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Further notes on Asian fauna of *Sepedon* (Diptera, Sciomyzidae)

N. E. Vikhrev✉, M. O. Yanbulat

Zoological Museum of Moscow University, 2 Bolshaya Nikitskaya, 125009, Moscow, Russia

Authors

Nikita E. Vikhrev
E-mail: nikita6510@yandex.ru
SPIN: 1266-1140
Scopus Author ID: 32467511100
Maria O. Yanbulat
E-mail: mairynia@yandex.ru

Abstract. This work is an update to our previous publication on the Asian fauna of *Sepedon* (Vikhrev and Yanbulat 2019). It is devoted to the few still unsolved problems. Taxonomic status of Far Eastern population of *S. spinipes* Scopoli, 1763 without dark frontal spots is raised to the subspecies level (1). *S. spangleri* Beaver, 1974, described from Central Thailand, is synonymised with *S. senex* Wiedemann, 1830 **syn. nov.** (2). We offer a modified identification key of the Asian *Sepedon* spp. with some changes and corrections as compared to the one previously published (3).

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Keywords: Diptera, Sciomyzidae, *Sepedon*, new subspecies, new synonym

Заметки по азиатской фауне *Sepedon* (Diptera, Sciomyzidae)

Н. Е. Вихрев✉, М. О. Янбулат

Зоологический музей МГУ им. М.В. Ломоносова, Большая Никитская ул., д. 2, 125009, г. Москва, Россия

Сведения об авторах

Вихрев Никита Евгеньевич
E-mail: nikita6510@yandex.ru
SPIN-код: 1266-1140
Scopus Author ID: 32467511100
Янбулат Мария Олеговна
E-mail: mairynia@yandex.ru

Аннотация. Статья является дополнением к нашей предыдущей публикации по азиатской фауне рода *Sepedon* (Vikhrev and Yanbulat 2019) и посвящена некоторым нерешенным вопросам. Таксономический статус дальневосточной популяции *S. spinipes* Scopoli, 1763 без черных лобных пятен повышен до уровня подвида (1). Описанный из центрального Таиланда *S. spangleri* Beaver, 1974 сведен в синоним к *S. senex* Wiedemann, 1830 **syn. nov.** (2). Мы предлагаем здесь улучшенный и исправленный по сравнению с ранее опубликованным ключ по азиатским видам *Sepedon* spp. (3).

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Ключевые слова: Diptera, Sciomyzidae, *Sepedon*, новый подвид, синоним

Introduction

In the 21st century, several publications on the Asian fauna of *Sepedon* Latreille, 1804 appeared, which clarified the taxonomy of this genus. Elberg et al. (2009) described probably the last unknown Asian species. Li & Yang (2017) offered useful illustrations and a complete key for the Chinese fauna which included all but one Asian species. Vikhrev & Yanbulat (2019) expressed their point of view on some taxonomic problems and offered another identification key. This work is devoted to the few still unsolved problems. Taxonomic status of Far Eastern specimens of *S. spinipes* Scopoli, 1763 without dark frontal spots (shortly discussed in Vikhrev & Yanbulat 2019) is raised to the subspecies level: *S. spinipes flavifrons* subsp. nov. (1). Dr. W. Murphy kindly provided photos of *S. spangleri* Beaver, 1974 described from Central Thailand. It is synonymised here with *S. senex* Wiedemann, 1830 **syn. nov.** (2) We offer a modified identification key of the Asian *Sepedon* spp. with some changes and corrections as compared to the one published by Vikhrev & Yanbulat (2019) (3).

Material and methods

Localities are given as follows: country, region (in italics), and geographical coordinates in decimal-degree format. Instead of full names of regions of Russian administrative subdivisions they are listed as a name and the word *region* (abbreviated as *Reg.*).

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

Abbreviations of collections in which specimens that were borrowed for examination during this research are deposited are as follows:

ISEA — Institute of Systematics and Ecology of Animals, Novosibirsk, Russia;

USNM — U. S. National Museum of Natural History, Washington, D. C., USA;

ZIN — Zoological Institute, Saint Petersburg, Russia;

ZMUM — Zoological Museum of Moscow University, Russia.

Result and discussion

Sepedon spinipes flavifrons, subsp. nov.

Figs 2, 3

<https://zoobank.org/References/eee41a7f-963c-4153-abf6-751f331c2d01>

Holotype, male, RUSSIA, Khabarovsk near airport, 48.53°N, 135.13°E, 5–7.06.2022, N. Vikhrev & M. Yanbulat, stored in ZMUM.



Figs 1–3. *Sepedon spinipes*, head: 1 — *S. s. spinipes*; 2, 3 — *S. s. flavifrons* subsp. nov.

