

Three new species of the genus *Dolichopus* Latreille, 1796 (Diptera: Dolichopodidae) from Japan

Три новых вида рода *Dolichopus* Latreille, 1796 (Diptera: Dolichopodidae) из Японии

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Ключевые слова: Diptera, Dolichopodidae, *Dolichopus*, Япония, новые виды.

Abstract. Three new species of the genus *Dolichopus*: *D. ibarakiensis* Negrobov, Kumazawa, Tago, **sp. n.**, *D. tokyoensis* Negrobov, Kumazawa, Tago, **sp. n.** and *D. vicfursovi* Negrobov, Kumazawa, Tago, **sp. n.** are described from Japan. New species are close to *Dolichopus smirnovianus*, and can be distinguished from the latter by the following characters: wing stigma elongate and well-developed, hind basitarsus mostly yellow, with 3 strong setae and different morphology of hypopygium.

Резюме. Описано 3 новых вида рода *Dolichopus*: *D. ibarakiensis* Negrobov, Kumazawa, Tago, **sp. n.**, *D. tokyoensis* Negrobov, Kumazawa, Tago, **sp. n.** и *D. vicfursovi* Negrobov, Kumazawa, Tago, **sp. n.** из Японии. Новые виды близки к *Dolichopus smirnovianus*, от которого отличаются удлиненной и хорошо развитой стигмой крыла, в большей части желтыми задними базитарсусами с 3 крепкими щетинками и структурой гипопигия.

The genus *Dolichopus* Latreille, 1796 is the largest genus of Dolichopodidae with more than 600 species worldwide [Yang et al., 2006]. No revision of the genus in the Palearctic Region has been published since the monograph of Stackelberg [1930]. Negrobov et al. [2005] published the latest key to males of Palearctic species of *Dolichopus*.

In Japan 10 species of the genus were previously known: *Dolichopus bigeniculatus* Parent, 1926, *D. crassicauda* Parent, 1926, *D. gubernator* Parent, 1926, *D. kuznezovi* Negrobov et al., 2012, *D. mediovenus* Negrobov, 1977, *D. nitidus* Fallen, 1823, *D. plumipes* (Scopoli, 1763), *D. ptenopedilus* Meuffels, 1982, *D. satoi* Negrobov, Fursov et Selivanova, 2014, *D. triangularis* Smirnov, 1948 [Parent, 1926; Stackelberg, 1930; Saigusa,

2008; Tago, 2010; Maslova et al., 2012, 2014; Masunaga, 2014; Negrobov et al., 2014a, b].

The material for this study was collected by T. Tago in 2010 and 2011 from Saitama and Ibaraki Prefectures, and Tokyo Metropolis (Japan). We also investigated the collections of the Osaka Museum of Natural History (Japan) and the Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine (Kiev, Ukraine).

