco to Pakistan, the northernmost record: Turkey, Antalya prov., Manavgat env., 36.76°N 31.45°E. Also known from Afrotropical and Oriental regions.

**Lispe kozlovi** Vikhrev, 2012

**Lispe kozlovi Vikhrev, 2012** (Vikhrev 2012c)

**Material examined:** see Vikhrev (2012c).

**Distribution.** E Palaearctic to the north of 50°N. Known from W Siberia (Khakassia and Omsk reg.) and Kazakhstan (W. Kazakhstan reg.). Seems to be distributed further north than the closely related *L. brunnicosa*.

**Lispe lanceoseta** Wang & Fan, 1981

**Figs 21–22**


**Distribution.** Known from the type locality: China, Shanxi pr., Hequ County (39.3°N 111.2°E) and from Tajikistan, Khatlon reg. and Uzbekistan, Bukhara reg.

**Remarks.** Male of *L. lanceoseta* is unmistakable due to modified mid tibia and hind tarsus, but identification of female is not as easy. Recently Zhang et al. (2016) gave redescription of *L. lanceoseta*, here I give my redescription to clarify or correct several points.

**Male** body length 4 mm. **Head** with frontal triangle and frontal-orbital plates densely greyish-white dusted, border with black frontal vitta very distinct. Frontal triangle reaches fore margin of frons, slightly convex in apical half, frontal vitta narrow all along, narrower than fronto-orbital plates. Antenna dark, densely grey dusted, postpedicel and arista remarkably short: postpedicel hardly longer than pedicel, arista as long as width of postpedicel. Aristal hairs longer than the width of postpedicel. Vibrissae absent. Palpi whitish-yellow. **Thorax** densely brownish-grey dusted. Anepimeron with 4–5 hairs, meron bare, *dc* 2+4 (not 2+3 as in Zhang et al. (2016)), rather weak. **Legs** dark except for yellowish knees. Ventral spines on femora absent. Hind coxa without seta on posterior margin. *t1* without submedian setae; *t2* with 1 *ad* and 1 *pd* both weak and short; at apex *t2* with modified willowleaf-like, elongated *av* and *pv* setae (Fig. 21); *f3* in basal 3/4 with a row of 6–7 *av* setae (longer than femur width); *tar2-2* to *tar2-5* yellow, especially on inner surface; *t3* with 1 *ad*; *tar3-1* modified, widened and flattened, with pointed apex; *tar3-2* narrowed basally (Fig. 22). **Abdomen** evenly grey dusted with black apex.

**Female** differs as follows. Body length 5.5 mm. Frontal triangle and frontal-orbital plates yellowish dusted, border with black frontal vitta less distinct. Postpedicel and arista longer than in male: postpedicel 1.5x as long as pedicel, arista as long as length of postpedicel. Vibrissae medium strong. Tibiae yellowish at base. *t2* without modified setae at apex. *f3* with 2 *av* in apical 1/3. Hind tarsus not modified. Apex of abdomen not black.
The relationship of *L. lanceoseta* is not clear. Zhang et al. (2016) placed it in the *L. caesia* group. Slightly broadened frontal triangle; modified *tar3-1* and bare meron provide formal reasons to agree with this opinion. However, the bare inner margin of hind coxa; the absence of *av* seta(e) on *t3* and velvety black postabdomen in male indicate possible relation to the *L. palposa* group. So far, I am inclined to follow Zhang et al. (2016) opinion.

**Lispe leucocephala** Loew, 1856
*Lispe frontalis* Zielke, 1972 (Zhang et al. 2016)
*Lispe leucocephala* Loew, 1856 (Hennig 1960; Zhang et al. 2016)

**Type material examined:** Syntypes, 2♂, 1♀ of *L. leucocephala:* EGYPT, Suez, coll. Frauenfeld (ZMHU). Holotype *L. frontalis* ♂: MADAGASCAR, (Boeny reg.) Amborovy (15.66°S 46.33°E), 28 June 1958, F. Keiser (MNHN).


**Distribution.** Known from seashores: Egypt, India, Madagascar.

**Lispe leucospila** Wiedemann, 1830
*Coenosia leucospila* Wiedemann, 1830.
*Lispe leucospila* Wiedemann, 1830 (Lyneborg 1970)
*Lispe eidsvoldica* Malloch, 1925 (Vikhrev 2014)
*Lispe leucospila sinica* (Hennig 1960)
*Lispe albipuncta* Shinonaga, 2010 *syn. nov.*
*Lispe leucospila* Wiedemann, 1830 (Vikhrev 2011; Vikhrev 2014; Pont 2019)

**Material examined:** see Vikhrev (2014).

**New records:** CHINA: *Beijing,* Olympic Park, 40.01°N 116.39°E, 16 September 2016, N. Vikhrev, 1♀ (ZMUM); *Guandong* prov., Tsisin’yan’ (~23°N 113°E), 29 November 1959, B. Rodendorf, 2♂ (ZIN); Ven’tsuan’
RUSSIA, Fall en, 1825 (Hennig 1960; Ringdahl, 1922 (Hennig 1960; Russia, Primorsky reg.: Novo-Kachalinsk, Khanka L. (45.1°N 132.0°E), 8 September 1978, A. Zinovjev, 2♀, 2♀ (ZIN)). RUSSIA, Primorsky reg.: Kedrovaya Pad NR, Kedrovka R. (43.09°N 131.58°E), 20 September 1978, A. Zinovjev, 1♀ (ZIN).

Distribution. East Asia and Australia. Distributed in the triangle: W India (Gujarat, Rajasthan) and Pakistan; Far East (NE China, Japan, Honshu, Russia, Primorsky reg.); E Australia.

Synonymy. Lispe albipuncta Shinonaga, 2010, type locality: Pakistan, Khyber Pakhtunkhwa prov., D. I. Khan (31.8°N 70.9°E). The type locality is westward from Indus River and therefore belongs to the Palaeartic region. According to the description (Shinonaga 2010, 103 and Fig. 35) L. albipuncta entirely fits L. leucospila with a reduced wing pattern. According to the discussion in Vikhrev (2014) the reduced wing pattern is typical for specimens of L. leucospila from the western parts of the range (India: Gujarat and Rajasthan), so Lispe albipuncta Shinonaga, 2010 = Lispe leucospila Wiedemann, 1830 syn. nov.

Lispe litorea Fallen, 1825
Lispe litorea Fallen, 1825 (Hennig 1960; Vikhrev 2015)

Material examined: see Vikhrev (2015).

Distribution. Known only from the shores of the Atlantic seas in NW Europe.

Lispe loewi Ringdahl, 1922
Figs 8, 9, 16
Lispe loewi Ringdahl, 1922 (Hennig 1960; Vikhrev 2015)

Material examined: see Vikhrev (2015).

New records: Russia, Rostov reg., Rostov-on-Don, 47.288°N 39.693°E, 11 October 2019, Yu. Palamarchuk, 1♀ (by photo). UZBEKISTAN, Bukhara reg.: 25 km SE of Bukhara, 39.574°N 64.72°E, 21 June 2019, E. Makovetskaya, 2♂, 2♀; Tudakul Lake, 39.80°N 64.74°E, 21 June 2019, E. Makovetskaya, 3♂, 3♀; 65 km SW of Bukhara, 39.305°N 63.873°E, 22 June 2019, E. Makovetskaya, 7♂, 8♀ (ZMUM).

Distribution. Widespread in coastal marshes and at banks of inland salt basins. Common in West Palaeartic, to the east known till Central Asia and Central Siberia. Probably this is the most southerly distributed species in Lispe palposa group: listed for Sudan (Pont 1986) and collected in S Morocco, 28.204°N 11.779°W.

Lispe longicollis Meigen, 1826
Figs 23, 24
Lispe longicollis Meigen, 1826 (Hennig 1960; Vikhrev 2012b; Vikhrev 2014)

Material examined: see Vikhrev (2012b; 2014).


Distribution. Palaeartic. Known from W Europe to Far East. The northern limit of distribution is around 55°N. Common in Turkey and Iran, but records from Israel and N Africa probably are misidentified L. cilitarsis.

