J. Entomol. Res. Soc., 18(2): 61-71, 2016 *ISSN:1302-0250*

New Data on the Taxonomy of the Diaphorinae and Medeterinae Subfamilies (Diptera: Dolichopodidae)

Oleg P. NEGROBOV* Maryia A. CHURSINA Olga V. SELIVANOVA

Voronezh State University, Universitetskaya sq., 1, 394006 Voronezh, RUSSIA
e-mals: *negrobov@list.ru, chursina.1988@list.ru, ins285@bio.vsu.ru

ABSTRACT

Characteristics of the morphology of antennae, head, abdomen, male genitalia, wing venation and thorax chaetotaxy have been used to study the systematic position of the genera *Acropsilus* Mik, 1878, and *Euxiphocerus* Parent, 1935. Tree-diagrams of the subfamilies Diaphorinae, Medeterinae, Peloropeodinae and Rhaphiinae based on morphological characteristics were constructed.

Key words: Taxonomy, morphology, *Acropsilus*, *Euxiphocerus*, Dolichopodidae.

INTRODUCTION

The formal principle of the submission of higher taxa is not sufficient for the grouping of lower taxa in the structure of higher taxa to build a natural system. The most acceptable is the congregation principle, which allows the association of similar elements of characteristics combinations, even if the extreme members of the group aren't characterized by common characters (Lyubishchev, 1982).

On this basis, it is not enough to allocate single characters to describe the taxa of high rank, such as subfamilies; a matrix of characters should be constructed, which allows the estimation of statistical distances between genera. According to Lyubishchev (1982), the estimated distance can be used to solve the issue of inclusion of any genus in a subfamily.

The structures of Dolichopodidae subfamilies changed together with descriptions of new genera and the expansion of knowledge about diagnostic characters. There are different views on the question of what kind of characters should be allocated as primary for a group of genera. This situation has led to genera, in particular *Acropsilus* Mik, 1878, and *Euxiphocerus* Parent, 1935, being placed by different researchers in different subfamilies.

MATERIALS AND METHODS

Morphology of the genus *Acropsilus* Mik, 1878 and 7 genera of the subfamily Diaphorinae and 10 genera of the subfamily Peloropeodinae were investigated: *Argyra*

Macquart, 1834, *Asyndetus* Loew, 1869, *Chrysotus* Meigen, 1824, *Cryptophleps* Lichtwardt, 1898, *Diaphorus* Meigen, 1824, *Melanostolus* Kowarz, 1884, *Trigonocera* Becker, 1902; *Alishania* Bickel, 2004, *Chrysotimus* Loew, 1857, *Discopygiella* Robinson, 1965, *Epithalassius* Mik, 1891, *Griphophanes* Grootaert and Meuffels, 1998, *Micromorphus* Mik, 1878, *Nepalomyia* Hollis, 1964, *Peloropeodes* Wheeler, 1890, *Pseudoxanthochlorus* Negrobov, 1977, *Vetimicrotes* Dyte, 1980.

35 characters of the morphology of antenna, head, abdomen, male genitalia, wing venation and thorax chaetotaxy for species of the subfamilies Diaphorinae and Peloropeodinae have been used to study the systematic position of the genus Acropsilus. The following characters, which are diagnostic for subfamilies Diaphorinae and Peloropeodinae, were investigated:

1. Scape setose above (1). Scape bare (0).

2. Postpedicel 1.5 or more times longer than wide (1). Postpedicel almost as long as wide or postpedicel shorter than wide (0).

3. Arista dorsal (1). Arista apical (0).

4. Head evidently wider than height (1). Head slightly wider than height or approximately equal (0).

5. Occiput convex (1). Occiput concave (0).

6. Vertex not excavated (1). Vertex excavated on either side of ocellar tubercle (0).

7. Postocular setae uniseriate (1). Postocular setae multiseriate (0).

8. Male vertical bristles longer than postvertical or postvertical bristles absent (1). Male postvertical bristles longer than vertical or vertical bristles absent (0).

