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New and insufficiently studied morphological characters in species of the genus *Dolichopus* Latreille, 1796 (Diptera: Dolichopodidae)

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ABSTRACT

The article discusses new morphological characters of species in the genus *Dolichopus* Latreille, 1796, which allow specific diagnostics of both males and females. For this purpose 244 *Dolichopus* species were studied. The identification of new diagnostic criteria, including these for females, is necessary, since diagnostics are often carried out using color characteristics that have extremely low value, it is difficult to identify females using existing tables, and for a number of species females have not yet been described. In particular, for the first time, such traits are discussed as the presence of setae on the haltere stem and processes on metepimerons. In a number of species of the *D. planitarsis* group, white claws on the tarsi were first detected. In addition, the variability in *Dolichopus* species was assessed for such features as setae on the mesonotum in front of the scutellum, the shape of the second and third male abdominal tergites, the setae on the postcranium, and groups of setae on the legs. Setae on mesonotum in front of scutellum are developed in both sexes and may serve to identify the entire group of *D. latilimbatus* species. Clusters of setae on the legs are also often developed in both females and males. For diagnostic purposes, the following characters can be used: the number of setae on the lower part of the head, the presence of a group of setae on the postgena, and the presence of flattened postocular setae.

Key words: *Dolichopus*, external morphology, morphological characters

Новые и мало изученные морфологические признаки видов рода *Dolichopus* Latreille, 1796 (Diptera: Dolichopodidae)

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РЕЗЮМЕ

В статье рассматриваются новые морфологические признаки видов рода *Dolichopus* Latreille, 1796, которые позволяют производить видовую диагностику как самцов, так и самок. С этой целью было изучено 244 вида рода *Dolichopus*. Выделение новых диагностических критериев, в том числе для самок, необходимо, поскольку диагностика часто производится с помощью цветковых характеристик, обладающих крайне низкой сохранностью, определение самок по существующим таблицам затруднено, а также для ряда видов самки до сих пор не описаны. Впервые для видов рода выделяются такие диагностические признаки как наличие волосков на ножке жужжалец и выросты на метэпимерах. У ряда видов группы *D. planitarsis* впервые обнаружен признак – белые коготки на лапках. Кроме того, оценивается изменчивость у видов рода таких признаков как щетинки на среднеспинке перед щитком, форма второго и третьего абдоминальных тергитов самца, щетинки на задней части головы, щетинки на задних лапках и группы волосков на ногах. Щетинки на среднеспинке перед щитком развиты у обоих полов и могут служить для идентификации всей группы видов *D. latilimbatus*. Группы волосков на ногах также часто развиты и у самок, и у самцов. В диагностических целях могут быть использованы такие признаки как количество щетинок на задней части головы, наличие группы щетинок сбоку от основания хоботка, наличие уплощенных постокуюлярных щетинок.

Ключевые слова: *Dolichopus*, внешняя морфология, морфологические признаки

INTRODUCTION

The genus *Dolichopus* Latreille, 1796 is the most specious genus of the family Dolichopodidae, including 644 valid species (Grichanov 2021) with a predominantly Holarctic distribution. Currently, 302 species of the genus are recorded from Palaearctic Region (Grichanov 2021), and 317 species from Nearctic Region (Pollet et al. 2004), of which 20 are common species for both faunas.

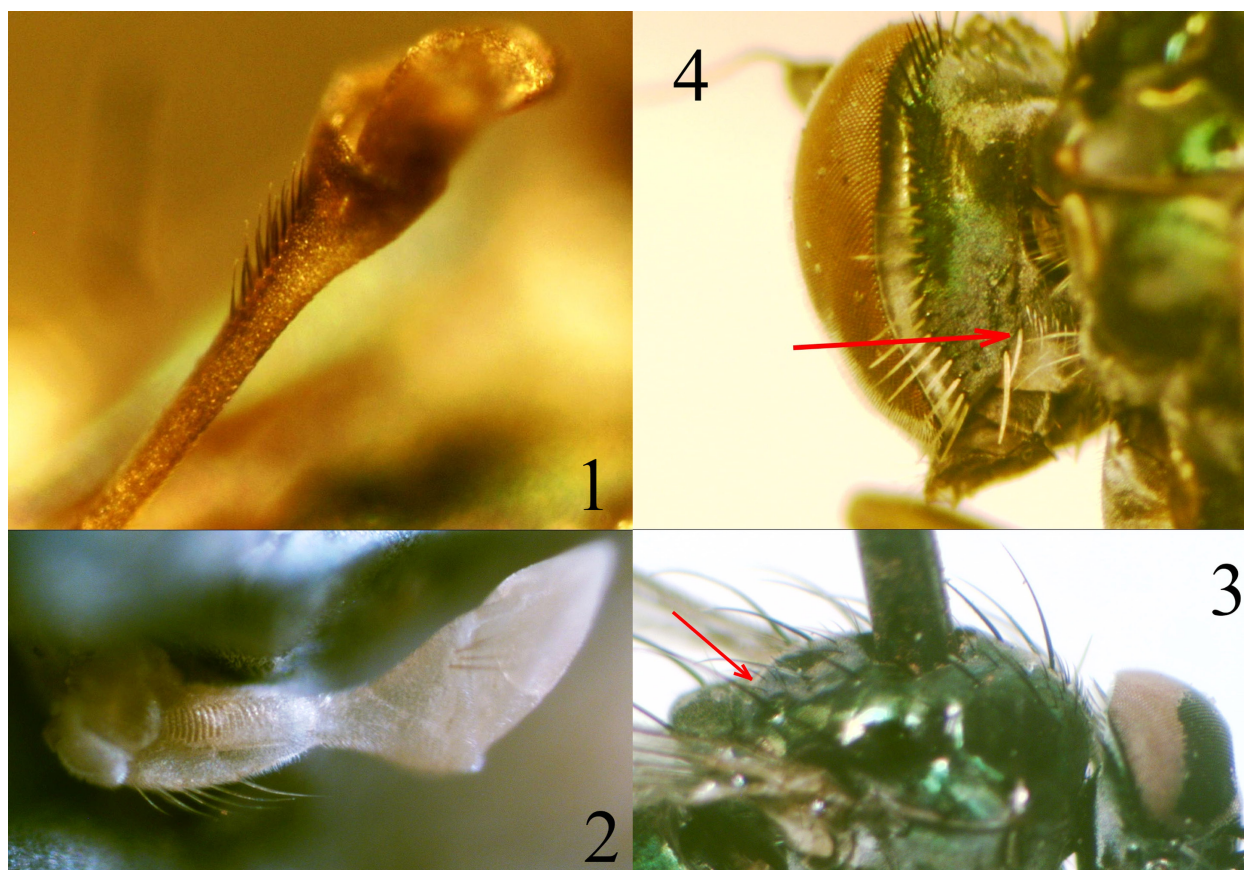
Compiling taxonomic keys for genera with hundreds of species (mega-diverse genera) is a complex task that requires a large collection and many specimens. Key tables for the genus *Dolichopus* were compiled at the beginning of the 20th century (Stackelberg 1934; Van Duzee and Curran 1934; Parent 1938) and subsequently supplemented by new species in the sequence of characters, which were proposed earlier. The detection of new morphological criteria is necessary for the diagnosis of female species, which are not known for many species of the genus *Dolichopus*, and those that are known, are difficult to identify by formerly used characters. To identify females, morphometric parameters are often applied, although at present they are determined to a large extent by color characteristics (Negrobov et al. 2015; Chursina and Negrobov 2020). We have noted a number of characters that can be used to identify *Dolichopus* species, including females, as well as to compile identification keys from the Palaearctic fauna.