Lispe marina Becker, 1913
Figs 8, 9, 16
Lispe lanzarotensis Baez, 1978 (Pont 1986)
Lispe marina Becker, 1913 (Hennig 1960; Bergerard 1995)


Material examined: MOROCCO, El Jadida prov., Oualidia lagoon, 32.746°N 9.024°W, 30 April 2012, N. Vikhrev, 12♂, 3♀ (ZMUM). PORTUGAL, Obidos (municipality 39.4°N 169
Lispe (Diptera, Muscidae) of the Palaearctic region

Lispe microptera Seguy, 1937

Material examined: see Vikhrev (2012b; 2014).


Lispe melaleuca Loew, 1847

Material examined: see Vikhrev (2015).

New record: UZBEKISTAN, Bukhara reg.: 25 km SE of Bukhara, 39.574°N 64.72°E, 21 June 2019, E. Makovetskaya, 1♂ (ZMUM).


Lispe naimongola Tian & Ma, 2000

Material examined: see Vikhrev (2015).


Distribution. Palaeartic species so far known from 38°N to 52°N and from 43°E to 114°E.

Lispe nivalis Wiedemann, 1830

Material examined: see Vikhrev (2015).


Distribution. Palaeartic species so far known from 38°N to 52°N and from 43°E to 114°E.

Lispe nana Macquart, 1835

Material examined: see Vikhrev (2014).

New record: UZBEKISTAN, Samarkand reg.: 25 km SW of Samarkand, 39.503°N 66.660°E, 950 m asl, 27 June 2019, E. Makovetskaya, 3♂, 8♀; Bukhara reg.: 25 km SE of Bukhara, 39.574°N 64.72°E, 21 June 2019, E. Makovetskaya, 1♂ (ZMUM).

Distribution. Palaeartic species so far known from 38°N to 52°N and from 43°E to 114°E.
**Lispe nuba** Wiedemann, 1830

*Lispe nuba* Wiedemann, 1830 (Vikhrev 2012b)

**Material examined:** see Vikhrev (2012b).

**Distribution.** Palaeartic: Egypt and Israel. Widespread in Africa.

**Lispe nubilipennis** Loew, 1873

Figs 36–38

*Lispe nubilipennis* Loew, 1873 (Hennig 1960; Vikhrev 2012a; Vikhrev 2014)

**Material examined:** see Vikhrev (2014).

**Distribution.** Palaearctic, Caspian Lowland: Kazakhstan (W Kazakhstan reg.); Russia (Asstrakhon, Kalmykia, Orenburg, Rostov, Volgograd regions).

**Lispe ochracea** Becker, 1910

*Lispe bivittata* Stein, 1909 (Hennig 1960; Pont 1991) misidentification


*Lispe subbivittata* Mou, 1992 (Vikhrev 2012c; Vikhrev 2014)

*Lispe subbivittata* Mou, 1992 **syn. nov.**

**Material examined:** see Vikhrev (2012c; 2014).


**Discussion.** In previous publications (Vikhrev 2012c; Vikhrev 2014) I didn't agree with synonymy (Hennig 1960) *L. ochracea* of described from Sokotra and the Oriental *L. bivittata*. However, I considered this taxon under the name *L. subbivittata* because the type female of *L. ochrivittata* was not found in Vienna. While working on this paper, I was again faced with the need to somehow solve this problem and now I decided to propose the synonymy *Lispe ochracea* Becker, 1910 = *Lispe subbivittata* Mou, 1992 **syn. nov.** First, Becker (1910) in his description makes it clear that the type female *L. ochracea* has characteristic submedian av seta on f3. Second, the type material of *L. subbivittata* was not re-examined after the description as well.

**Distribution.** Widely distributed in Palaeartic from Egypt to NE China (Liaoning), also recorded from Saudi Arabia, Oman and Iran. Afrotropical records: Ethiopia, Sudan, Yemen. In the Oriental region is common in India: Andhra Pradesh, Gujarat, Orissa, Rajasthan and Uttarakhand states. In Uttarakhand *L. ochracea* is sympatric with the related *L. bivittata*.

**Lispe odessae** Becker, 1904

Figs 27–28

27 — *L. nana*, female (photo: Maherjos, diptera.info); 28 — *L. pectinipes*, female

**Discussion.** Palaeartic, from E Europe to...

**Lispe orientalis** Wiedemann, 1824

*Lispe orientalis* Wiedemann, 1824 (Hennig 1960; Vikhrev 2014)

**Material examined:** see Vikhrev (2011; 2014).

**Distribution.** In Palaearctic known from: Egypt (Sinai), Israel, Turkey, Russia (Krasnodar and Primorsky reg.), Iran, Azerbaijan, Pakistan, Tajikistan, Korea, widespread in China. Widespread in highland localities in the Oriental region. *L. orientalis* prefers dirty, organically polluted water.

**Lispe patellitarsis** Becker, 1914

Figs 31–33

*Lispe hamanae* Hori & Kurahashi, 1966 (Zhang et al. 2016)

*Lispe hirsutipes* Mou, 1992 *syn. nov.*

**Lispe patellitarsis** Becker, 1914 (Shinonaga 2003; Zhang et al. 2016)

**Type material examined:** Syntype *Lispe patellitarsis* Becker, 1914, 1♂, TAIWAN For- mosa, Anping, May 1912, H. Sauter (ZMHU).


**Distribution.** E Palaearctic: seashores from NE China (Liaoning), Korea and Japan to Tai- wan.

**Remarks.** I found some errors in the rede- scription of *L. patellitarsis* given in Zhang et al. (2016): *dc*: 0+2, not 0+1 (1); ♀ *t3* with 1 *ad* and 1 *av*, these setae are placed in the apical half of tibia, but they are submedian, not preapical (2); “frontal triangle distinctly broad”—actually frontal triangle narrow (3).

**Synonymy.** *Lispe hirsutipes* Mou, 1992 was described from China, Liaoning prov. According to Zhang et al., 2016, they neither got the type specimens from Jinzhou Municipal Health and Anti-epidemic Station, where the type material should be deposited, nor could contact the author. In the MBFU collection there is a series of *L. patellitarsis* from Liaoning prov., Jinzhou, Longqi Bay, i.e. from the type locality of *L. hirsutipes*. The only considerable difference between these taxa is that in *L. hir-
**Lispe parcespinosa** Becker, 1900

*Lispe frigida* Erichson, 1851 (Hennig 1960) misidentification

*Lispe parcespinosa parcespinosa* Becker, 1900

*Lispe bohemica* Becker, 1904 sensu Snyder (Vikhrev 2015)

**Material examined:** see Vikhrev (2015).

**Distribution.** Known from N China: Liaoning and Xinjiang prov. and Mongolia.

**Remarks.** The taxonomy of the above listed subspecies *L. parcespinosa* was discussed in Vikhrev (2015). Comparing the variability in *L. parcespinosa* with that in other *Lispe*, it seems more reasonable to regard it as a single species, and in the present paper I treat *L. parcespinosa* in this broad sense.

**Lispe pectinipes** Becker, 1903

**Fig. 28**

*Lispe leucospila* Wiedemann, 1830 (Hennig 1960), misidentification

*Lispe leucospila* Wiedemann, 1830 (Shinona-ga 2003; Xue, Zhang 2005)

**Material examined:** see Vikhrev (2014).

**Distribution.** Palaearctic: from Morocco to Central Asia; Oriental: India; Afrotropical.

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**Lispe parcespinosa** Heinrich, 1858

*Lispe sutipes* the wing is described as clear at the apical part. Even if so, the wing pattern of the related *L. flavicornis* shows the same variability: males with either spotted and clear wings being recorded. That is why I regard *Lispe patellitarsis* Becker, 1914 = *Lispe hirsutipes* Mou, 1992 = **syn. nov.**

**Lispe parcespinosa** Becker, 1900

**Lispe pygmaea** Fallen, 1825

**Fig. 35**

*Lispe aureola* Shinonaga, 2014 (Vikhrev 2016)

**Lispe japonica** Shinonaga, 2014 (Vikhrev 2016)

**Material examined:** see Vikhrev (2016).

**Distribution.** Whole Palaearctic from south to about 60°N; recently introduced in Japan and Hawaiian Oahu Island (Vikhrev 2016). Afrotropical: Sudan and Ethiopia; Oriental: India.