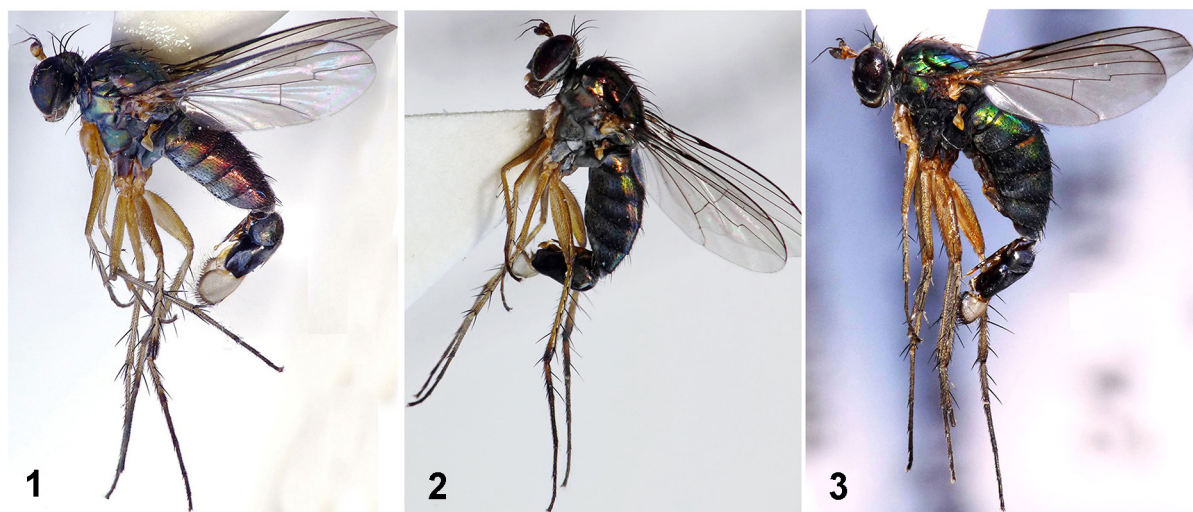
Holotypes and paratypes of new species are deposited in the Osaka Museum of Natural History (OMNH) and the Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine (IZU), some paratypes are deposited in the collections of the Zoological Institute of the Russian Academy of Sciences (ZIN, St. Petersburg, Russia) and Voronezh State University (VSU, Voronezh, Russia).

Dolichopus ibarakiensis Negrobov, Kumazawa et Tago,
sp. n.
(Figs 1, 4–6)

Material. Holotype, ♂: Japan, Ibaraki Pref., Tsuchiura City, Shishizuka-Ooike, 18.09.2011, leg. T. Tago (OMNH). Paratypes: 3♂, 4♀, at the same locality (OMNH, 2♂, 1♀ VSU).

Diagnosis. Face light yellow. Antenna yellow, apical part of postpedicel dark. Postocular bristles in ventral part of head light yellow. Legs yellow, apex of fore and mid tarsi and hind tarsomeres 2–5 dark, apex of hind tibia and hind basitarsus dark. Tarsomere of fore and mid legs simple. Fore tibia without apicoventral seta. Hind femur without long ventral seta. Wing finely infuscate, especially in the front, M_{1+2} with rudiment of M_2 .

Description. Male. Body length 3.3–3.8 mm, wing length 3.4–3.9 mm. Head. Face light yellow, without hairs, not reaching lower margin of eyes, its width in middle approximately equal to width of postpedicel (1 : 1.1). Proboscis dark-brown. Palpus



Figs 1–3. Habitus of *Dolichopus* species.

Рис. 1–3. Виды рода *Dolichopus*, внешний вид.

1 – *Dolichopus ibarakiensis* sp. n.; 2 – *Dolichopus tokyoensis* sp. n.; 3 – *Dolichopus vicfursovi* sp. n.

yellow with black bristles and yellow hairs. Frons shining green with grey pollination along margins. Antenna yellow, apical part of postpedicel dark. Postpedicel reniform with pointed apex, longer than wide. Stylus located in middle part of postpedicel, with very short hairs. Ratio of postpedicel length to its width to stylus length 1.4 : 1.1 : 3.8. Postocular bristles in ventral part of head light yellow, on upper part of head black.