MATERIAL AND METHODS

Specimens included in the present paper belong to the following collections: Zoological Institute of the Russian Academy of Sciences; Zoological Museum of University of Moscow and Zoological Museum of Voronezh State University. A total of 244 *Dolichopus* species were studied, including 174 Palaearctic and Holarctic and 70 Nearctic species. The studied material included 57 type specimens. The species names given below should be considered as examples for certain diagnostic morphological characters. Photographs were taken using an MMU-3 metallographic microscope, an MS-3 ZOOM LED binocular microscope, and an HD Camera Toupcam, model XCAM1080PHA. All photographs were taken by O.V. Selivanova. Arrows on the photographs show morphological characters discussed in the text.

RESULTS

1. Setae on the stem of halter. This character is pointed for the first time for the genus *Dolichopus* and was found for both sexes and can be used for phylogenetic analysis and identification keys for several species groups. Haltere setae are found in several genera from Sciapodinae, for example: *Condylostylus* Bigot, 1859, and *Amblypsilopus* Bigot, 1888 (Bickel 1994) and this character is often used in identification keys for this subfamily. In contrast



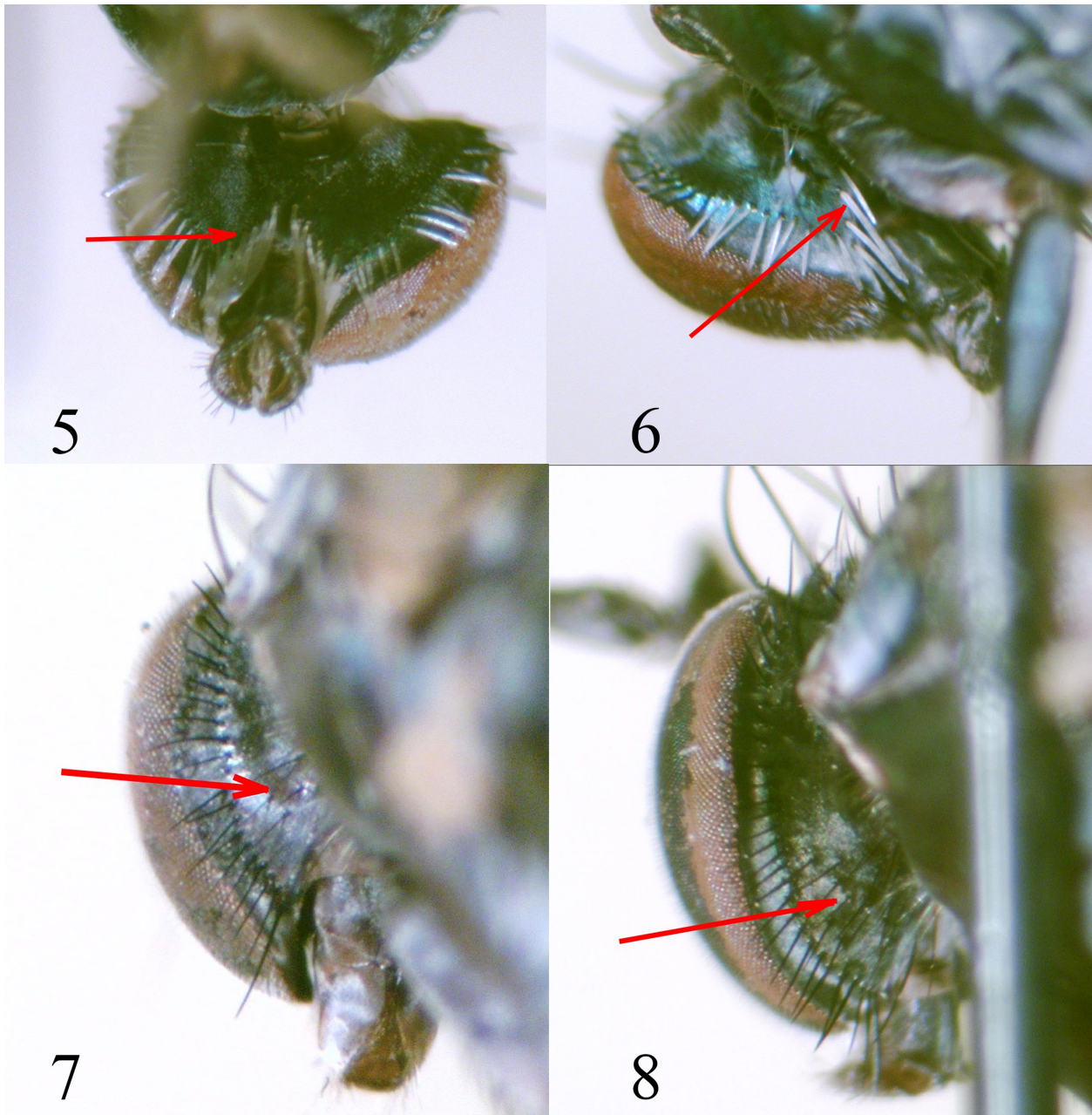
Figs 1–4. Chaetotaxy of halteres, mesonotum and head: 1, 2 – Hairs on halter (1 – *Condylostylus* sp., 2 – *Dolichopus claviger* Stannius, 1831); 3 – Setae on mesonotum in front of the scutellum in *D. latilimbatus* Macquart, 1827; 4 – Setae on the postgena in *D. galeatus* Loew, 1871.

to representatives of the subfamily Sciapodinae, in which the setae are located close or at the base of the knob of halter (Fig. 1), in *Dolichopus* species, the setae are located along the entire length or closer to the base of the stalk, or at the base and on the apex of the stalk, as in *D. claviger* Stannius, 1831 (Fig. 2), *D. bilamellatus* Parent, 1929, *D. czekanovskii* Stackelberg, 1928, *D. lenensis* Negrobov, Barkalov et Selivanova, 2014, and *D. spinuliformis* Maslova, Negrobov et Selivanova, 2012, which have a group of setae only in front of the knob of halter.