**Lispe rigida** Becker, 1903

**Fig. 30**

*Lispe persica* Becker, 1904 (Vikhrev 2012a)

**Lispe scalaris** Loew, 1847

**Figs 42–44**

*Lispe persica* Becker, 1904 (Vikhrev 2012a)

*Lispe scalaris** ssp. *maroccana* Canzoneri & Meneghini, 1966 (Vikhrev 2014)

**Material examined:** see Vikhrev (2014).

**Distribution.** Palaearctic: from Morocco to Central Asia; Oriental: India; Afrotropical.
Lispe septentrionalis Xue & Zhang, 2005
Lispe septentrionalis Xue & Zhang, 2005 (Vikhrev 2015)
Material examined: see Vikhrev (2015)

Lispe sericipalpis Stein, 1904
Lispe quaerens Villeneuve, 1936 (Hennig 1960; Vikhrev 2015)
Lispe tienmuensis Fan, 1974 (Ge et al. 2016)
Lispe fanjingshanensis Wei, 2006 (Ge et al. 2016)
Lispe sericipalpis Stein, 1904 (Vikhrev 2014; Ge et al. 2016)
Material examined: see Vikhrev (2011; 2014).
Distribution. In Palaearctic known from: S Europe, Russia (Krasnodar reg.), Israel, Turkey, Iran, Azerbaijan, Pakistan, Tajikistan, Uzbekistan, widespread in China. Widespread in highland localities in the Oriental region. L. sericipalpis is a typical species of fast mountain streams.

Lispe superciliosa Loew, 1861
Lispe superciliosa superciliosa Loew, 1861
Fig. 45
Lispe superciliosa cancellata Canzoneri & Meneghini, 1966 (Vikhrev 2015)
Lispe superciliosa superciliosa Loew, 1861 (Hennig 1960; Vikhrev 2015)
Material examined: see Vikhrev (2015).
Distribution. The West Palaearctic subspecies extending from Central Europe to W Siberia until the Yenisey R.

Lispe superciliosa monochaita Mou et Ma, 1992
Lispe litorea Fallen, 1825 (Xue & Zhang 2005) misidentification
Lispe monochaita Mou et Ma, 1992 (Xue, Zhang 2005)
Lispe superciliosa monochaita Mou et Ma, 1992 (Vikhrev 2015)
Material examined: see Vikhrev (2015).
Distribution. The East Palaearctic subspecies ranging from the Yenisei R. to Far East (China, Mongolia, Russia).

Lispe tarsocilica Xue & Zhang, 2005
Lispe tarsocilica Xue & Zhang, 2005 (Vikhrev 2015)
Material examined: see Vikhrev (2015).
New record: RUSSIA, Tuva reg., Dus-Khol
salt L., 700 m asl, 51.36°N 94.45°E, 2–5 July 2017, N. Vikhrev, 11♂, 8♀ (ZMUM).

**Distribution.** China, Hebei prov.; Mongolia, Bayankhongor prov.; Russia: Tuva and Zabaykalsky reg.

*Lispe tentaculata* De Geer, 1776


*Lispe tentaculata* De Geer, 1776 (Hennig 1960; Vikhrev 2011; Vikhrev 2014; Ge et al. 2016)

**Material examined:** see Vikhrev (2011; 2014).

**Distribution.** Whole Palearctic except the Maghreb where replaced by closely related *L. draperi*. The northern distributional limit is well beyond the Arctic Circle. Afro-tropical (Ethiopia), Oriental (N India) and Nearctic.


*Lispe uliginosa* Fallen, 1825

*Lispe cotidiana* Snyder, 1954 (Vikhrev 2015)

*Lispe neouliginosa* Snyder, 1954 (Vikhrev 2015)

*Lispe uliginosa* Fallen, 1825 (Hennig 1960; Vikhrev 2015)

**Material examined:** see Vikhrev (2015).

**New record:** RUSSIA, Yamalo-Nenets reg., 10 km NE of Salekhard, shore of Ob’ R., 66.6°N 66.8°E, 16–19 July 2019, N. Vikhrev, 2♂ (ZMUM).

**Distribution.** A widespread Holarctic species. To the north extends till Arctic Circle.

II. Identification key for *Lispe* of the Palearctic region, ♂ and ♀

1. *t*2 with submedian *ad* seta(e) ............ 2
   — *t*2 without submedian *ad* seta (though *av* seta sometimes present in *L. longicollis* group) ........................................ 8

2. Scutum and abdomen shining black, without dusting (Fig. 34). Legs black, but *tar*1-2 to *tar*1-5 red. *t*3 with strong submedian *pd. dc* 1 + 2–3 (anterior *post dc* weak if present). Small (body length 4–5 mm) species. Antenna remarkably long. *t*1 with *p* ............ *kowarzi kowarzi* Becker, 1903
   — Scutum and abdomen with distinct grey dusting. Fore tarsus not modified as above. *t*3 without *pd* .................. 3

3. *dc* 2+4, weak. ♀ unmistakable due to modified mid and hind legs (Figs 21–22). ♀: body length 5.5 mm; *t*1 without seta; *t*3 with 1 *ad*; all tibial setae weak and short; palp yellow; hind coxa bare on inner posterior surface; frontal triangle very distinct, large, wide; postpedicel very short .............. *lanceoseta* Wang & Fan (see also key for *L. caesia* group, part III)
   — 2+3 *dc* (except *L. ezensis*), all strong. Other character not as above .................. 4

4. Frontal triangle broad, with convex margins, densely silvery-white dusted (like that in Fig. 5). Hind coxa with seta on inner posterior surface. Femora usually with ventral rows of short spines. Meron bare .............. *L. caesia* group, part (see key for *L. caesia* group, part III)

Figs 34–35. 34 — *L. kowarzi*, female; 35 — *L. pygmaea*, female (photo: Yu. Palamarchuk)

Рис. 34–35. 34 — *L. kowarzi*, самка; 35 — *L. pygmaea*, самка (фото: Ю. Паламарчук)
— Frontal triangle of usual shape, frons not densely silvery-white dusted (except L. hydromyzina). Hind coxa usually bare on inner posterior surface. Femora without ventral spines. Meron with setulae (except L. cinifera, L. elkantarae and L. rigida) .... 5
5. t3 with ad seta and without av. Tibiae dark, at most basally yellowish .... L. palposa
and L. rigida groups (see key for L. palposa and L. rigida groups, part IV)
— t3 with av and ad setae. Tibiae yellow .... 6
(L. uliginosa group; Vikhrev 2015, 240–243; figs 34–36; 39–41)
6. t3 with several additional ad setae of various length. t1 with d seta in apical 1/3. ♀: Cercal plate with rounded apex. ♀: f3 with 1–2 av in basal 1/3 and 1(2) av near middle ................ uliginosa Fallen — t3 with single submedian ad setae. t1 without d seta. ♀: cercal plate with pointed apex. ♀: f3 at most with 1 av near middle .................. 7
7. ♀: f3 without strong ventral setae, only weak av and pv at apex and some fine setulae may present near base. Fore tarsus remarkably modified: tar1-5 to tar1-2 shortened and broadened; tar-5 to tar1-3 black, tar1-4 bicolour, tar1-1 yellow. ♀: f3 with-
out submedian av ....... melaleuca Loew — ♀:f3 in basal 2/3 with av and pv rows of 6–7 strong setae. Fore tarsus slightly modified: tar1-2 to tar1-5 less shortened and broadened than in L. melaleuca; tar1-1 to tar1-3 dark dorsally and yellowish ventrally, tar1-4 and tar1-5 entirely dark. ♀:f3 with 1 submedian av ..............................

septentrionalis Xue & Zhang

8. Vein M distinctly curved forward at apex. t3 with 3 strong submedian setae: av, ad and pd (except ♀ L. microptera and L. cilitarsis without or with very weak av, but with modified hind tarsi). (2+4 dc: medium, medium + weak, weak, strong, strong.) ...... 9 (L. longicollis group; Vikhrev 2012b; 2014) — Vein M not curved forward at apex. t3 with at most 2 submedian setae: av and ad or ad and pd, or t3 with only 1 seta ............ 13

9. Meron bare. t2 without ventral seta. ♀: hind tarsus not modified .............. 10 (L. assimilis subgroup Vikhrev 2012b) — Meron setulose above hind coxa. t2 with av or v seta (except some specimens of L. microptera). ♀: hind tarsus modified: curved and with long ventral hairs (except L. longicollis) .................. 11 (L. longicollis subgroup Vikhrev 2012b; 2014)