Рис. 1–3. *Sepedon spinipes*, ГОЛОВА: 1 — *S. s. spinipes*; 2, 3 — *S. s. flavifrons* subsp. nov.

Paratypes 14♂, 16♀: RUSSIA: *Amur* Reg., Zeya (53.77°N, 127.28°E): 20.06.1978, A. Shatalkin, 1♀; 12–14.09.1981, A. Shatalkin, 3♂, 7♀ (all ZMUM); *Khabarovsk* Reg.: Bychikha env. (48.30°N, 134.82°E): 16.05.1973, K. Gorodkov, 1♂ (ZIN); 25.07.2020, O. Kosterin, 2♂, 1♀; 9.08.2020, O. Kosterin, 1♂ (ZMUM); *Khabarovsk* near airport, 48.53°N, 135.13°E, 5–7.06.2022, N. Vikhrev & M. Yanbulat, 1♂ (ZIN); *Khabarovsk*, suburb, 48.53°N, 135.13°E, 5–7.06.2022, N. Vikhrev, 2♂, 2♀ (ZMUM and ZIN); *Komsomolsk-Amur*, Mylki L., 50.50°N, 136.97°E, 21.06.2022, N. Vikhrev, 1♀ (ZMUM); *Mayak* env., 48.9°N, 136.19°E, 6.06.2022, N. Vikhrev, 1♀; 24.06.2022, N. Vikhrev, 1♀ (ZMUM); *Prymorsky* Reg.: Lake Khanka near Platono-Aleksandrovka village, 45.061°N, 131.99°E, 1.08.2020, O. Kosterin, 1♂ (ZMUM); *Spassk-Dalny* (44.6°N, 132.82°E), 20.08.1993, S. Belokobylsky, 1♂ (ZIN); *Yakutia* Reg.: 7 km N of Yakokit, 58.95°N, 125.85°E, an oxbow lake, 24–27.06.2022, O. Kosterin, 1♀ (ZMUM); *Olyokminsk* env., Kyachchi (60.35°N, 120.10°E), 20.07.2008, A. Ovchinnikov, 1♀ (ZIN); *Zabaykalsky* Reg., Solontsy env., 51.45°N, 118.85°E, 14.06.2023, V. Zinchenko, 2♂ (ISEA).

Distribution. E Asia, where known from 119°E to 136°E and from 60°N to 45°N.

Diagnosis. We found no differences between *S. spinipes flavifrons* subsp. nov. and the nominotypical *S. s. spinipes* either in the genitalia structure or in the non-genitalic characters, except for the absence of the dark frontal spots. In *S. spinipes flavifrons* subsp. nov., parafacial spots under the antennae are present and distinct, but the area of the frontal spots is not black, it is only slightly darker yellow than the surface of the frons around it (compare Fig. 1 and Figs 2, 3).

Discussion. In the field season 2022, we found that all specimens of *S. spinipes* Scopoli, 1763 from *Khabarovsk* Region of the Russian Far East had no dark frontal spots. This contradicts the identification key and photo illustrations given in our work on the Asian *Sepedon* (Vikhrev & Yanbulat 2019: 48–49 and figs 1, 4). This also contradicts the identification

key and photo illustrations given in the work on the Chinese *Sepedon* (Li & Yang 2017: 303 and figs 68–70). Vikhrev & Yanbulat (2019: 52) shortly mentioned that there are “...several specimens of *S. spinipes* in which the normally black frontal spots are represented by yellowish stains only”. This time we’ve re-examined our rich material of *S. spinipes* in ZMUM and ZIN and found a clear geographical trend in distribution of specimens with or without dark frontal spots, the trend permits to regard these specimens as two subspecies. Nominotypical *S. spinipes spinipes*, with black frontal spots, is distributed from W Europe to Central Yakutia, while *S. spinipes flavifrons* ssp. nov., without black frontal spots, is distributed from Central Yakutia to the Far East, the border between two subspecies runs at longitudes 119–129°E.

The examined material from the easternmost localities for the nominotypical subspecies was as follows:

Buryatia reg.: Tunka env., 51.7°N, 102.6°E, 750 m, 7–11.06.2021, N. Vikhrev, 3♂;

Kyren env., 51.7°N, 102.1°E, 750 m, 16–19.06.2021, N. Vikhrev, 2♂, 1♀ (ZMUM);

Irkutsk Reg., Slyudyanka, 51.68°N, 103.69°E, 480 m, 27–29.06.2021, N. Vikhrev, 1♀ (ZMUM);

Yakutia Reg.: Zhigansk (66.77°N, 123.37°E), 15.08.1973, K. Gorodkov, 1♂; *Olyokminsk* (60.37°N, 120.40°E), 31.08.1988, K. Gorodkov, 7♂, 3♀; *Yakutsk* (60.03°N, 129.73°E), 8–25.08.1927, Moskvina, 2♂, 1♀; *Olyokminsk* Distr., Biryuk R. near mouth of Melichan R. (60.5°N, 119.4°E), 13–14.07.2008, A. Ovchinnikov, 1♂, 1♀ (all ZIN).