This character is also present in the following species (in addition to those mentioned above): *D. calceatus* Parent, 1927, *D. galeatus* Loew, 1871, *D. migrans* Becker, 1917, *D. taigensis* Smirnov, 1948, *D. tumicosta* Negrobov, Grichanov et Barkalov, 2009, *D. unguulatus* (Linnaeus, 1758), *D. vadimiani* Negrobov et Barkalov, 1978, *D. tumefactus* Negrobov, 1973. However, these species have poorly developed setae. In the

Dolichopus latipennis species group (= *Hygrocelestus* Loew), the trait was found in *D. breviclypeus* Negrobov, 1976, *D. latipennis* Fallén, 1823, *D. rotundipennis* Loew, 1848, *D. pamiricus* Negrobov, 1976, *D. tundrensis* Barkalov, Negrobov et Grichanov, 2009, and *D. jakutus* Selivanova et Negrobov, 2011.

Of the examined species from the Nearctic fauna, setae on halteres were found in *D. affinis* Walker, 1849, *D. coercens* Walker, 1849, *D. coloradensis* Aldrich, 1893, *D. contiguus* Walker, 1849, *D. cuprinus* Wiedemann, 1830, *D. dakotensis* Aldrich, 1893, *D. eudactylus* Loew, 1861, *D. finitus* Walker, 1849, *D. flagellitenens* Wheeler, 1890, *D. jugalis* Tucker, 1911, *D. lobatus* Loew, 1861, *D. longimanus* Loew, 1861, *D. longipennis* Loew, 1861, *D. nudus* Loew, 1864, *D. palaesticus* Loew, 1864, *D. plumosus* Aldrich, 1893, *D. porphyrops* Van Duzee, 1921, *D. pulchrimanus* (Bigot, 1888), *D. quadrilamellatus* Loew, 1864, *D. renidescens* Melander et Brues, 1900,



Figs 5–8. Bristles on the lower part of the head: 5, 6 – *Dolichopus remipes* Wahlberg, 1839; 5 – Male, ventral view; 6 – Female, lateral view; 7 – *D. robustus* Stackelberg, 1928 male, lateral view; 8 – *D. nataliae* Stackelberg, 1930, male, lateral view.

D. scapularis Loew, 1861, *D. sexarticulatus* Loew, 1864, *D. sufflavus* Van Duzee, 1921, *D. tonsus* Loew, 1861, and *D. orichalceus* Gosseries, 1989.

2. Setae on mesonotum in front of the scutellum. This character was noted by Brooks (Brooks 2005) for *D. aldrichii* (Wheeler, 1899), *D. latipennis*, *D. la-*

tilimbatus Macquart, 1827, *D. humilus* Van Duzee, 1921, and *D. nubilus* Meigen, 1824 (Fig. 3) and was also found by us in the species with fine white setae on the face: *D. andalusiacus* Strobl, 1899, *D. austriacus* Parent, 1927, and *D. excisus* Loew, 1859. This character is present in both sexes; and is more notice-



Fig. 9. *Dolichopus nataliae* Stackelberg, 1930, female middle claws.

able than ephemeral setae on the face and, along with them, can serve to identify the entire “*latilimbatus*” species group. In the East Palaearctic species *D. ringdahli* Stackelberg, 1930, which is similar, the mesonotum is bare in front of the scutellum, which clearly distinguishes females of this species, which are also identified by white setae on the face. In addition to *D. latipennis* and *D. humilus* mentioned by Brooks, other species previously belonging to the *Hygroceleuthus* group have setae in front of the scutellum: *D. brevichypeus*, *D. rotundipennis*, as well as *D. angustipennis* Kertész, 1901, *D. shamshevi* Negrobov, Selivanova et Maslova, 2014, and *D. dubrovskyi* Negrobov, Maslova et Selivanova, 2019. In addition to supplementary setae, acrostichal setae may be located directly in front of the scutellum. In most species of the genus, acrostichal setae ending before the fifth pair of dorsocentral setae, and in some species, they extend beyond the fifth pair. In *D. negrobovi* Gosseries, 1989, two rows of acrostichal setae continue up to the scutellum.

3. Setae on the lower postcranium. In the lower postcranium, behind the postocular setae, there are setae: one, rarely two near the occipital foramen and several on the postgena. Most species of the genus *Dolichopus* have 1 long and 1 short strong setae and several thin ones, present in both sexes. These setae rarely have the same size, and sometimes asymmetrical (Fig. 4).

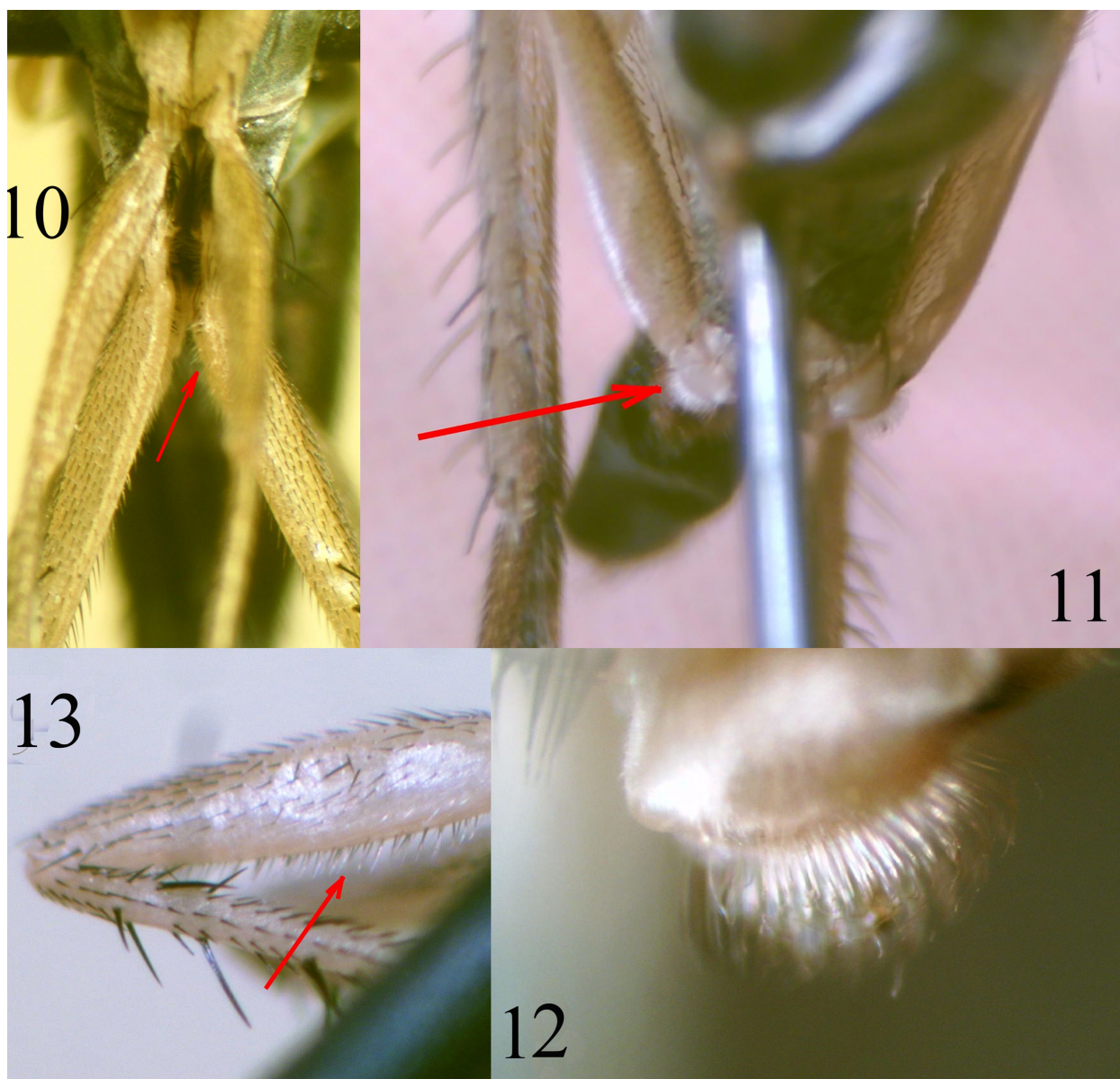
In species with pale lower postocular setae, the number of setae may be greater, a group of four to six setae lateral to the base of the proboscis is found in