10. ♀:f1 ventrally with a dense brush of setulae placed in about 5 rows in basal half of femur and in 1–2 rows in apical half. f2 in basal 1/3 with a brush of ventral setae 1.5–2x as long as femur width. ♀:f1 ventrally with 2–3 rows of fine setulae .................. nuba Wiedemann — ♀: f1 ventrally unmodified, without dense brush of setulae. f2 with only short ventral setae. ♀: f1 bare on ventral surface apart from usual row of av setae .................. assimilis Wiedemann

11. ♀: hind tarsus unmodified. t3 with strong av. Cercal plate — Fig. 24. ♀: f3 with both submedian and apical av setae. Eurasia northward of 35°N .... longicollis Meigen (Fig. 23) — ♀: hind tarsus modified, curved and with elongated hairs. t3 with av weak or absent. ♀: f3 with only submedian or apical av setae. Palaearctic southward of 32°N .... 12

12. ♀: t2 with always with p and v setae. Mid tarsus modified, tarsomerites with elongated p setulae. f3 in basal 1/4 with 1–2 fine pv and 1 apical av. Hind tarsus modified: tar3-1 with complete a and v rows of setulae. Cercal plate—Fig. 26. ♀: f3 with apical av, without median av. t2 always with v seta. Africa and Near East .... cilitarsis Loew — ♀: t2 with 1 p only, v seta absent. Mid tarsus unmodified. f3 in basal half with 4–5 long (2x femur width) pv and 1 short av in basal half, apical av absent. Hind tarsus modified: tar3-1 with tufts of v setulae at base and apex, tar3-2 with a complete row of v setulae. Cercal plate—Fig. 25. ♀: f3 with-
out apical av, with or without median av. t2 usually without v seta. Pakistan, India

13. Hind coxa with seta on inner posterior surface. t1 with p seta, except L. aquamari 

...microptera Seguy

L. caesia group, part (see key for L. caesia group, part III)
— Hind coxa bare on inner posterior surface

14. Femora with ventral rows of short spines (Fig. 19). Tergites 3 and 4 with paired trapezoid dark spots, tergites 1+2 and 5 without dark spots (Figs 18–19). dc: 0+2. (Frontal triangle narrow, whitish (Fig. 20); palpi black; t2 with 1 p; t3 with 1 ad and 1 av.)... bengalensis Robineau-Desvoidy (this species is also included in the key for L. caesia group)
— Femora without ventral spines. Abdominal pattern not as above... 15

15. t1 with p seta. Only 1 strong prst dc on the position of 2nd prst dc as in Fig. 28. (t2 with 1 p; t3 with 1 ad, 1(2) av and a row of pv setulae in apical half in males)... 16 (L. leucospila group; Vikhrev 2014)
— t1 without p seta. dc not as described... 17

16. Disc of scutum densely dusted, with rather narrow brown median vitta from neck to tip of scutellum, submedian vittae hardly distinct. Wing hyaline. ♀: t3 with 8–11 longer pv setae. Abdomen dull black, with wide lateral whitish-grey vittae (uninterrupted or sometimes interrupted by a black stripe on posterior part of tergite 4). ♀: Abdomen densely grey dusted, only dorsally with black spots...... pectinipes Becker (Fig. 28)
— Disc of scutum dusted only in lateral part, with wide, glossy black, distinct median and submedian vittae, disc of scutellum entirely glossy black. Wing with more or less distinct dark pattern. ♀: t3 with 5–6 shorter pv setae. Abdomen black with separated whitish lateral spots. ♀: Abdomen entirely glossy black, only small paired whitish lateral spots present...

17. t3 without pd, with 1 ad only. Meron bare. Small species...

18 — t3 with 1 ad and 1(weak) pd. Meron with hairs except L. nana and L. freidbergi. Mainly medium size species...

19. 0+1 dc. Vibrissae inserted on half distance between mouth margin and tip of antenna.

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Figs 47–50. 47 — L. halophora, male; 48 — L. bengalensis, ventral spines on f1; 49 — L. caesia, male tar3-1; 50 — L. odessae, male tar3-1 (49–50, from Hennig 1960, 404: textfig 100 and 98)

Рис. 47–50. 47 — L. halophora, самец; 48 — L. bengalensis, вентральные шипики на f1; 49 — L. caesia, tar3-1 самца; 50 — L. odessae, tar3-1 самца (49–50, по Hennig 1960, 404: textfig 100 and 98)
Mid and fore trochanter yellow, contrasting with densely grey dusted femora. (♂: mid tarsus modified: tar2-1 with 2 strong v setae in apical 1/3. f3 in basal half with a sparse row of 3–4 long backcurved v setae.) aceponti Vikhrev (Vikhrev 2015)

— 2+3 dc. Wing distinctly darkened (Fig. 36). Abdomen with black area less extensive, laterally with separated black shining spots. Tibiae yellow. Body length 3.8–4.4 mm. ♂: f3 with pv setae in apical half. Cer-}

cal plate—Fig. 38; sternite 5—Fig. 37

— Wing less distinctly darkened (Fig. 36). An-

episternum without black shining stripe (Fig. 36). Abdomen with black area less extensive, laterally with separated black shining spots. Tibiae yellow. Body length 4.8–5.1 mm. ♂: f3 without pv setae. Cer-
}

cal plate—Fig. 38; sternite 5—Fig. 37

— Palpi distinctly widened at apex. Occiput, thorax and abdomen always with shining black area. ac hairs in 2 rows. Postpronotal lobes without strong spinules ...................... pygmaea Fallen

— Palpi distinctly widened at apex. Occiput, thorax and abdomen always with shining black area. ac hairs in 3–4 rows. Postpronotal lobes without strong spinules ......................20 (L. scalaris group; Vikhrev 2014)

20. Wing not darkened. Abdomen with shining black area less extensive, ventral and lateral parts of tergites 1+2 and 3 always dusted (Figs 42–43). Scutum often without distinct shining vittae, or vittae present, but less distinct. ♂ f2 ventrally without setae. Cercal plate — Fig. 44 . . . scalaris Loew

— Wing more or less distinctly darkened (as shown in Figs 36 and 39). Abdomen with extensive shining black area, at least ventral and lateral parts of tergites 1+2 and 3 partly shining black (Figs 36 and 39). Scutum always with distinct wide shining vit-
}

tae. ♂: f2 ventrally with setae ..........21

21. Wing distinctly darkened (Fig. 39). An-

episternum with black shining stripe (Fig. 39). Abdomen with black area more extensive, ventral and lateral surfaces entirely black. Tibiae darkened in apical half. Body length 3.8–4.4 mm. ♂: f3 with pv setae in basal half. Cercal plate — Fig. 41; sternite 5 in Fig. 40 . . . elegantissima Stackelberg

— Wing less distinctly darkened (Fig. 36). An-

episternum without black shining stripe (Fig. 36). Abdomen with black area less extensive, laterally with separated black shining spots. Tibiae yellow. Body length 4.8–5.1 mm. ♂: f3 without pv setae. Cer-
}

cal plate—Fig. 38; sternite 5—Fig. 37

— Notopleuron bare on area between strong notopleural setae. Ane-

pimeron with 4–8 hairs usually placed in a single horizontal row or almost so. Meron bare below spir-}

cacle (and with 2–3 hairs above hind coxa). ♂: f3 with 3(4) long submedian pv setae, the distal one the longest; 1–2 submedian av. Fore coxa with a dense tuft of long curved setae posteriorly. t3 on a surface with only 1 strong submedian ad seta. tar3-1 un-modified. ♀: f3 without submedian av setae .......... nivalis Wiedemann (Fig. 29)

— Notopleuron with 1 to several setulae on area between strong notopleural setae. Ane-

pimeron with 10–15–20 hairs placed in about 3 rows and occupying a rounded area. Meron with 1–2 hairs just below spiracle (and with 2–3 hairs above hind coxa). ♂: f3 without submedian pv setae; with 1 submedian av. Fore coxa without long setae posteriorly. t3 below strong ad with a dense brush of about 20 setu-
}

lae on ad, a and av surfaces. tar3-1 with dense short curved setulae on av surface. ♀: f3 with 1 strong submedian av setae ................. ochracea Becker