The above outlined geographical distribution of the subspecies explains why only the subspecies with dark frontal spots was reported for Chinese fauna (Li & Yang 2017): few *S. spinipes* specimens examined by Chinese colleagues were from Xinjiang (90–100°E) or Shaanxi (105–110°E) provinces, these localities are to the west of line 119–129°E.

The dark frontal spots are used as a diagnostic character; for example, the presence of these spots (together with the structure of the surstyli) distinguishes *Sepedon ferruginosa*



Fig. 4. *Sepedon spangleri*, male, general view (photo by W. Murphy)

Рис. 4. *Sepedon spangleri*, самец, общий вид (фото: W. Murphy)

from *S. senex*. In our opinion, the absence of the dark frontal spots as the only diagnostic character is not enough for description of a new species, but together with a clear distributional trend it is well suitable for a subspecies level. It is also practically useful because the Far Eastern *S. spinipes flavifrons* subsp. nov. is sympatric with a similar *S. neanias*, but the absence of frontal spots allows to distinguish these species at the first glance.

Sepedon senex Wiedemann, 1830

Figs 4, 5, 15

Sepedon spangleri Beaver, 1974, **syn. nov.**

Type material of *S. spangleri*: Holotype, ♂ (Thailand), Bangkok, 28.02.1971, P. & P. Beaver (USNM). Other material: (Thailand), Bangkok, 3.12.1973, Yaovamayn, 1♂ (USNM).

Synonymy. We postponed the decision on validity of *S. spangleri* until the examination of the type material (Vikhrev & Yanbulat 2019: 47), now it is examined in USNM by Dr. W. Murphy and he has kindly sent us detailed images.

According to Beaver (1974: 88): “*Sepedon spangleri* is related to *S. senex* and *S. plumbella* Wiedemann, 1830, differing from those species in its smaller size and lack of distinct

apical infuscation on the hindfemur.” Beaver also indicated that *S. spangleri* differs from *S. senex* by “the basal abdominal tergites smooth [not transversely rugulose] and the 2nd antennal segment more than twice as long as the 3rd...”

Beaver reasonably compares *S. spangleri* with both *S. senex* and *S. plumbella*. The latter two species are closely related, they share the same anchor-shaped surstyli and the absence of the frontal or parafacial spots. However, *S. plumbella* clearly differs from both *S. senex* and *S. spangleri* by modified fore tarsi in males, so *S. spangleri* should be compared with *S. senex*. Our objections to Beaver’s taxonomic decision are listed below.

1. *S. senex* is smaller than *S. plumbella*. Specimens of the type series of *S. spangleri* fit the body length range of *S. senex*.

2. Indeed, the apex f_3 of *S. spangleri* is only slightly infuscated. We can add that specimens of *S. spangleri* have a brownish colour of the face, not yellow as is typical for *S. senex*. However, this colour variabilities are less distinct than that between the dark and yellow forms of the related *S. plumbella* (Yano 1978: 17); (Vikhrev & Yanbulat 2019: 52 and figs 31, 32). So, the colour



Fig. 5. *Sepedon spangleri*, male, antenna (photo by W. Murphy)

Рис. 5. *Sepedon spangleri*, самец, антенна (фото: W. Murphy)

variability indicated by Beaver should be regarded as an intraspecific one as well.

3. The transversal rugulosity of abdominal tergites is not an easy object for photographing, but in Murphy's photo of a male of *S. spangleri* (Fig. 4) it is still distinct that posterior part of tergite 2 is rugulose.

4. In *S. spangleri* (Fig. 5) and in more than 50 specimens of *S. senex* in ZMUM and ZIN collections the 2nd antennal segment is more than twice as long as the 3rd one.

Thus, we propose that *Sepedon senex* Wiedemann, 1830 = *S. spangleri* Beaver, 1974, **syn. nov.**

Key to Palaearctic *Sepedon* ♂♀

1. Two notopleural setae present. Katatergite with fine black hairs (except *S. hecate*). Face with a pair of black parafacial spots (in *S. spegea* these spots are on a dark background but still distinct) 2

— Only one notopleural seta (posterior) present. Katatergite always bare. Face always without black parafacial spots 5
 2. Head, thorax, and abdomen yellowish or brownish. Frons with black frontal spots (brownish on yellow background in *S. spinipes flavifrons* subsp. nov.). Prescutellar *dc* setae present 3
 — Head, thorax, and abdomen bluish-black. Frontal spots absent. Prescutellar *dc* setae absent. ♂: surstyli as in Fig. 13
 *spegea* 2*
 2*. Scape of antenna black. NW part of Eurasia *spegea spegea* Fabricius
 — Scape of antenna orange. SE part of Eurasia *spegea aenescens* Wiedemann
 3. Katatergite bare. Body length usually more than 8 mm. Brown to dark-brown species. Orbital spots elongate, touching eye margins or almost so (Fig. 8); frontal ridges