males of the *Hygroceleuthus* species group: *D. asymmetricus* Selivanova, Negrobov et Barkalov, 2012, and *D. remipes* Wahlberg, 1839 (Fig. 5); group of three to four setae: *D. platychaetus* Negrobov et Barkalov, 1977, *D. signifer* Haliday, 1832. In these cases, the setae are often flattened to varying degrees. In females of these species, the number of strong setae is less, usually two or three. *Dolichopus remipes* and *D. nigricauda* Van Duzee, 1921 make up a peculiar group, the silvery lower setae are flat in females, but to a lesser extent than in males, the number of setae at the base of the proboscis is three to four (Fig. 6).

Species with black postocular setae are also characterized by one long and one short strong setae, for example, *D. rupestris* Haliday, 1833. Others may have three or four evenly decreasing setae: *D. annulipes* Zetterstedt, 1838, *D. bonsdorffi* Frey, 1915, *D. maculipennis* Zetterstedt, 1843. Between the postocular setae and the neck, another group of setae may be located, for example, in *D. robustus* Stackelberg, 1928 (Fig. 7), *D. bilamellatus*, *D. fridolini* Stackelberg, 1928, or rows of setae, denser in males, may form characteristic of the *D. planitarsis* species group: *D. amginensis* Stackelberg, 1928, *D. nataliae* Stackelberg, 1930 (Fig. 8), *D. planitarsis* Fallén, 1823, *D. postocularis* Negrobov, 1977, *D. romanovi* Smirnov et Negrobov, 1973, *D. setiger* Negrobov, 1973 and *D. ussuriensis* Stackelberg, 1930 (Barkalov et al. 2009).

The color of the setae on the posterior margin of the head is the same for both sexes. In addition to the dark and light postocular setae used in the identification keys, individual characters can be used to identify females of individual species, for example, one or two pairs of dark postocular setae in the lower part of the head in *D. claviger*, three to five pairs of dark postocular setae in *D. apicalis* Zetterstedt, 1849 (this is used, for example, by Negrobov et al. 2005: §95) or light setae on the postgena with dark postocular setae in *D. mannerheimi* Zetterstedt, 1838.

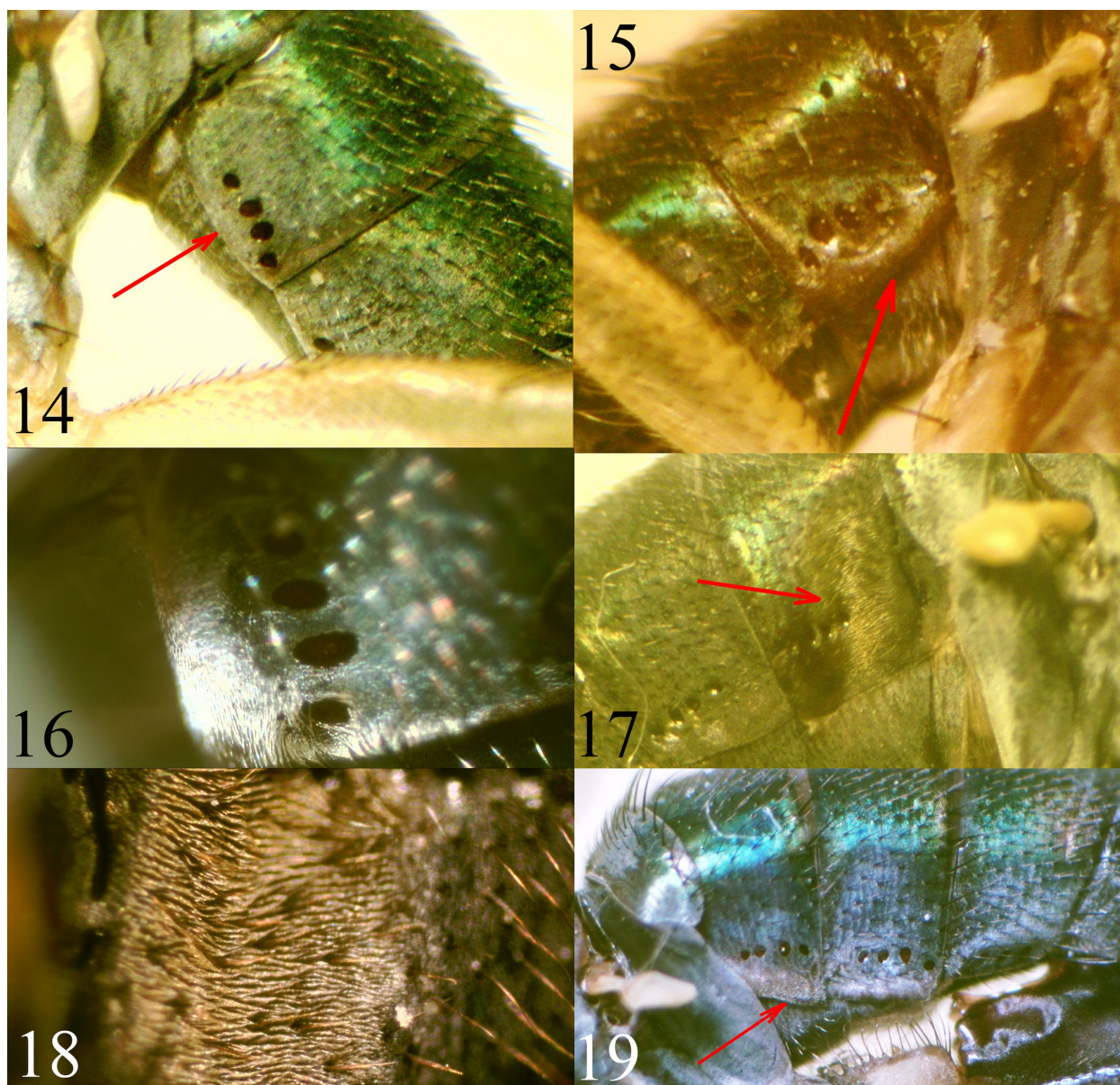
4. White claws on the tarsi. The character was found for the first time in a number of species of the *D. planitarsis* group and appears in both sexes on all legs, including feathered ones (males – *D. annulitarsis* Ringdahl, 1920, *D. fridolini*, *D. nataliae*, *D. planitarsis*, *D. postocularis*, *D. romanovi* and *D. setiger*; of females were examined only *D. nataliae* and *D. planitarsis*). Base and most of the length of claws are silvery to off-white, apexes are black (Fig. 9).