9. Male eyes widely separated (1). Male eyes contiguous under antennae (0).

10. Male face wider than ocellar tubercle (1). Male face narrower than ocellar tubercle (0).

12. Male face nearly parallel-sided or slightly narrowing towards clypeus (1). Male face widening toward clypeus (0).

12. Lower margin of clypeus ending beyond or at level of lower eye margin (1). Lower margin of clypeus ending above lower eye margin (0).

13. Antennae inserted in upper third of head (1). Antennae inserted near the middle of head (0).

14. Acrostichal setae biserial (1). Acrostichal setae uniserial, irregular or absent (0).

15. 5-6 pairs of strong dorsocentral setae (1). Some pairs of dorsocentral setae short or absent (0).

16. Upper part of proepisternum bare (1). Upper part of proepisternum with group of hairs (0).

17. Lateral scutellar setae short or absent (1). Lateral scutellar setae strong (0).

18. R_{4+5} and M_{1+2} diverging apically (1). R_{4+5} and M_{1+2} subparallel or convergent apically (0).

19. Anal vein present (1). Anal vein absent or rudimentary (0).

20. Anal angle reduced (1). Anal vein developed (0).

21. Apical part of CuA_1 shorter than its basal part (1). Apical part of CuA_1 longer than its basal part or equal to it (0).

22. Abdomen almost as long as thorax or slightly longer (1). Abdomen at least 1.5 times longer than thorax (0).

23. Abdomen green with metallic shine (1). Abdomen black, dark-brown or yellow, pollinose (0).

24. 7^{th} abdominal segment developed, visible (1). 7^{th} abdominal segment hidden in previous segment (0).

25. Male abdomen with 7 visible tergites (1). Male abdomen with 5-6 visible tergites (0).

26. Male 6^{th} abdominal tergite square in lateral view, well developed (1). Male 6^{th} abdominal tergite triangular in lateral view, partly or entirely hidden in previous segment (0).

27. Male 8^{th} sternite well developed, semicircular, with strong bristles (1). Male 8^{th} sternite small, bare or with short bristles (0).

28. Epandrium and hypandrium separated (1). Epandrium fused with hypandrium (0).

29. Hypandrium elongated (1). Hypandrium short (0).

30. Foramen placed in lower part of epandrium (1). Foramen placed in central part of epandrium (0).

31. Epandrial process developed, elongated, equal to dorsal lobe of surstylus (1). Epandrial process short (0).

32. Surstylus divided into two lobes: dorsal and ventral (1). Surstylus not divided (0).

33. Epandrium elongated, longer than high (1). Epandrium truncated, shorter than high (0).

34. Cercus 1-2 times shorter than epandrium (1). Cercus more than 2 times shorter than epandrium (0).

35. Hypopygium exposed (1). Hypopygium encapsulated at abdominal apex (0).

Morphology of the genus *Euxiphocerus* Parent, 1935 and 17 genera of the subfamily Medeterinae and 6 genera of the subfamily Rhaphiinae were investigated: *Atlatlia* Bickel, 1986, *Corindia* Bickel, 1986, *Craterophorus* Lamb 1921, *Dolichophorus* Lichtwardt, 1902, *Grootaertia* Grichanov, 1999, *Maipomyia* Bickel, 2004, *Medetera* Fischer von Waldheim, 1819, *Medeterites* Grichanov, 2010, *Neomedetera* Zhu, Yang and Grootaert, 2007, *Nikitella* Grichanov, 2011, *Palaeosystenus* Grichanov, Negrobov and Selivanova, 2014, *Palaeosystenus* Grootaert and Meuffels, 1997, *Systenites* Grichanov, Negrobov and Selivanova, 2014, *Systenomorphus* Grichanov, 2010, *Systenoneurus* Grichanov, 2010, *Systenus* Loew, 1857, *Thrypticus* Gerstaecker, 1864; *Haplopharyngomyia* Meuffels and Grootaert, 1999, *Mischopyga* Grootaert and Meuffels, 1990, *Nematoproctus* Loew, 1857, *Ngirhaphium* Evenhuis and Grootaert, 2002, *Physopyga* Grootaert and Meuffels, 1990, *Rhaphium* Meigen, 1803.