Thorax green with bronze shade, pleura grey pollinose, with bronze spots. Mesonotum shining metallic. Proepisternum with black seta and white hairs. 6 strong dorsocentral bristles. Acrostichal setae well developed. Scutellum with 2 strong, 2 small black marginal bristles and with small hairs. Legs. Coxae with black seta and hairs. Middle and hind coxae dark, yellow at apex, with black setae and hairs. Legs yellow, apex of hind tibia and hind basitarsus dark, pulvilli white. Tarsomeres of fore and mid legs simple. Fore femur without strong seta and long hairs. Fore tibia without apicoventral seta, with 2 anterodorsal, 2 posterodorsal and 1 posteroventral setae. Length ratio of fore tibia and tarsus (from 1st to 5th): 6.6 : 3.3 : 1.4 : 1.1 : 0.6 : 0.5. Mid femur with 1 strong preapical bristle. Mid tibia with 4 anterodorsal, 2 posterodorsal and 1 posteroventral setae. Mid basitarsus without strong setae on the ventral side and with few small bristles. Length ratio of mid tibia and tarsus (from 1st to 5th): 7.5 : 4.6 : 2.5 : 1.8 : 1.1 : 0.9. Hind femur without long ventral seta, with 1 strong preapical seta. Hind tibia with 4 anterodorsal and 4 posterodorsal strong setae, 1 anteroventral seta and short ventral seta. Hind basitarsus with 3 strong setae. Length ratio of hind tibia and tarsus (from 1st to 5th): 9.8 : 4.3 : 4.3 : 2.9 : 2 : 1.1. Wing finely infuscate anteriorly, with elongate thickening on costal vein near apex of subcostal vein. R_{4+5} and M_{1+2} parallel at apex. M_{1+2} with rudiment of M_2 . Ratio of part of costa between R_{2+3} and R_{4+5} and that between R_{4+5} and M_{1+2} 3.4 : 1.6. Apical part of CuA_1 longer than $dm-cu$ – 3.4 : 2. Anal angle obtuse. Lower calypter yellow with black hairs. Halter yellow.

Abdomen shining green with bronze stripes along margins of segments, covered with black setae dorsally, sides with white pollen. Hypopygium black. Epandrium brown, oblong-oval with long appendage at base and straight top. Hypandrium on the left side with long sharp appendage. Apicoventral epandrial lobe yellow, broad, oblong-oval, with 2 bristles at apex. Cerci oval, yellow, with wide black border at apex, with serrated margin and sickle-shaped setae. Phallus on ventral side with tooth.

Female. Face whitish grey, wider than that in male. Ratio of postpedicel length to its width to face length 1 : 1.5 : 3.8. Wing with simple costal vein.

Etymology. The new species is named after the prefecture Ibaraki in Japan.

Dolichopus tokyoensis Negrobov, Kumazawa et Tago,
sp. n.

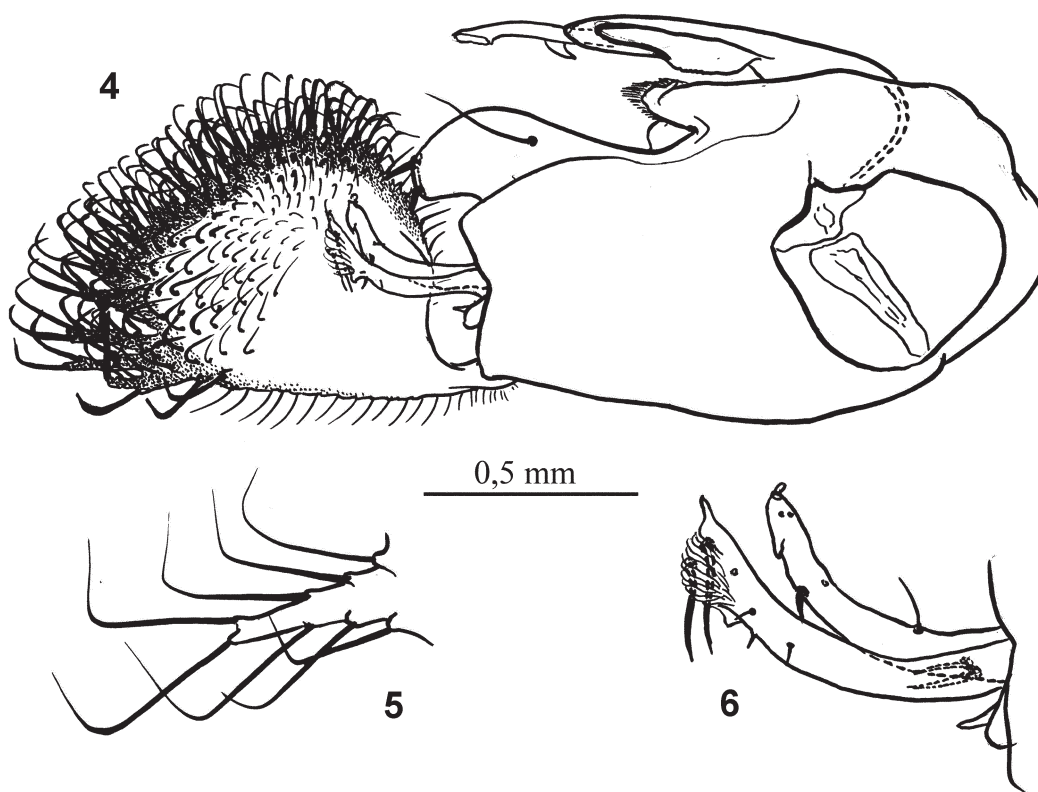
(Figs 2, 7–9)