Figs 10–13. Groups of hairs on the legs: 10 – *Dolichopus claviger* Stannius, 1831, hairs on the ventral surface of the middle and hind femora of the female; 11 – *D. galeatus* Loew, 1871, “pads” of dense hairs on the middle trochanters of the male; 12 – *D. galeatus* Loew, 1871, “pads” of dense hairs on the middle trochanters of the male (enlarged); 13 – *D. setimanus* Smirnov, 1948, row of hairs on the ventral surface of the fore femora of the female.

5. Groups of setae on the legs. In contrast to the ventral cilia on the femora or the long apicoventral seta on the fore tibia, which are usually characteristic only of males, some groups of setae are developed in both males and females. Setae along the lower margin of the middle and hind femora are present in both sexes of *D. claviger* (Fig. 10). In *D. galeatus*, there are “pads” of dense setae on the middle tro-

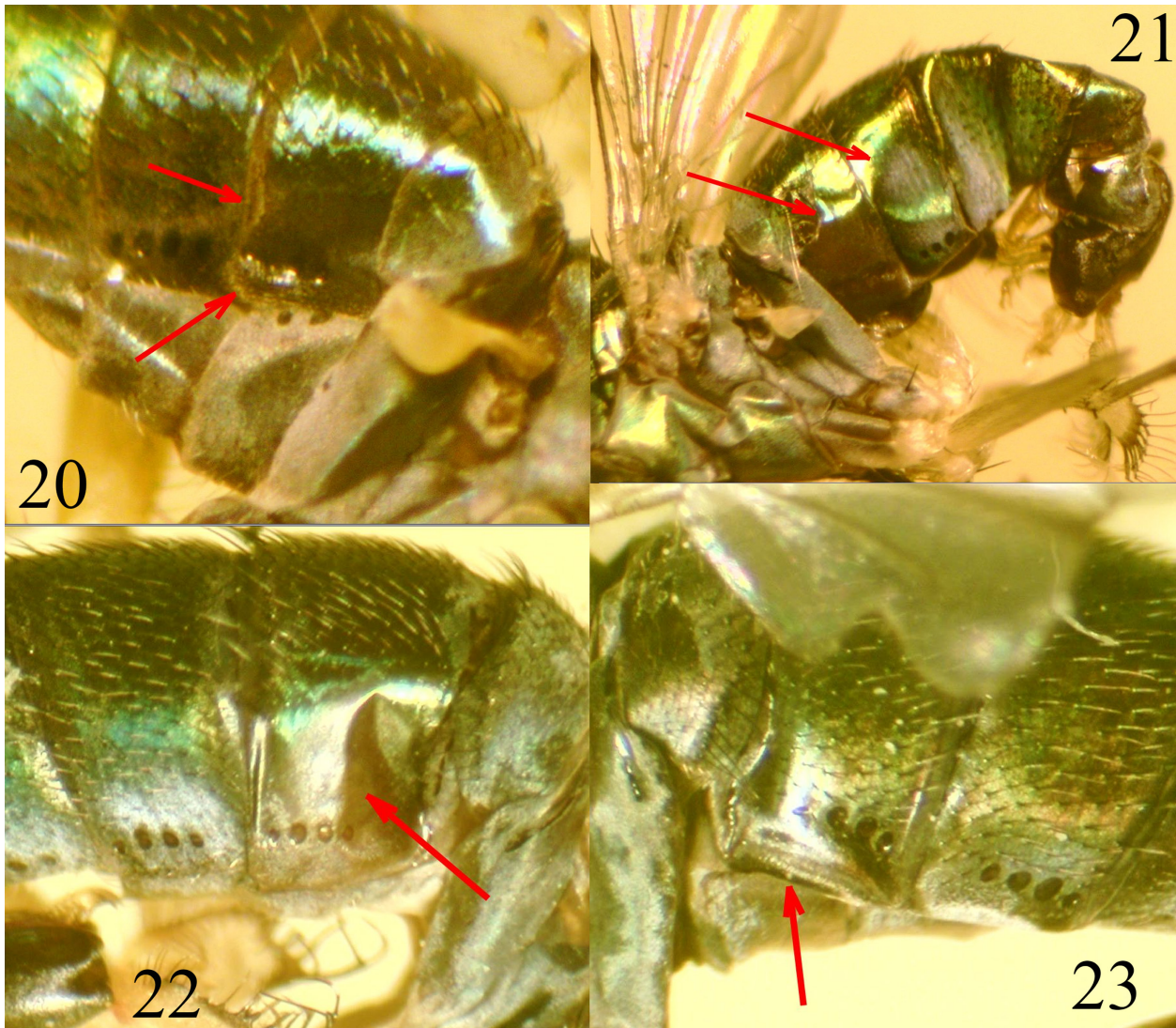
chanters (Figs 11–12), longer in males, but equally dense in both sexes; in *D. setimanus* Smirnov, 1948 and closely related *D. storozhenkoi* Negrobov, Selivanova et Maslova, 2016, a row of fine light setae is located on the ventral surface of the fore femora, slightly shorter in females than in males (Fig. 13). This character can be used to identify the females of these species.



Figs 14–19. Margins of the second and third abdominal tergites of males: 14 – *Dolichopus ptenopedilus* Meuffels, 1982, second tergite; 15 – *D. festivus* Haliday, 1832, thickened margins of the second tergite; 16 – *D. trivialis* Haliday, 1832, thickened margins of the second tergite; 17 – *D. robustus* Stackelberg, 1928, “felt” spot on the second tergite; 18 – *D. robustus* Stackelberg, 1928, “felt” spot on the second tergite (enlarged); 19 – *D. nataliae* Stackelberg, 1930, light “felt” spots on the posterior corners of the second tergite.