28 characters of the morphology of antenna, head, abdomen, male genitalia, venation of the wings and thorax chaetotaxy for species of the subfamilies Medeterinae and Rhaphiinae were analyzed. To build a cladistic tree of the subfamilies, the following data of genera were considered:

1. Postpedicel 1.5 or more times longer than wide at base (1). Postpedicel almost as long as width or postpedicel shorter than width (0).

2. Scape developed normally (1). Scape elongated or swollen (0).

3. Arista dorsal (1). Arista apical (0).

4. Occiput convex or flat (1). Occiput concave (0).

5. Vertex flat (1). Vertex with excavations on both sides of ocellar tubercle

6. Male vertical bristles longer than postverticals, or postvertical bristles absent (1). Male postvertical bristles longer than verticals, or vertical bristles absent (0).

7. Male face wider than ocellar tubercle (1). Male face narrower than ocellar tubercle (0).

8. Transverse suture absent (1). Transverse suture more or less pronounced (0).

9. Eyes with tiny hairs (1). Eyes bare (0).

10. Male eyes widely separated (1). Male eyes contiguous under antennae (0).

11. Postocular setae uniseriate (1). Postocular setae multiseriate (0).

12. Male face nearly parallel-sided (1). Male face narrowing towards clypeus (0).

13. Lower margin of clypeus ending beyond or at level of lower eye margin (1). Lower margin of clypeus ending above lower eye margin (0).

14. Acrostichal setae biserial (1). Acrostichal setae uneserial or absent (0).

15. 5-6 pairs of strong dorsocentral setae (1). Some pairs of dorsocentral setae short or absent (0).

16. Upper part of proepisternum bare (1). Upper part of proepisternum with group of hairs (0).

17. Lateral scutellar setae short or absent (1). Lateral scutellar setae strong (0).

18. Mid and hind femur with preapical setae (1). Mid and hind femur without preapical setae (0).

19. Anal vein present (1). Anal vein absent or rudimentary (0).

20. Anal angle reduced (1). Anal angle developed (0).

21. 7th abdominal segment well developed, visible, forming peduncle (1). 7th abdominal segment short, not forming peduncle (0).

22. Hypandrium elongated, almost 1.1 and more times as long as epandrium (1). Hypandrium short, almost 0.9 and less times as long as epandrium (0).

23. Epandrium and hypandrium separated (1). Epandrium fused with hypandrium (0).

24. Epandrium elongated, at least 1.5 times longer than wide (1). Epandrium shortened, as long as wide (0).

25. Apical epandrial process present (1). Apical epandrial process absent (0).

26. Foramen is located near the middle part of epandrium (1). Foramen is located near posterior edge of epandrium (0).

27. Surstylus relatively short, as long as cercus or shorter (1). Surstylus elongated, almost 1.5 and more times as long as cercus (0).