24. Meron bare. Always 2+3 strong dc. . . .25

— Meron with hairs above hind coxa. dc 1+4 or 2+4 (2+3 dc only in ♂ L. tentaculata and L. draperi with modified fore tarsus) . . . . .26 (L. tentaculata group; Vikhrev 2014)

25. ac hairs in 3 rows. Postpronotal lobes with spinulose setae on anterior part. W Palae-
}

arctic eastwards to Central Asia. ♂: β with 2–3 fine v setae. Abdominal tergite 3 with a small rounded knob-like process at each ventral fore-marginal corner (visible on not dissected abdomen) .................. nana Macquart (Fig. 27)
— ac hairs in 5–7 rows. Postpronotal lobes with usual setulae. Known from Sinai and Negev. ♂: f3 with complete av and pv rows of spine-like setae of irregular length. Abdominal tergite 3 unmodified ..................... freidbergi Vikhrev (Vikhrev 2012c, figs 8–10)

26. dc 2+4 or 2+3, all strong (except L. consanguinea with 2 anterior pairs of post dc weak). ♂: fore tarsus modified: mainly yellow, tar1–1 shortened and on p side with a finger-like yellow process with black apex ............................................. 27

— dc 1+4, only posterior pair of prst dc present, 2 anterior pairs of post dc weak to hardly distinct. ♂: fore tarsus unmodified or modified (L. emdeni) but not yellow .................. 29

27. f3 without strong submedian av seta(e). Scutellum bare below at apex. dc 2+4(3), 2(1) anterior pairs of post dc weak. t2 and t3 yellow. ♀: 2nd and 3rd post dc never approximated, median pruinose patch on scutum always absent .................. consanguinea Loew

— f3 with 1–3 strong submedian av. Scutellum with some fine hairs below at apex. t2 and t3 dark or yellow. ♂: 2+3 dc. ♀: 2+4 dc, all strong, 2nd and 3rd post dc approximately, a median pruinose patch at level of 2nd and 3rd post dc present. (Rarely ♀ specimens have dc seta as in ♂) .................. 28

28. Tibiae dark, only knees yellow. f3 usually with 2–3 long submedian av and 2–4 weak but distinct av in basal half. Widespread including E Africa and Canary Islands, but absent in the Maghreb region. ♀: sternite 5 — Vikhrev 2014, fig. 16 .................. tentaculata De Geer

— posterior tibiae at least in basal half yellowish, usually both t2 and t3 entirely yellow. f3 usually with only 1 long submedian av, av setae in basal half indistinct. Maghreb region only. ♂: sternite 5 — Vikhrev 2014, fig. 15 .................. draperi Séguy

29. prst ac in 3 rows. f3 with apical pv setae. Occiput with black undusted area in upper part. Body length 4–4.5 mm ♂: Fore tarsus modified: tar1–2 to tar1–4 shortened, tar1–1 on p surface with flat apical process .......... emdeni Vikhrev (Vikhrev 2012a)

— prst ac in 5–7 rows. f3 without apical pv setae. Occiput evenly grey dusted. Body length 5–7 mm. ♂ fore tarsus simple ........ 30

30. Body length 5–6 mm; palpi yellow; prst ac in 4–5 rows; ♂: f3 with only 1 v seta at base ..................... sericipalpis Stein

— Body length 6–7 mm. Palpi yellow. prst ac in 6–7 rows. ♂: f3 with complete rows of av and pv setae .... orientalis Wiedemann

III. Lispe caesia group

I only partly considered the Lispe caesia group in previous papers. The L. caesia group was proposed by Hennig (1960) for 6 Palaearctic taxa: L. caesia caesia Meigen, 1826; L. caesia microchaeta Seguy, 1940; L. candidans Kowarz, 1892; L. halophora Becker, 1903; L. leucocephala Loew, 1856 and L. odessae Becker, 1904. Hennig (1960) wrote that the L. caesia group is one of the most clearly bordered and pointed out its following diagnostic characters: (1) frontal triangle broad, with convex margins; (2) femora with ventral rows of short spines; (3) abdomen with characteristic pattern. However, there is an evident discrepancy in Hennig’s approach to the L. caesia group: he included in the group L. leucocephala, which has neither spines on femora, nor the typical abdominal pattern, while he did not include in the group L. marina, which has all the diagnostic characters except broad frontal triangle. In the recent review of the L. caesia group, Zhang et al. (2016) included in the group several other species with narrow frontal triangle (again except for the unlucky L. marina), but did not give any substantiation of this. Zhang et al. (2016) included in the L. caesia group the following Palaearctic taxa: 5 out of 6 Hennig’s taxa (except for L. odessae previously synonymized to L. caesia) and 6 new taxa: L. aquamarina Shinonaga & Kano, 1983; L. flavicornis Stein, 1909; L. hirsutipes Mou, 1992; L. lanceoseta Wang & Fan, 1981; L. palawanensis Shinonaga & Kano, 1989; L. patellitarsis Becker, 1914. Later, Chinese colleagues and I (Vikhrev et al. 2016) refuted the groundless synonymy of L. odessae, but syn-
onymized *L. c. microchaeta* to *L. c. caesia*. In the present paper *L. palawanensis* known from Philippines is excluded as a non-Palaearctic species and *L. hirsutipes* is excluded as synonym. Three species, *L. bengalensis* Robineau-Desvoidy, 1830; *L. marina* Becker, 1913 and *L. astakhovi* sp. nov. are included here in the *L. caesia* group for the first time. Thus, in the present paper 11 Palaearctic species of the *L. caesia* group are considered in total.

I suppose that characters offered by Hennig for the *L. caesia* group are really apomorphic, because they do not occur among other species of *Lispe*. I add one more character: hind coxa with seta on inner posterior margin. (It should be mentioned that the seta on the hind coxa occurs also in three species of *Lispe* belonging to the *L. palposa* group.) This seta on the hind coxa is absent in several species distributed in Australia and Sundaland and in Paleotropical *L. bengalensis*. Pont (2019) proposed to include several Australian species with bare hind coxa in a separate *L. cana* group, but I am inclined to regard these *Lispe* as belonging to the *L. caesia* group. According to so far unpublished molecular data on phylogeny of *Lispe* obtained by Zhang Dong, his co-workers and me, at least *L. bengalensis* is closely related to other Palaearctic species of the *L. caesia* group.

So, the *L. caesia* group has the following set of characters:

1. Femora with ventral rows of short spines (more distinct in females, less so in males) (Fig. 48).
2. Abdomen with characteristic pattern: black dorsal spots on posterior part of tergite 4 fused with antero-lateral spots on tergite 5 (see Fig. 47 or Zhang et al. 2016: Figs 8 a and e).
3. Frontal triangle broad, with convex margins; often the frons is evenly and densely silvery-white (Fig. 5) or yellow dusted so frontal triangle is hardly distinct.
4. Hind coxa with seta on inner posterior margin (absent in *L. bengalensis* and *L. lanceoseta*).
5. As to the current knowledge, all species are active predators on imago of other Diptera (Figs 10 and 17). This habit is not common in *Lispe*, the only other example of obligatory predation on Diptera imago is *L. geniseta* Stein, 1909 (Vikhrev 2016). Typically, *Lispe* hunt on soft insect larvae (like Chironomidae larvae) or (and) feed on invertebrate carrion. The active hunting is closely associated with the presence of ventral spines on femora; the stronger development of spines in female sex shows that its function is not mating but hunting.
6. All species are confined to salt water (from brackish to hypersaline), they inhabit either seashores or inland salt basins.
7. Male genitalia with rather uniform, heart-shaped cercal plate but the shape of surstyli is often characteristic. The inner side of sternite 5 has a pair of internal sclerites, the shape of which is usually characteristic for species.
8. Male *tar3-1* is often modified (Figs 17, 22, 49, 50).
9. Meron is bare in all Palaearctic species (setulose in several species from Australia (see: Pont 2019) and Sundaland).
10. The *L. caesia* group is distributed in warm regions of the Old World. The northernmost species is *L. caesia* which extend till 56° N along the Atlantic coast; in W Siberia *L. caesia* and *L. odessae* are recorded at 51.3° N. No wonder that Bering Land Bridge was too cold for the species of the *L. caesia* group to spread to America.

Only the minority of species of the *L. caesia* group kept all these characters, while the majority lost some of them.