6. Margins of the second and third abdominal tergites of males. Species diagnosis of males of the genus *Dolichopus* is largely based on the signs of sexual dimorphism. In addition to the structure of male genitalia, wings, antennae and legs characters are used (Kornev 2012). In the descriptions of species, spots and discoloration are noted on the sides of the abdomen, but these characters are not used

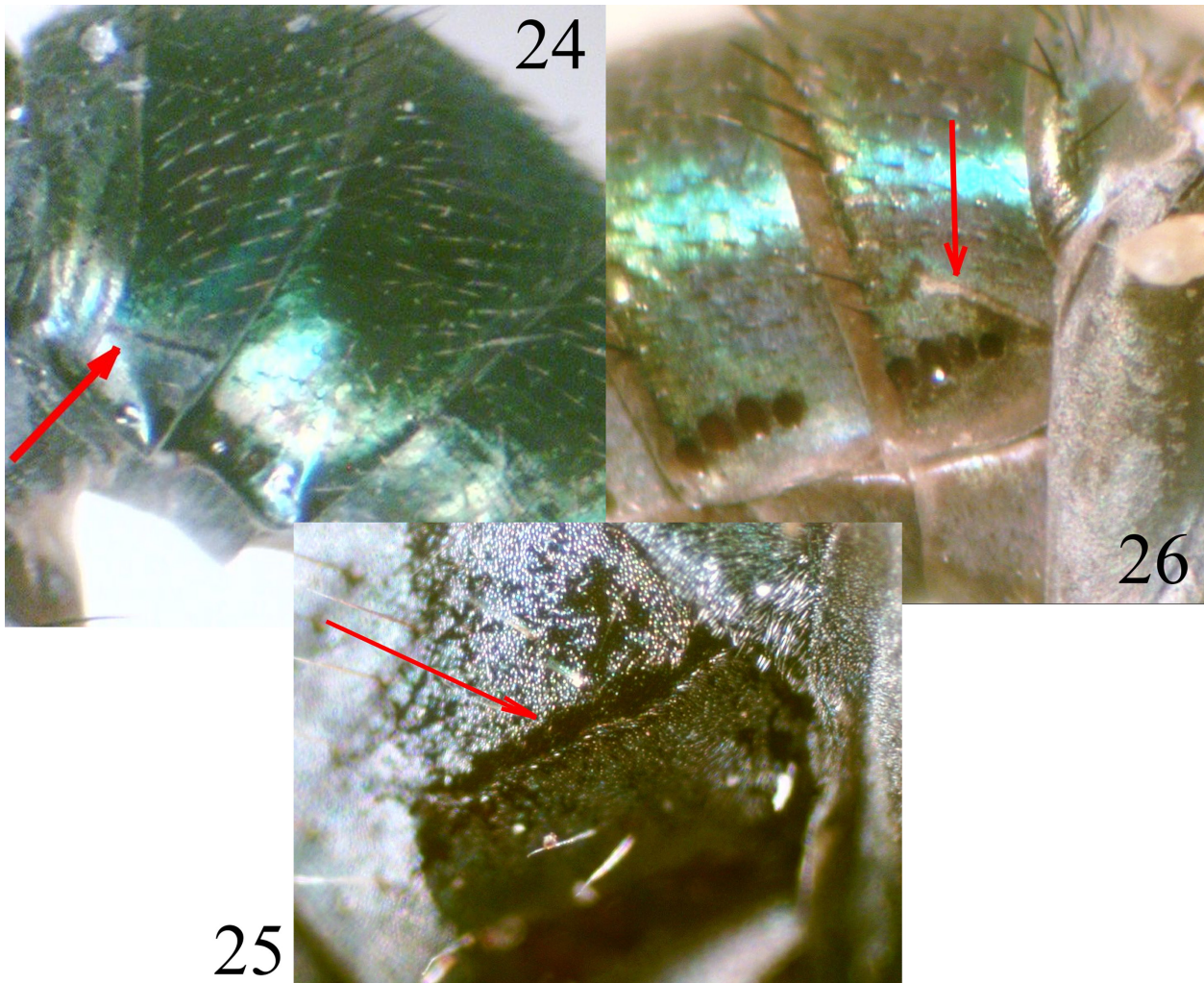
in identification keys, since they often change depending on the methods of collection or storage of the material and are not distinguishable in alcohol. Lateral surfaces of abdominal tergites end in “abdominal plaques” (Stoffolano et al. 1988), edges of tergites under them may be narrow and colored like the rest of the abdomen (*D. linearis* Meigen, 1824; *D. jacutensis* Stackelberg, 1929; *D. longicornis*



Figs 20–23. Margins of the second and third abdominal tergites of males: 20 – *Dolichopus zernyi* Parent, 1927, a ridge with “felt” on posterior margin of the second tergite; 21 – *D. jaxarticus* Stackelberg, 1927, shining area without pollen on second tergite and hairs along the entire lateral surface of the third tergite; 22 – *D. verae* Negrobov, 1977, shiny surface of the second tergite; 23 – *D. dorycerus* Loew, 1864, roll on the second tergite.

Stannius, 1831, *D. rezvorum* Stackelberg, 1930, *D. plumitarsis* Fallén, 1823, *D. ptenopedilus* Meufels, 1982, and *D. simius* Parent, 1927 (Fig. 14). Margins of the second tergite (*D. taigensis*), or the second and third tergites (*D. rupestris*) may be extended below abdominal plaques and thickened further (*D. arbustorum* Stannius, 1831, *D. cilifemortatus* Macquart, 1827, *D. festivus* Haliday, 1832, and *D. trivialis* Haliday, 1832) (Figs 15–16). In a number of species, the edges of tergites or the entire lateral part have a different cuticle structure, most

often this manifests itself as a brown coating, sometimes cilia form a “felt” spot. A large brown “felt” spot extends over the entire lateral surface of the second tergite in *D. robustus* (Figs 17–18). A distinct light spot occupies the entire lateral surface of the second tergite in *D. sabinus* Haliday, 1838, the second and third tergites in *D. platylepis* Negrobov et Grichanov, 1979. A small light spot is present on the margins of the second tergite in *D. nataliae* (Fig. 19) and *D. naglisi* Maslova, Selivanova et Negrobov, 2011, light “felt” spots on the posterior



Figs 24–26. Margins of the second and third abdominal tergites of males: 24 – *Dolichopus discifer* Stannius, 1831, longitudinal matte stripe on the second abdominal male tergite; 25 – *D. discifer* Stannius, 1831, longitudinal matte stripe on the second abdominal male tergite (enlarged); 26 – *D. plumipes* (Scopoli, 1763), oblique stripe on the second abdominal male tergite.