28. Surstylus divided into two lobes: dorsal and ventral (1). Surstylus not divided (0).

The species of Dolichopodidae from the collection of Voronezh State University were investigated for the analysis, the published species descriptions were also considered. Examined representative species for the study are as follow (* means using data from published descriptions, with first descriptions being mainly considered; otherwise, references are mentioned in parenthesis): *Acropsilus niger* (Loew, 1869); *Alishania elmohardyi* Bickel, 2004*; *Argyra diaphana* (Fabricius, 1775); *Asyndetus latifrons* (Loew, 1857); *Atlatlia grisea* Bickel, 1986a*; *Chrysotimus molliculus* (Fallen, 1823); *Chrysotus cilipes* Meigen, 1824; *Corindia major* Bickel, 1986c*; *Craterophorus currani* Grichanov, 1998; *Grootaertia kuznetsovi* Grichanov, 1999; *Cryptophleps kerteszi* Lichtwardt, 1898; *Diaphorus oculatus* (Fallen, 1823); *Discopygiella setosa* Robinson, 1965; *Dolichophorus kerteszi* Lichtwardt, 1902; *Epithalassius caucasicus* Becker, 1918; *Euxiphocerus wulfi* Parent, 1935* (Grichanov, 2009); *Griphomyia gravicaudata* Grootaert and Meuffels, 1997*; *Haplopharyngomyia mutilus* (Grootaert and Meuffels, 1998)*; *Maipomyia insolita* Bickel, 2004*; *Medetera jacula* (Fallén, 1823); *Medeterites molestus* (Meunier, 1907)* (Grichanov, 2010 a); *Melanostolus melancholicus* (Loew, 1869); *Micromorphus albipes* (Zetterstedt, 1843); *Mischopyga artifacies* Grootaert and Meuffels, 1990*; *Nematoproctus praesectus* Loew, 1869; *Ngirhaphium murphyi* Evenhuis and Grootaert, 2002*; *Neomedetera membranacea* Zhu, Yang and Grootaert, 2007*; *Nepalomyia tatjanae* (Negrobov, 1984); *Nikitella vikhrevi* Grichanov, 2011*; *Palaeosystenus succinorum* (Meunier, 1907)* (Grichanov *et al.*, 2014); *Paramedetera papuensis* Grootaert and Meuffels, 1997*; *Peloropeodes acuticornis* (Oldenberg, 1916); *Physopyga miranda* Grootaert and Meuffels, 1990*; *Pseudoxanthochlorus micropygus* Negrobov, 1977; *Systenites inclytus* (Meunier, 1907)* (Grichanov *et al.*, 2014); *Rhaphium crassipes* (Meigen, 1824); *Systenomorphus katyushae* Grichanov, 2010*; *Systenoneurus ovechkinae* Grichanov, 2010*; *Systenus bipartitus* (Loew, 1850); *Trigonocera rivosa* Becker, 1902; *Thrypticus nigricauda* Wood, 1913; *Vetimicrotes nartshukae* (Negrobov,1976).

In this study, we focused on characters, which are important for the diagnoses of the genera *Acropsilus* and *Euxiphocerus*. Analyzed character states of the species have been presented in the form of binary table (Table 1, Table 2), and then the matrix of proximities has been calculated. The tree-diagram has been constructed in Past v. 2.11 software (Hammer *et al.*, 2001). All characters were equally weighted. Character polarity was based on outgroup comparison, with the most plesiomorphic state indicated by “0” and the apomorphic state indicated by “1” according to Sinclair and Cumming (2006) and Wang *et al.* (2007). Tree-diagrams of the subfamilies were built using the method of neighbor joining with measure of Euclidean distance from 1000 bootstrap replicates.

Table 1. Character state matrix for Diaphorinae and Peloropeodinae analysis. Missing data are indicated by “?”, absent character is indicated by “-“.

	Argyra Macq.	*Asyndetus* Lw.	*Chrysotus* Meig.	*Cryptophleps* Licht.	*Diaphorus* Meig.	*Melanostolus* Kow.	*Trigonocera* Beck.	*Acropsilus* Mik	*Alishanimyia* Bick.	*Chrysotimus* Lw.	*Discopygiella* Rob.	*Epithalassius* Mik	*Griphophanes* Groot.	*Micromorphus* Mik	*Nepalomyia* Holl.	*Peloropeodes* Wheel.	*Pseudoxanthochlorus* Negr.	*Vetimicrotes* Dyte
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1
3	0	1	0	0	1	1	0	0	1	1	1	0	1	0	0	1	0	0
4	1	1	1	1	1	1	1	1	1	0	?	1	1	1	0	1	1	0
5	0	1	0	1	1	1	1	0	1	0	0	1	0	1	0	0	1	0
6	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1
7	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1
8	1	1	1	1	0	0	1	1	0	1	1	0	1	1	1	0	0	0
9	1	1	1	1	0	1	1	0	1	1	1	1	0	0	1	1	0	1
10	1	1	0	1	1	1	1	0	1	1	1	1	0	0	1	0	1	0
11	1	1	0	0	1	0	1	0	1	1	1	1	1	1	1	1	1	1
12	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	1	1
13	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	0	0	0
14	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
15	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1
16	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
17	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
18	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	0	0	1
20	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1
21	1	0	1	-	0	0	1	1	0	0	1	1	1	0	1	0	0	0
22	0	1	1	0	0	1	0	1	1	0	1	0	0	0	0	1	1	1
23	0	1	1	1	0	1	1	0	0	1	0	0	0	1	1	1	0	1
24	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0
25	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	1	1
26	1	0	1	0	0	0	0	1	1	0	1	0	0	1	0	1	0	0
27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1
28	1	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1
29	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
30	1	1	0	1	1	0	1	0	0	1	1	0	0	0	1	0	1	0
31	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	1
32	1	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	0
33	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
34	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	1
35	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1