**Identification key for *Lispe caesia* group**

♀

1. *t2* with *ad*. Frontal triangle never narrow ........................................ 2
   — *t2* without *ad*. Frontal triangle narrow or wide .................................... 6
2. *t1* without *p* seta. Palpi always yellow. E Palaearctic .......................... 3
   — *t1* with *p* seta. Palpi dark or yellow. Mostly W Palaearctic ................. 4
3. *tar3-1* modified as in Fig. 22, apical setae on *t2* willowleaf-like as in Fig. 21. *t3* without *av* setae. *dc* 2+4. Hind coxa bare on pos-
Lispe (Diptera, Muscidae) of the Palaearctic region

1. **L. leucocephala** Loew (see Zhang et al. 2016, figs 23–24)
   - Fronto-orbital plates whitish dusted, frontal vitta matt black, frontal triangle glossy black (Fig. 31). Vibriissae present. Antenna of normal length. Wings with dark apex (Figs 31–32). Abdomen with dark pattern (Fig. 33). t3 with 1 ad ........... **patellitarsis** Becker

2. Hind coxa without seta on inner posterior surface. **dc**: 2+4. t1 without seta. t3 with 1 ad. All tibial setae weak and short. Femora without ventral spines. Palpi yellow ............. **lanceoseta** Wang & Fan
   - Hind coxa with seta on inner posterior surface. **dc**: 2+3. t3 with 1 ad and 1–2 av. Fe-

3. Hind coxa without seta on inner posterior surface. Frontal triangle narrow (Fig. 20). Vibriissae very strong. Palpi dark, narrow. Hind tarsus unmodified. Terigs 3 and 4 with paired trapezoid dark spots, tergites 1+2 and 5 without dark spots (Figs 18–19). **dc**: 0+2 ... **bengalensis** Robineau-Desvoidy
   - Hind coxa with seta on inner posterior surface. Frontal triangle narrow (though in L. marina may be badly distinct). Vibriissae strong. Palpi yellow .... 9
   - Strong **dc**: 0+2; in L. candicans anterior **dc** pairs are weak but distinct, so **dc** setae may be described as 2+4; in L. leucocephala and **L. patellitarsis** anterior **dc** pairs are hardly distinct, so **dc** setae may be described as 0+2 or 2+4 depend on specimen ... 10

4. **L. candicans** Becker
   - Mid tarsus modified. Hind tarsus widened. Vibriissae strong. Palpi dark, narrow. Frontal triangle white to yellow. Antenna entirely yellow. t3 with only 1 av. Wings with dark apex ............... **flavicornis** Stein (Fig. 17)

5. **L. caesia** Meigen
   - Hind coxa without seta on inner posterior surface. Frontal triangle narrow (Fig. 20). Vibriissae very strong. Palpi dark, narrow. Abdomen with dark pattern (Fig. 33). t3 with 1 ad and 2 av setae. Wing unspotted ....... **marina** Becker (Fig. 16)
   - Mid tarsus not modified. Hind tarsus modified, **tar3-1** widened. Fronto-orbital plates whitish dusted, frontal vitta dark, frontal triangle white to yellow. Antenna entirely yellow. t3 with 1 ad and 2 av setae. Wing unspotted .............. **marina** Becker (Fig. 16)

6. t1 without p seta. (t3 with 1 ad and 1 av. Ventralspines on femora distinct and strong (Fig. 48)) .......................... 7
   - t1 with p seta .......................... 8

7. Hind coxa without seta on inner posterior surface. Frontal triangle narrow (Fig. 20). Vibriissae very strong. Palpi dark, narrow. Hind tarsus unmodified. Tergites 3 and 4 with paired trapezoid dark spots, tergites 1+2 and 5 without dark spots (Figs 18–19). **dc**: 0+2 ... **bengalensis** Robineau-Desvoidy
   - Hind coxa with seta on inner posterior surface. Frontal triangle narrow (though in L. marina may be badly distinct). Vibriissae strong. Palpi yellow .... 9
   - Strong **dc**: 0+2; in L. candicans anterior **dc** pairs are weak but distinct, so **dc** setae may be described as 2+4; in L. leucocephala and **L. patellitarsis** anterior **dc** pairs are hardly distinct, so **dc** setae may be described as 0+2 or 2+4 depend on specimen ... 10

8. Strong **dc**: 2+3. Frontal triangle narrow (though in L. marina may be badly distinct). Vibriissae strong. Palpi yellow .... 9
   - Hind coxa with seta on inner posterior surface. **dc**: 2+3. t3 with 1 ad and 1–2 av. Fe-

9. Mid tarsus modified: **tar2-2** and **tar2-3** with long a seta each, **tar2-5** with a row of fine p hairs (Fig. 9). Hind tarsus not modified. Frons yellow dusted, narrow frontal triangle hardly distinct (Fig. 8). Postpedicel mostly dark. t3 with 1 ad and 2 av setae. Wing unspotted ....... **marina** Becker (Fig. 16)

10. Hind tarsus unmodified. Body length 6.5–8 mm. Femora with strong ventral spines. Frons whitish dusted ... **candicans** Kowarz (Figs 10, 12–15)
   - Mid tarsus not modified. Hind tarsus modified, **tar3-1** widened. Fronto-orbital plates whitish dusted, frontal vitta dark, frontal triangle white to yellow. Antenna entirely yellow. t3 with only 1 av. Wings with dark apex ............... **flavicornis** Stein (Fig. 17)

11. Frons even silvery, borders between fronto-orbital plates, frontal vitta and frontal triangle hardly distinct. Vibriissae absent. Antenna remarkably short. Wings clear. Abdomen evenly grey, unmarked. t3 without ad ........... **leucocephala** Loew (see Zhang et al. 2016, figs 23–24)
   - Fronto-orbital plates whitish dusted, frontal vitta matt black, frontal triangle glossy black (Fig. 31). Vibriissae present. Antenna of normal length. Wings with dark apex (Figs 31–32). Abdomen with dark pattern (Fig. 33). t3 with 1 ad ........... **patellitarsis** Becker

12. Hind coxa without seta on inner posterior surface. Postabdomen velvety black ......... **lanceoseta** Wang & Fan
   - Hind coxa with seta on inner posterior surface. Abdomen evenly light grey dusted, without dark pattern. (Male terminalia — Figs 6, 7) ............................. **astakovi** sp. nov.

13. Hind coxa with seta on inner posterior surface. Abdomen evenly light grey dusted, without dark pattern. (Male terminalia — Figs 6, 7) ............................. **astakovi** sp. nov.
mora with ventral spines. Frontal triangle always broad with convex margins ....... 3
3. Palpi yellow, at most whitish dusted. Mostly E Palaearctic .......................... 4
   — Palpi black to brown. Mostly W Palaearctic ........................................ 5
4. t1 without p seta (sometimes short seta present on one tibia). t3 with 2 av at least on one side. f3 in apical half with 2–3 av. Abdomen usually without distinct pattern on tergite 4 .......... astakhovi sp. nov.
   — t1 with p seta. t3 with 1 av at least on one side. f3 in apical half with 1–2 av. Abdo-
men with a pair of dark spots on tergite 4 ............................................. odessae Becker
5. Palpi usually black. t3 with 1 av. f3 with only 1 av seta beyond middle, preapical av absent. ... caesia Meigen
   — Palpi brown. t3 with 2 av at least on one side. f3 with 2 av setae: submedian and preapical .............. halophora Becker
6. Hind coxa without seta on inner posterior surface. (t1 without p seta. Frontal triangle narrow. Femora with remarkably strong ventral spines. Tergites 3 and 4 with paired trapezoid dark spots.) Paleotropical ............. bengalen sis Robineau-Desvoidy
   — Hind coxa with seta on inner posterior surface. t1 with p seta, except L. aquama rina. .......................... 7
7. dc: 2+3, all strong ..................... 8
   — Strong dc – 0+2; in L. candidans anterior dc pairs are weak but distinct, so dc setae may be described as 2+4; in L. leucocephala and L. patellitarsis anterior dc pairs are hardly distinct, so dc setae may be described as 0+2 or 2+4 depend on specimen ......... 10
8. t1 without p seta. Antenna entirely dark. Palpi brown. Temperate zone of Pacific coast ....... aquamarina Shinonaga & Kano (see Zhang et al. 2016, fig. 7)
   — t1 with p seta. Pedicel and base of postpedi-
cel yellow. Palpi yellow .............................. 9
9. Parafacial with a complete row of hairs. t3 with 1 av setae. Temperate zone of Atlantic coast ............. marina Becker
   — Parafacial bare in upper half. t3 with 1 av setae. Paleotropical ...... flavicornis Stein (see Zhang et al. 2016, fig. 16)
10. Femora with strong ventral spines. Body length 6.5–8.5 mm. (Palpi dark. Frons densely to moderately whitish or yellowish dusted. t3 with 1 av and 0–1 av.) ............................................ candidans Kowarz (Fig. 11)
   — Femora without ventral spines. Body length less than 6 mm. t3 with 1 av and 0–1 av ... ...................................................... 11
11. Frons evenly silvery, borders between fronto-orbital plates, frontal vitta and fronto-
   — Fronto-orbital plates and frontal triangle whitish-yellow dusted, frontal vitta black. Antenna of normal length. Palpi darkened. Abdomen with distinct pairs of dark spots on tergites 3 and 4 ...... patellitarsis Becker (see Zhang et al. 2016, fig. 29)