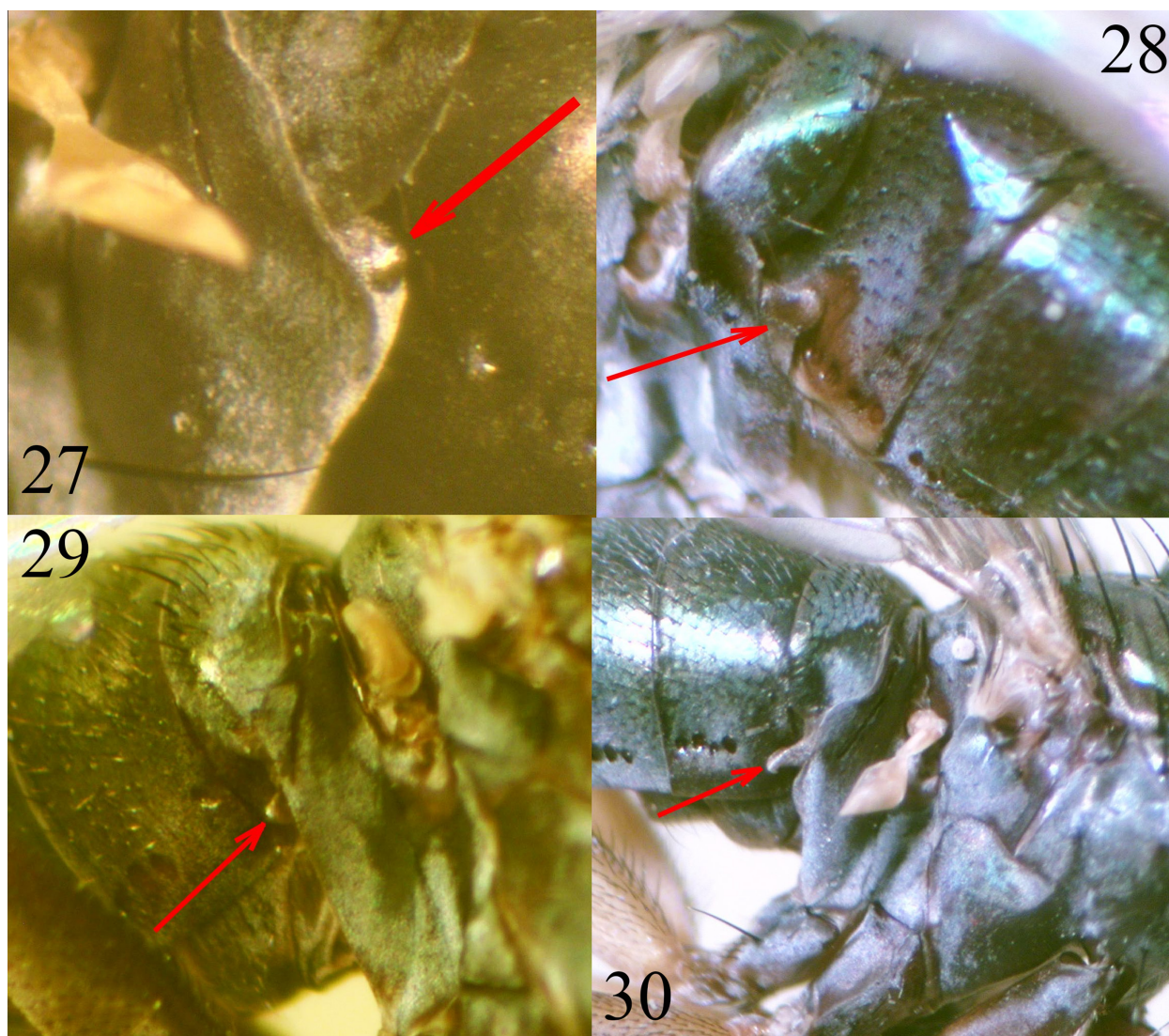
corners of the second and third tergites of *D. calceatus* and *D. nudus*. Anteroventral corners of the same tergites of *D. annulitarsis* and *D. romanovi* are covered with dense and long white setae, longer on the second tergite.

In males of *D. zernyi* Parent, 1927, the lateral surfaces of the second tergite in the lower part are devoid of coated setae, the thickening of the margin forms a ridge with “felt” and the posterior margin of the tergite has a dark expanded margin (Fig. 20). In *D. jaxarticus* Stackelberg, 1927, the second and third tergites are shiny, without pollen and setae, along the entire lateral surface (Fig. 21); in *D. verae* Negrobov, 1977, the surface is shiny only on the second

tergite (Fig. 22). In a representative of the Nearctic fauna *D. dorycerus* Loew, 1864, the margins of the ridges on the second tergite are rounded and raised (Fig. 23).

The structure of the cuticle on the surface of the second tergite may have stripes and spots characteristic of males of a number of species: in *D. discifer* Stannius, 1831, a longitudinal dark matt stripe (Figs 24, 25); in *D. plumipes* (Scopoli, 1763), a stripe above the abdominal plaques located obliquely (Figs 26, 27), while *D. simplex* Meigen, 1824 also has an oblique oblong spot.

7. Processes on metepimerons. This feature is noted for the genus *Dolichopus* for the first time. The



Figs 27–30. Outgrowths and tubercles on the posterior margins of the male metepimerons: 27 – *Dolichopus annulipes* Zetterstedt, 1838, tubercle; 28 – *D. negrobovi* Gossesies, 1989, outgrowth; 29 – *D. socer* Loew, 1871, outgrowth; 30 – *D. rupestris* Haliday, 1833.

posterior margins of the metepimerons, which cover the base of the abdomen in some species, have processes. The degree of their development varies: from small tubercles in *D. altayensis* Yang, 1998, *D. ciscaucasicus* Stackelberg, 1927, *D. flavipes* Stannius, 1831, *D. obcordatus* Aldrich, 1893, *D. portentosus* Negrobov, 1973, *D. sagittarius* Loew, 1848, *D. mannerheimi* and *D. annulipes* (Fig. 27) to well-marked “ears” in *Dolichopus griseifacies* Becker, 1917, *D. armillatus* Wahlberg, 1850, *D. punctum* Meigen, 1824, *D. socer* Loew, 1871, *D. shamshevi*, *D. rupestris* and *D. negrobovi* (Figs 28–30).

CONCLUSION

As a result of a long-term study, morphological characters have been identified, which, as a rule, are not used in the description of new species and the compilation of diagnostic keys for species of the genus *Dolichopus* (Table 1):

1. Setae on the stem of the halter.
2. Setae on mesonotum in front of scutellum.
3. Bristles on the back of the head.
4. White claws on the tarsi.
5. Groups of setae on the legs.

Table 1. Morphological characters in species of the genus *Dolichopus* Latreille, 1796.