Table 2. Character state matrix for Medeterinae and Rhaphiinae analysis. Missing data are indicated by “?”.

	Atlatlia Bick.	*Corindia* Bick.	*Craterophorus* Lamb	*Dolichophorus* Licht.	*Grootaertia* Grich.	*Maipomyia* Bick.	*Medetera* Fisch.	*Medeterites* Grich.	*Neomedetera* Zhu, Yang et Groot.	*Nikitella* Grich.	*Palaeosystenus* Grich. et al.	*Paramedetera* Groot. et Meuff.	*Systenites* Grich. et al.	*Systenomorphus* Grich.	*Systenoneurus* Grich.	*Systenus* Lw.	*Thrypticus* Gerst.	*Euxiphocerus* Par.	*Haplopharyngomyia* Meuff. et Groot.	*Mischopyga* Groot. et Meuff.	*Nematoproctus* Lw.	*Ngirhaphium* Evenh. et Groot.	*Physopyga* Groot. et Meuff.	*Rhaphium* Meig.
1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	1	1	1
2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	1	1	0	1	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	1	1	1
5	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
6	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
7	0	?	0	1	1	0	1	1	0	1	1	1	0	1	1	1	1	0	0	0	1	1	0	0
8	0	0	1	0	1	1	0	0	1	1	0	0	1	0	0	0	1	1	0	1	0	0	0	0
9	1	1	1	0	?	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
10	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0
12	1	1	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	1
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	1
14	1	1	0	1	0	0	1	0	1	1	1	0	0	1	1	1	1	1	0	1	1	1	1	1
15	1	1	0	1	0	1	1	1	0	1	1	0	1	1	1	1	1	1	0	1	1	1	0	1
16	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	1	1	1	0	1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	1	1	1	1	1
18	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	1	0	0	0	0	1	1	1	1	0	1	0	1	0	0	1	0	1	0	0	1	1	0	1
20	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	1	1	0	1	1	0	1	1	1
21	1	1	0	1	1	0	1	0	1	1	0	0	0	1	1	1	1	1	0	1	1	0	0	0
22	1	1	1	0	0	0	1	1	0	1	0	0	1	1	1	0	1	0	1	0	0	1	0	0
23	1	1	1	0	1	0	1	1	1	0	0	0	0	0	0	0	1	0	-	1	0	1	0	1
24	1	1	1	1	1	0	1	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0
25	0	0	1	1	0	0	1	1	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0
26	1	0	0	1	1	1	1	0	1	?	1	0	0	0	0	0	0	1	0	?	0	1	0	0
27	1	1	1	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
28	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0

RESULTS AND DISCUSSION

The genus *Acropsilus* Mik, 1878 was for a long time included in the subfamily Sympycninae (Parent, 1938; Dyte and Smith, 1980); then it was moved to the subfamily Peloropeodinae (Bickel and Dyte, 1989). In the catalog of Palaearctic Dolichopodidae (Negrobov, 1991), as well as the world catalog of Dolichopodidae (Yang *et al.*, 2006) the genus is placed in the subfamily Peloropeodinae.

However, Grichanov transferred the genus *Acropsilus* to the subfamily Diaphorinae, Argyrini tribe, on the basis of several signs in the morphology of antenna, genitals and wing venation (Grichanov, 1998). Therefore, the systematic position of this genus still remains controversial.