IV. Lispe palposa and Lispe rigida groups

The identification key for L. palposa and L. rigida groups is also placed in the separate chapter for the following reasons:

a. These groups have characteristic tibial chaetotaxy (t2 with 1 or more ad seta(e); t3 with 1 av seta, without av or pd) which differs from those of other Lispe.

b. L. palposa and L. rigida groups include together 22 taxa, i.e. more than 1/3 of all Palaearctic Lispe. The presence of these taxa in the general key would make it too large and inconvenient for using.

c. The general key is organized for both sexes together, while in the key for L. palposa and L. rigida groups males and females should be considered separately.

Identification key for Lispe palposa and Lispe rigida groups

♂
1. tar3-1 modified: shortened and laterally flattened; at apex with long finger-like ven-
tral process. Katepimeron with 2–3 setulae at posterior part. Apex of abdomen is later-
ally dorsally pointed and ventrally with a notch. t3 with long v setulae near apex. (see Vikhrev 2012c, figs 19–20, 22–30) ........... 2
Lispe (Diptera, Muscidae) of the Palaearctic region

— 6. vibrissa absent. Parafacials without dark spot on ventral surface, though some fine setulae present. Cercal plate and sternite 5: (Vikhrev 2012c, figs 25–27) ...................................... brunnica Becker

— 7. with long setae on v surface ........................................ 4

— Hind coxa bare on inner posterior side. t2 with only 1 ad seta (except in some specimens of L. apicalis) and without dense setae on v surface ........................................ 7

4. Vibrissae absent. Parafacials without dark spot in upper part. Chaetotaxy of t2: 1 ad seta placed distinctly above middle; 1(2) p seta(e) short and weak, also placed above middle; v surface at apical half 1–2 strong spine-like seta(e) and a row of longer fine setae (Vikhrev 2015, fig. 17). tar-2-1 with long fine curved ventral setae at base .......................................................... loewi Ringdahl

— Vibrissae present. Parafacials with dark spot in upper part. t2 with ad and pd setae placed below middle; v surface bare (but 1 strong pv present in L. superciliosa superciliosa), tar-2-1 without long seta at base .......................................................... littorea Fallen

5. t3 with ad strong and very distinct. tar-2-1 to tar-2-3 with long (longer than tarsus width) setae on a surface (Vikhrev 2015, fig. 13). Vibrissae strong (2.5–3x as long as distance between vibrissae). Mid tarsus about half as long as t2. t1 with fine but distinct pv seta below middle. f3 with 10–12 av setae .............................. litorea Fallen

— t3 with elongated ad setae, but without distinct ad seta. tar-2-1 to tar-2-3 with only usual short hairs (Vikhrev 2015, fig. 14). Vibrissae rather weak (1.5–2x as long as distance between vibrissae). Mid tarsus almost as long as t2. t1 without pv, with or without v in apical 1/4, f3 with 6–8 av setae ........................................ 6 (superciliosa Loew)

6. t2 with strong pv seta. t1 with short but distinct v in apical 1/4–1/5 (Vikhrev 2015: fig. 18). Europe–W Siberia .............................. superciliosa superciliosa Loew

— t2 without pv. t1 without v near apex. E Siberia – Far East .............................. superciliosa monochaita Mou & Ma

7. t2 with 1 strong pv seta, also with 1 ad and 1 pd below middle. Hind tarsus shortened and strongly depressed laterally (Vikhrev 2015: fig. 9). All frontal setae (about 10) backward directed (Vikhrev 2015: fig. 31).

(Abdominal tergites 3 to 5 evenly grey dusted, without distinct black pattern. Frons relatively narrow and narrowed in lower part. Parafacials without dark spot in upper part. t1 without p. f3 with 7–8 av setae.) .................. hebeiensis Ma & Tian

— t2 without pv. Hind tarsus not or less depressed laterally. Only 2 upper frontal setae are reclinate, 4–5 lower setae are inclinate ........................................ 8

8. Abdomen ventrally with dense brush of setae. Abdominal tergites with large black shining areas. Vibrissae strong. t1 without p seta ........................................ 9

— Abdomen without dense brush of ventral setae, abdominal tergites mostly dense grey dusted, with small dark spots ......... 10

9. Palpi small, yellow. Sternites 3 and 4 with long setae, tergites 3 and 4 also long-haired along ventral margin (Fig. 30). Meron bare. Thoracic and abdominal spiracles small. Apex of abdomen without whitish midspot. Terminalia: Vikhrev (2012c, figs 31, 32). Saline water; S Palaearctic ........ rigida Becker