Species	1	2	3	4	5	6	7	8	9
<i>D. affinis</i> Walker, 1849	+								
<i>D. altayensis</i> Yang, 1998									+
<i>D. amginensis</i> Stackelberg, 1928			+						
<i>D. andalusiacus</i> Strobl, 1899		+							
<i>D. angustipennis</i> Kertész, 1901		+							
<i>D. annulipes</i> Zetterstedt, 1838									+
<i>D. annularis</i> Ringdahl, 1920				+				+	
<i>D. apicalis</i> Zetterstedt, 1849			+						
<i>D. arbustorum</i> Stannius, 1831						+			
<i>D. armillatus</i> Wahlberg, 1850									+
<i>D. asymmetricus</i> Selivanova, Negrobov et Barkalov, 2012			+						
<i>D. austriacus</i> Parent, 1927		+							
<i>D. bilamellatus</i> Parent, 1929			+						
<i>D. bonsdorffi</i> Frey, 1915			+						
<i>D. breviclypeus</i> Negrobov, 1976	+	+							
<i>D. calceatus</i> Parent, 1927	+							+	
<i>D. cilifemoratus</i> Macquart, 1827						+			
<i>D. ciscaucasicus</i> Stackelberg, 1927									+
<i>D. claviger</i> Stannius, 1831	+				+				
<i>D. coercens</i> Walker, 1849	+								
<i>D. coloradensis</i> Aldrich, 1893	+								
<i>D. contiguus</i> Walker, 1849	+								
<i>D. czezanovskii</i> Stackelberg, 1928									
<i>D. cuprinus</i> Wiedemann, 1830	+								
<i>D. dakotensis</i> Aldrich, 1893	+								
<i>D. discifer</i> Stannius, 1831								+	
<i>D. dorycerus</i> Loew, 1864						+			
<i>D. dubrovskyi</i> Negrobov, Maslova et Selivanova, 2019		+							
<i>D. eudactylus</i> Loew, 1861	+								
<i>D. excisus</i> Loew, 1859		+							
<i>D. festivus</i> Haliday, 1832						+			
<i>D. finitus</i> Walker, 1849	+								
<i>D. flagellitenens</i> Wheeler, 1890	+								
<i>D. flavipes</i> Stannius, 1831									+
<i>D. fridolini</i> Stackelberg, 1928			+	+					
<i>D. galeatus</i> Loew, 1871	+				+				
<i>D. griseifacies</i> Becker, 1917									+
<i>D. humilis</i> Van Duzee, 1921		+							
<i>D. jacutensis</i> Stackelberg, 1929									+
<i>D. jakutus</i> Selivanova et Negrobov, 2011		+							
<i>D. jaxarticus</i> Stackelberg, 1927								+	
<i>D. jugalis</i> Tucker, 1911		+							
<i>D. latilimbatus</i> Macquart, 1827		+							
<i>D. latipennis</i> Fallen, 1823		+	+						
<i>D. lenensis</i> Negrobov, Barkalov et Selivanova, 2014		+							
<i>D. linearis</i> Meigen, 1824								+	
<i>D. lobatus</i> Loew, 1861		+							
<i>D. longicornis</i> (Fabricius, 1775)								+	
<i>D. longimanus</i> Loew, 1861		+							
<i>D. longipennis</i> Loew, 1861		+							
<i>D. maculipennis</i> Zetterstedt, 1843			+						
<i>D. mannerheimi</i> Zetterstedt, 1838									+
<i>D. migrans</i> Zetterstedt, 1843		+							
<i>D. naglisi</i> Maslova, Selivanova et Negrobov, 2011								+	
<i>D. nataliae</i> Stackelberg, 1930			+	+				+	
<i>D. negrobovi</i> Gosseries, 1989		+							+
<i>D. nubilus</i> Meigen, 1824		+							
<i>D. nudus</i> Loew, 1864		+						+	
<i>D. obcordatus</i> Aldrich, 1893									+
<i>D. orichalceus</i> Gosseries, 1989		+							
<i>D. palaesticus</i> Loew, 1864		+							
<i>D. planitarsis</i> Fallen, 1823			+	+					
<i>D. platychaetus</i> Negrobov et Barkalov, 1977			+						
<i>D. platylepis</i> Negrobov et Grichanov, 1979								+	
<i>D. plumipes</i> (Scopoli, 1763)								+	
<i>D. plumitarsis</i> Fallen, 1823								+	
<i>D. plumosus</i> Aldrich, 1893		+							
<i>D. porphyrops</i> Van Duzee, 1921		+							
<i>D. portentosus</i> Negrobov, 1973									+
<i>D. postocularis</i> Negrobov, 1977			+	+					
<i>D. ptenopedilus</i> Meuffels, 1982								+	
<i>D. pulchrimanus</i> (Bigot, 1888)		+							
<i>D. punctum</i> Meigen, 1824									+
<i>D. quadrilamellatus</i> Loew, 1864		+							
<i>D. remipes</i> Wahlberg, 1839			+						

Species	1	2	3	4	5	6	7	8	9
<i>D. renidescens</i> Melander et Brues, 1900	+								
<i>D. rezvorum</i> Stackelberg, 1930								+	
<i>D. ringdahli</i> Stackelberg, 1930		+							
<i>D. robustus</i> Stackelberg, 1928			+					+	
<i>D. romanovi</i> Smirnov et Negrobov, 1973			+	+				+	
<i>D. rotundipennis</i> Loew, 1848	+	+							
<i>D. rupestris</i> Haliday, 1833						+			+
<i>D. sabinus</i> Haliday, 1838								+	
<i>D. sagittarius</i> Loew, 1848									+
<i>D. scapularis</i> Loew, 1861	+								
<i>D. setimanus</i> Smirnov, 1948					+				
<i>D. setiger</i> Negrobov, 1973			+	+					
<i>D. sexarticulatus</i> Loew, 1864	+								
<i>D. shamshevi</i> Negrobov, Selivanova et Maslova, 2014		+							+
<i>D. signifer</i> Haliday, 1832			+						
<i>D. simius</i> Parent, 1927							+		
<i>D. simplex</i> Meigen, 1824								+	
<i>D. socer</i> Loew, 1871									+
<i>D. spinuliformis</i> Maslova, Negrobov et Selivanova, 2012	+								
<i>D. storozhenkoi</i> Negrobov, Selivanova et Maslova, 2016					+				
<i>D. sufflavus</i> Van Duzee, 1921	+								
<i>D. taigensis</i> Smirnov, 1948	+					+			
<i>D. trivialis</i> Haliday, 1832						+			
<i>D. tonsus</i> Loew, 1861	+								
<i>D. tumefactus</i> Negrobov, 1973	+								
<i>D. tumicosta</i> Negrobov, Grichanov et Barkalov, 2009	+								
<i>D. unguatus</i> (Linnaeus, 1758)	+								
<i>D. ussuriensis</i> Stackelberg, 1930			+						
<i>D. vadimiani</i> Negrobov et Barkalov, 1978	+								
<i>D. verae</i> Negrobov, 1977							+		
<i>D. zernyi</i> Parent, 1927						+			

1 – setae on the stem of halter; 2 – setae on mesonotum in front of the scutellum; 3 – setae on the lower postcranium; 4 – white claws on the tarsi; 5 – groups of setae on the legs; 6 – thickened margins of the second and third abdominal tergites of males; 7 – shiny margins of the second and third abdominal tergites of males; 8 – changing the structure of the cuticle on the second and third abdominal tergites of males; 9 – processes on metepimerons.

6. Margins of the second and third abdominal males tergites.

7. Processes on metepimerons.

We have found that most of these characters have a low degree of sexual dimorphism, are clearly visible in a light microscope both on dry and wet (alcohol) specimens, and do not require preparation of the samples. We propose to include into the arsenal of entomologists-taxonomists the studied characters that can be used to distinguish the species, compose new identification keys, identify related groups and analyze phylogenetic relationships between species and groups of species, at least for such a diverse and species-abundant genus, like *Dolichopus*.

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