In particular, typical characteristics for the subfamily Diaphorinae are also characteristic for a species of the genus *Acropsilus*: the arista is pubescent and apical, the length of the postpedicel is approximately equal to its height at the base, the head is relatively wide and the face does not reach the lower edge of the eyes. However, the 8^{th} sternum of the *Acropsilus* species doesn't have long bristles, which are characteristic of the subfamily Diaphorinae.

Species of *Acropsilus* is closer to the subfamily Peloropeodinae by the following characters: acrostichals are absent, the hypopygium is open, the 7^{th} abdominal segment forms a peduncle, cerci at least 1.5-2 times shorter than epandrium.

The genus *Acropsilus*, based on the selected set of characteristics (Table.1), was placed in the group of genera from the subfamily Diaphorinae (Fig. 1), although its borderline position is obvious. The genus *Chrysotus* Meigen, 1824, is morphologically closest to *Acropsilus* (bootstrap support values higher than 70%). The similarities of these genera is also evident in the modification of the postpedicel, namely in its dense pubescence and the presence of a small apical incision. *Acropsilus* species can be distinguished from the other species of Diaphorinae by the following characters: visible hypopygium and the morphology of abdominal segments.

The genus *Euxiphocerus* Parent was first described in 1935 in the subfamily Rhaphiinae as close to the genus *Systenus* Loew, 1857 (Parent, 1935). The genus *Systenus*, based on the characteristics of postpedicel morphology was for a long time considered a member of that subfamily, and was isolated into the separate subfamily Systeninae by Robinson (1970).

Bickel (1986b), considering the morphology of the genital and pregenital segments of the genus *Systenus*, concludes that these genera are morphologically closer to the species of the subfamily Medeterinae than to species of Rhaphiinae, but excludes *Euxiphocerus* from the Medeterinae.

The genus is placed in the subfamily Rhaphiinae in the world catalog (Yang *et al.*, 2006). Grichanov (2009), considering the morphology of two new species of *Euxiphocerus*, includes the genus in the subfamily Medeterinae, based on the characters of wing venation, thorax chaetotaxy, morphology of the postpedicel and of the 7^{th} abdominal segment.

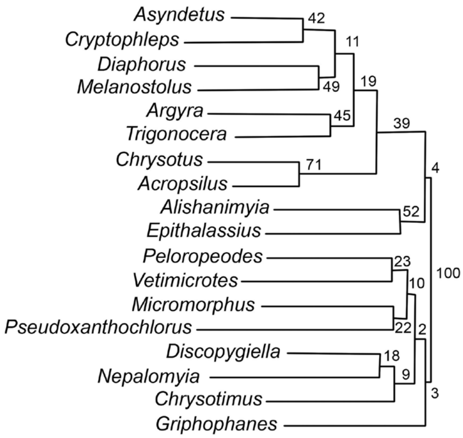

Fig. 1. Tree-diagram obtained from 35 morphological characters for of the Diaphorinae and Peloropeodinae subfamilies. Bootstrap support values are showed beside nodes.

The morphology of the antenna, namely elongated scape and postpedicel, and apical arista, are characteristic of *Euxiphocerus*, and these characters are typical for species of the tribe Systenini, and for the species of *Rhaphium* Meigen, 1803, and *Ngirhaphium* Evenhuis and Grootaert, 2002 not referenced. A surstylus separated into two parts and uniseriate upper postocular bristles group the species *Euxiphocerus* together with the Medeterinae.

Similarity with members of the subfamily Rhaphiinae, except the form of postpedicel, is also evident in the morphology of the occiput, the absence of the apical epandrial process and the characteristics of thorax chaetotaxy. There are six strong dorsocentral bristles and acrostichal bristles arranged in two regular series in *Euxiphocerus* species, whereas species of the subfamily Medeterinae can have 4-5 pairs of dorsocentral bristles or 6 pairs, two of which are reduced, and acrostichal bristles can be very short or absent.