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10. Vibrissae indistinct or very weak (L. flavicincta), shorter than distance between vibrissae bases. Smaller species (usually 4.5–6.5 mm) .................. 11
— Vibrissae strong (rather weak in L. neimon-gola), always distinctly longer than distance between vibrissae bases. Larger species (6–8 mm) .................. 15
11. tar2-4 at apex with anterior blunt projection subequal in length to tar2-5 (Vikhrev 2015, figs 15, 16). Parafacials bare in upper 2/3. Either parafacials with a dark spot in upper part or frons evenly silvery-whitish dusted .................. 12
— tar2-4 without such projection. Parafacials with a complete row of setulae and without dark spot in upper part. Frons not silvery-whitish dusted .................. 13
12. Frons and fronto-orbital plates evenly whitish dusted, almost unicolourous, frontal triangle wide, whitish dusted, hardly distinct from whitish frons (Vikhrev 2015, fig. 33). Parafacials without dark spot in upper part. Antennae and arista remarkably short. Palpi yellow. t1 with short but distinct p below middle. t3 with ad seta weak, not very distinct among ad setulae. Thorax and abdomen evenly light-grey dusted, without black stripes or spots ...... hydromyzina Fallen
— Frons dark, parafacials with dark spot in upper part, frontal triangle distinct (Vikhrev 2015, fig. 32). Antennae longer. Palpi dark brown to yellow. t1 without p. t3 with ad distinct. Thorax and abdomen not evenly light-grey dusted, with black stripes and spots ........... parcespinosa Becker
13. f3 with a complete row of about 12 strong and long av setae. Hind tarsus (Vikhrev 2015, fig. 7): tar3-5 narrowed and long, about as long as tar3-4 and tar3-3 together. (Meron with setulae above hind coxa. f2 with a complete row of rather strong ventral setae. t3 with ad seta much stronger than elongated setulae in ad row. Wing not darkened.) ............... flavicincta Loew
— f3 with 3–5 less strong av setae in apical half only. Hind tarsus (Vikhrev 2015, fig. 6): tar3-5 as wide as tar3-4 and shorter than tar3-4 and tar3-3 together ......... 14
14. Wings darkened antero-apically around R45 and R23 (in specimens from Morocco darkening may be hardly distinct). Meron with setulae above hind coxa. t3 with ad seta much stronger than elongated setulae in ad row. Cercal plate: Vikhrev (2015, fig. 1) .................. apicalis Mik
— Wings not darkened. Meron bare above hind coxa. t3 with ad seta hardly distinct, longer but about as strong as other elongated setulae in ad row. Cercal plate: Vikhrev (2015, fig. 2) ............... elkantarae Becker
15. Mid tarsus modified: tar2-1 shortened (shorter than tar2-4 and tar2-3 together), with a tuft of 10–12 long waved v setae at base (Vikhrev 2015, fig. 20); tar2-1 to tar2-3 each with several elongated a setulae. (Postpronotal lobe, anepisternum, katepisternum and lateral surface of abdomen (often dorsal surface too) with distinct yellow tint (Vikhrev 2015, figs 19, 21). t1 with p seta short but strong. t2 with only 1 pd setae. Parafacials with dark spot in upper part.) ............ tarsocilica Xue & Zhang
— Mid tarsus not modified ............... 16
16. Meron bare above hind coxa. Frons narrowed as on Vikhrev (2015: fig. 30). f3 with several long pv in basal third. Hind tarsus with pulvillus longer than half length of claw. (Parafacials without dark spot in upper part. t1 without p seta. Large species.) ............... cinifera Becker
— Meron with hairs above hind coxa. Frons wider (Vikhrev 2015, figs 22, 29). f3 without pv. Hind tarsus with pulvillus reduced shorter than half length of claw ........... 17
17. dc 2+4. (t1 without p seta. Far East.) ............... ezensis Shinonaga & Kano
— dc 2+3 .................. 18
18. t1 with fine pd seta and with d setulae elongated (as long as tibia width), f2 without strong av setae, at most with fine hairs at base (do not confuse with a setae). Vibrissae strong. Mid tarsus Vikhrev (2015, fig. 12): tar2-5 thick and short. Body length 7–7.5 mm ............... flavinervis Becker
— t1 without pd seta or elongated d setulae. f2 in basal half with 4–6 strong av setae 1–1.5x as long as femur width (Vikhrev 2015, fig. 22). f3 without pv. Vibrissae usu-
1. Katepimeron with 2–3 setulae in posterior part. (Merion also setulose. Palpi rather narrow and pure yellow. Thorax and abdomen only thinly brown dusted, partly shining. Body length about 7 mm. Central Asia.) ........... brunniosa Becker or kozlovi Vikhrev
— Katepimeron bare ....................... 2
2. Meron bare. Abdomen without median vitta, but with pairs of large, black, trapezoid spots on tergites 3 and 4. f3 with only 1 av near apex and with 2–3 long (1.5x femur width), fine pv in basal half. Palpi remarkably narrow compared to species of L. palposa group, pure yellow. (Small, body length about 5 mm. Hind coxa bare on inner posterior margin. Morocco to south of Central Asia.) ............... rigida Becker
— Meron setulose (except L. elkantarae and L. cinifera, with abdomen with median vitta and without lateral spots). Abdomen without the above described pattern. f3 not as described above .................. 3
3. Hind coxa with seta on inner posterior margin. t2 with more than 1 ad setae. Palpi wider, black to yellow ............... 4
— Hind coxa bare on inner posterior margin. t2 with only 1 ad setae .................. 7
4. t2 with 1 strong pv seta. t1 with short but distinct v in apical 1/4–1/5. (Parafacials with dark spot in upper part at level of insertion of antenna. Besides above mentioned 1 pv, t2 with only 1 pd and several ad setae, 1–2 of which much longer than other. f3 with 5–6 av. Abdominal tergites 3–5 with a broadly triangular dark median spot; paired lateral dark spots from very conspicuous to almost indistinct. Europe to W Siberia (till Yenisey River). River banks or freshwater to brackish lakes.) ........... superciliosa superciliosa Loew (Fig. 45)
— t2 without pv seta. t1 without short v in apical 1/4–1/5, but usually with p seta slightly below middle .................... 5
5. Parafacials without dark spot in upper part. t2 with 2 medium strong ad and 3 short pd, either ad and pd widely separated, upper ad and pd set above middle of tibia. (f3 with 4–5 av. t1 with p slightly below middle. Abdomen with conspicuous dark midline.) Widespread in Palaearctic; the southernmost species of L. palposa group, recorded till 28°N. Salt lakes or saline sea shore marshes ....... loewi Ringdahl (Fig. 46)
— Parafacials with a dark spot in upper part at level of antenna. t2 with 3–4 ad and 1–2 pd, all setae on t2 densely set below middle, ad setae of different length, 1(2) ad much longer than other .................... 6
6. t1 with p seta. f3 with 7–9 av. Abdomen with dark midline inconspicuous. Seashore marshes of W Europe ........... litorea Fallen
— t1 without p, f3 with 4–5 av. Abdomen with a conspicuous dark midline. East Palaearctic from Yenisey River to Far East. River banks or freshwater to saltish lakes ............... superciliosa monochaita Mou & Ma
7. t2 with 1 strong pv seta in addition to 1 ad and 1 pd. (Abdominal tergite 4 with a pair of postero-lateral spots, otherwise tergites 3 to 5 evenly grey dusted, without distinct black pattern, rarely indistinct dark midline present. Antenna short, arista short haired, about as long as postpedicel. Parafacials without dark spot in upper part. t1 without p, f3 with 4–7 av setae. Palpi brown to black.) E Europe to Far East ............ hebeiensis Ma & Tian
— t2 without pv ......................... 8
8. t1 with p seta ......................... 9
— t1 without p seta ....................... 10
— Frons black, frontal triangle of typical shape, distinct, parafacials with dark spot in upper part (Vikhrev 2015, fig. 29). Antennae and arista longer. Thorax and abdomen brown-grey dusted, with distinct dark pat-
tern. Large species, body length 6–8 mm. Inland regions of E Europe and Asia ... flavinervis Becker or tarsocilica Xue & Zhang

10. Frons narrowed (Vikhrev 2015, fig. 30). Meron bare above hind coxa. fβ with several long pv in basal third. Hind tarsus with pulvilli longer than half length of claw. Parafacials without dark spot in upper part. t1 without p seta. Large species, body length 7–8 mm ............... cinifera Becker
— Frons wide (as on Vikhrev 2015, fig. 29) ........ 11

11. Thoracic and abdominal spiracles strongly enlarged (Vikhrev 2015, fig. 24, 25, 26). Parafacials with dark spot in upper part. Holarctic, from 60° N and northern ......... frigida Erichson (= canadensis Snyder)
— Thoracic and abdominal (Vikhrev 2015, fig. 27) spiracles not enlarged. Parafacials without dark spot in upper part. Palaearctic from 55°N and southern ........... 12

12. Abdominal tergites 3 to 5 with characteristic pattern: median and a pair of submedian vittae (Vikhrev 2015, fig. 28) .................. flavicincta Loew
— Abdomen without such pattern ............... 13

13. dc 2+4. Far East ... ezensis Shinonaga & Kano
— dc 2+3 ......................... 14

14. t2 with ad seta almost as long as distance from its insertion to apex of tibia. Hind tar-
sus with pulvilli longer than half length of claw. (Palpi yellow.) .................. 15
— t2 with ad seta shorter hardly longer than half distance from its insertion to apex of tibia. Hind tarsus with pulvilli shorter than half length of claw ............. 16

15. Meron bare above hind coxa. Algeria and Morocco ........... elkantarae Becker
— Meron with several hairs above hind coxa. From Maghreb to Central Asia ............ apicalis Mik

16. Parafacials with 1 sparse row of hairs. t2 with 1 strong ad only. Apex of abdomen always grey. Sand beaches along big rivers .................. parcespinosa Becker
— Hairs on upper half of parafacials in 2 rows. t2 usually with 2–3 short setae above strong ad. Apex of abdomen usually orange-yellow. Brackish lakes ... neimongola Tian & Ma

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References


Lispe (Diptera, Muscidae) of the Palaearctic region


Vikhrev, N. (2011) Review of the Palaearctic members of the Lispe tentaculata species-group (Diptera, Muscidae): Revised key, synonymy and notes on ecology. ZooKeys, vol. 84, pp. 59–70. DOI: 10.3897/zookeys.84.819 (In English)


Vikhrev, N. E. (2012c) Four new species of Lispe Latreille, 1796 (Diptera, Muscidae) with taxonomic notes on related species. Russian Entomological Journal, vol. 21, no. 4, pp. 423–433. (In English)


Zhang, D., Ge, Y.-Q., Li, X.-Y. et al. (2016) Review of the Lispe caesia-group (Diptera: Muscidae) from Palaearctic and adjacent regions, with redescriptions and one new synonymy. Zootaxa, vol. 4098, no. 1, pp. 43–72. DOI: 10.11646/zootaxa.4098.1.2 (In English)


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