1



Figs 6–9. *Sepedon*, head: 6 — *S. s. spinipes*, lateral; 7 — *S. neanias*, lateral; 8 — *S. hecate*, dorsal; 9 — *S. s. spinipes*, dorsal

Рис. 6–9. *Sepedon*, голова: 6 — *S. s. spinipes*, сбоку; 7 — *S. neanias*, сбоку; 8 — *S. hecate*, сверху; 9 — *S. s. spinipes*, сверху



Figs 10–13. *Sepedon*, postabdomen and surstyli: 10 — *S. hecate*; 11 — *S. spinipes*; 12 — *S. neanias*; 13 — *S. sphegea* (12 and 13 from Li & Yang 2017)

Рис. 10–13. *Sepedon*, постабдомен и сурстии: 10 — *S. hecate*; 11 — *S. spinipes*; 12 — *S. neanias*; 13 — *S. sphegea* (12 и 13 из Li & Yang 2017)

much nearer to eye margins than to midfrons. (Posterior crossvein *m-cu* arched.)
 ♂: surstyli with stronger sclerotization and narrowed at apex (Fig. 10)
 *hecate* Elberg, Knutson & Rozkosny
 — Katatergite with several hairs. Body length usually less than 7.5 mm. Yellow or light brown species. Orbital spots rounded and widely separated from eye margins (Figs 1–3, 7, 9); frontal ridges nearer to midfrons than to eye margins 4
 4. Lower 1/3–1/4 of mid face with several hairs. Posterior crossvein *m-cu* always straight. Gena distinctly narrower than short axis of the ellipsoid eye (Fig. 7). Dark frontal spots present. (In the Russian Far East *S. neanias* is sympatric only with the eastern subspecies *S. spinipes flavifrons* subsp. nov., which has no distinct dark or-

bital spots, in contrast to *S. neanias*). ♂: surstyli reduced to a pair of short protrusions (Fig. 12) *neanias* Hendel
 — Lower 1/3 of face bare. Posterior crossvein *m-cu* arched. Gena as wide or wider than short axis of the ellipsoid eye (Fig. 6). ♂: surstyli not reduced, weakly sclerotised, rounded at apex (Fig. 11) *spinipes* 4*
 4*. Black orbital spots present (Figs 1, 9). Palearctic from W Europe to 120–130°E *spinipes spinipes* Scopoli
 — Black orbital spots absent (Figs 2, 3). Palearctic from 120–130°E to Pacific coast *spinipes flavifrons* subsp. nov.
 5. Orbital and apical scutellar setae absent, postalar setae weak. Foretarsus modified: *tar1-2* to *tar1-5* widened; *tar1-2* to *tar1-4* dark, *tar1-5* white; *tar2-5* and *tar3-5* also whitish, contrasting with adjacent tarso-



Figs 14–17. *Sepedon*, postabdomen and surstyli: 14 — *S. plumbella*; 15 — *S. senex*; 16 — *S. ferruginosa*; 17 — *S. lobifera* (from Li & Yang 2017)

Рис. 14–17. *Sepedon*, постабдомен и сурстии: 14 — *S. plumbella*; 15 — *S. senex*; 16 — *S. ferruginosa*; 17 — *S. lobifera* (из Li & Yang 2017)

- meres; in female these modifications also present but less distinct. (Frons with a pair of dark teardrop-shaped spots.) ♂: surstyli as in Fig. 17 *lobifera* Hendel
- Orbital and apical scutellar setae present. Foretarsus not modified as above 6
6. Frons with a pair of dark triangular spots. Inner surface of basal 1/3 of postpedicel bright yellow. ♂: legs unmodified; surstyli subtriangular in caudal view and with a characteristic upwardly directed brush at apex in lateral view (Fig. 16) *ferruginosa* Wiedemann
- Frontal spots absent. ♂: surstyli appearing as two halves of an anchor, central lobe rounded, lateral lobe sharpened at apices (Figs 14, 15) 7
7. ♂: *tar1-1* distinctly twisted and grooved and with elongated curved hairs. ♀: Body

- length 8–9 mm. Dorsal surface of second visible tergite smooth or rugulose only at base *plumbella* Wiedemann
- ♂: *tar1-1* unmodified. ♀: Body length 6.5–8 mm. Dorsal surface of second visible tergite entirely or mostly rugulose *senex* Wiedemann

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