Variations in the development of the 7^{th} abdominal segment and a bend in the apical part of R_{4+5} can be found in both subfamilies. Also, species with eyes contiguous under the antennae can be found among the Rhaphiinae and Medeterinae.

This analysis shows that the genus *Euxiphocerus*, given the present composition of subfamilies (Table. 2), is morphologically closer to the representatives of the Medeterinae, Systenini tribe (bootstrap support values higher than 50%) (Fig. 2). It can be distinguished within the tribe by the characteristics of the eyes (male eyes contiguous under the antennae) and the hypandrium (hypandrium is separated from epandrium).

CONCLUSIONS

In conclusion, it should be noted that our study of the whole complex of characters allowed the neutralization of insufficient data on the comparative value of different characters and the subjective assessment of their order of priority. In the future, it will be possible to specify a composition of taxonomic groups based on a comparison of the number of similarities and differences of an ensemble of diagnostic characters that are relevant for the group. In particular, the method of cluster analysis of a binary matrix can be used to determine and clarify the taxonomic position of genera.

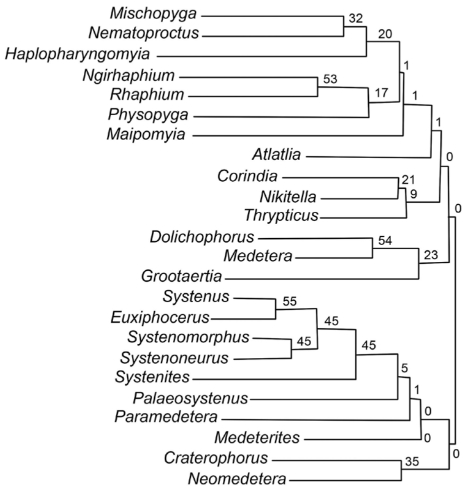

Fig. 2. Tree-diagram obtained from 28 morphological characters for of the of the Medeterinae and Rhaphiinae subfamilies. Bootstrap support values are showed beside nodes.

ACKNOWLEDGMENTS

The work was supported by the Russian Foundation for Basic Research, grant number 14-04-00264.

REFERENCES

Bickel, D. J., 1986a, *Atlatlia*, a new genus of Dolichopodidae (Diptera) from Australia. *Entomologica Scandinavica*, 165-171.

Bickel, D. J., 1986b, Australian species of *Systenus* (Diptera: Dolichopodidae). *Records of the Australian Museu*m, 38: 263-270.

Bickel, D. J., 1986c, *Thrypticus* and an allied new genus, *Corindia*, from Australia (Diptera: Dolichopodidae). *Records of the Australian Museum*, 38: 135-151.

Bickel, D. J., 2004, *Alishania*, a new genus with remarkable female terminalia from Taiwan, with notes on *Chrysotimus* Loew (Diptera, Dolichopodidae). *Bishop Museum Bulletin in Entomology*, 12: 27-34.

Bickel, D. J., 2004, *Maipomyia* (Diptera: Dolichopodidae), a new genus from Chile. *Proceedings of the Entomological Society of Washington*, 106(4): 844-850.

Bickel, D. J., Dyte, C. E., 1989, *Family Dolichopodidae. In*: Evenhuis, N. L. (Ed.). A catalog of the Diptera of the Australasian and Oceanian region. Bishop Museum Press, Honolulu, 393-418.

Dyte, C. E., Smith, K. G. V., 1980, 33. *Family Doliohopodidae. In*: Crossley, R. W., Cogan, B. H., Freeman, P., Pont, A. C., Smith, K. G. V., Oldroyd, H. (Eds.): Catalogue of the Diptera of the Afrotropical region. British Museum (Natural History), London, 443-463.

Evenhuis, N. L., Grootaert, P., 2002, Annotated checklist of the Dolichopodidae (Diptera) of Singapore, with descriptions of a new genus and new species. *The Raffles Bulletin of Zoology*, 50(2): 301-316.

Grichanov, I. Ya., 1998, The Afrotropical species of the genus *Acropsilus* (Diptera: Dolichopodidae). *International Journal of Dipterological Research*, 9(3): 183-190.

Grichanov, I. Ya., 2009, Systematics of the genus *Euxiphocerus* Parent 1935 (Diptera, Dolichopodidae). *Caucasian Entomological Bulletin*, 5(1): 127-131.

Grichanov, I. Ya., 2010a, A new genus Medeterinae (Diptera: Dolichopodidae) from Baltic amber. *Caucasus Entomological Bulletin*, 6(2): 209-212.

Grichanov, I. Ya., 2010b, Two new genera of Systenini from South Africa and Madagascar (Diptera: Dolichopodidae: Medeterinae). *International Journal of Dipterological Research*, 21(1): 79-90.

Grichanov, I. Ya., 2011, Three new genera of Medeterinae (Diptera: Dolichopodidae) from Old world tropics and Australia. *Far Eastern Entomologist*, 225: 1-16.

Grichanov, I. Ya., Negrobov, O. P., Selivanova, O. V., 2014, Two new genera of Medeterinae (Diptera: Dolichopodidae) from Baltic amber and some new combination. *Russian Entomological Journal*, 23(1): 61-70.

Grootaert, P., Meuffels, H. J. G., 1990, Dolichopodidae (Diptera) from Papua New Guinea IX: *Mischopyga* gen. nov. and *Physopyga* gen. nov., two new genera from the mangrove in Papua new Guinea. *Indo-Malayan Zoology*, 6: 195-206.

Grootaert, P., Meuffels, H. J. G., 1997, *Griphomyia* (Diptera, Dolichopodidae, Peloropeodinae) a new genus from Southern Thailand. *Belgian Journal of Zoology*, 127(2): 107-114.

Grootaert, P., Meuffels, H. J. G., 1998, *Haplopharynx*, a new genus incertae sedis from forest in Thailand (Diptera, Dolichopodidae). *Studia Dipterologica*, 5(2): 253-259.

Hammer, Ø., Harper., D. A. T., Ryan, P. D., 2001, Past: Paleontological Statistics Software Package for Education and Data Analysis. *Palaeontologia Electronica*, 4(1): 1-9.

Lyubishchev, A. A., 1982, *Problemy Formy*, *Sistematiki i Jevoljucii Organizmov* [*Problems of the form, Systematics and Evolution of Organisms*]. Nauka, Moscow, 281 (in Russian).

Negrobov, O. P., 1991, *Family dolichopodidae. In*: Soos, A., Papp, L. (Eds.). Catalogue of Palaearctic Diptera. Volume 7. Dolichopodidae-Platypezidae. Akademiai kiado, Budapest, 11-139.

Parent, O., 1935, Dipteres Dolichopodidés du Congo Belge. Nouvelle contribution. *Revue de zoologie et de botanique africaines*, 27: 112-129.

Parent, O., 1938, Dipteres Dolichopodidés. Faune de France. *L'Académie des Sciences de Paris*, 35: 1-720.

Robinson, H., 1970, The subfamilies of the family Dolichopodidae in North and South America (Diptera). *Papeis Avulsos de Zoology*, 23(6): 53-62.

Sinclair, B. J., Cumming, J. M., 2006, The morphology, higher-level phylogeny and classification of the Empidoidea (Diptera). *Zootaxa*, 1180: 1-172.

Wang, M., Zhu, Y., Zhang, L., Yang, D., 2007, A phylogenetic analysis of the Dolichopodidae based on morphological evidence (Diptera, Brachycera). *Acta Zootaxonomica Sinnica*, 32(2): 241-254.

Yang, D., Zhu, Y. J., Wang, M. Q., Zhang, L., 2006, *World catalog of Dolichopodidae (Insecta: Diptera)*. China Agricultural University Press, Beijing: 704.

Zhu, Y., Yang, D., Grootaert, P., 2007, *Neomedetera*, a new genus in the subfamily Medeterinae (Diptera: Dolichopodidae). *Annales Zoologici*, 57(2): 227-230.

Received: May 25, 2015 *Accepted: April 13, 2016*