Material. Holotype, ♂: Japan, Tokyo, Katsushika ward, Mizumoto, 18.04.2010, leg. T. Tago (OMNH). Paratypes: 5♂, at the same locality, 18.04.2010, 21.08.2010, 17.10.2010, leg. T. Tago (OMNH, 2♂ VSU).

Diagnosis. Face silvery-white. Antenna yellow, 2/3 of the apical part of postpedicel dark. Legs yellow, apex of hind tibia, apex of fore and mid tarsi, apex hind basitarsus, and 2–5 segments of hind tarsus dark. Fore tibia without apicoventral seta. Hind femur without long ventral seta. Wings finely infuscate anteriorly, M_{1+2} with rudiment of M_2 .

Description. Body length 2.4–2.8 mm, wing length 2.5–2.7 mm. Head. Frons shining green with a purple tint with grey pollination along the edges. Face silvery-white, without hairs, not reaching lower margin of eyes, its width in middle approximately equal to width of postpedicel. Proboscis dark-brown. Palpus yellow with black seta and hairs. Antenna yellow, 2/3 of apical part of postpedicel dark. Postpedicel reniform with pointed apex, longer than wide. Stylus located closer to apex of postpedicel, with very short hairs. Ratio of postpedicel length to its width to stylus length 1 : 0.8 : 2.6. Postocular bristles in ventral part of head light yellow, on upper part of head black.

Thorax green with bronze shade, pleura grey pollinose. Mesonotum shining metallic. Proepisternum with black seta and white hairs. 6 strong dorsocentral bristles. Acrostichal setae well developed. Scutellum with black 2 strong, 2 small marginal bristles and with small hairs. Middle and hind coxae dark, yellow at apex, with black seta and hairs. Legs yellow, apex of hind tibia, apex of fore and mid tarsi, apex of hind basitarsus, and 2–5 segments of hind tarsus dark, pulvilli white. Tarsomeres of fore and mid legs simple. Mid and hind femora with 1 strong preapical bristle. Fore femur without strong seta and long hairs. Fore tibia without apicoventral seta, with 2 anterodorsal, 2 posterodorsal and 1 posteroventral setae. Length ratio of fore tibia and tarsus (from 1st to 5th): 4.5 : 1.8 : 0.9 : 0.6 : 0.5 : 0.6. Mid tibia with 2–3 anterodorsal, 1 dorsal, 2 posterodorsal and 1 ventral setae. Mid basitarsus without strong setae on the ventral side and with few small bristles. Length ratio of mid tibia and tarsus (from 1st to 5th): 6.2 : 3.3 : 1.6 : 1.4 : 1 : 0.8. Hind femur without long ventral seta, with 1 strong preapical seta. Hind tibia with 5 anterodorsal, 5 posterodorsal strong setae, 1 ventral seta and short ventral seta. Hind basitarsus with 3 strong setae. Length ratio of hind tibia and tarsus (from 1st to 5th): 9.4 : 3 : 3.4 : 2.1 : 1.7 : 1.2. Wing finely infuscate anteriorly, with well-developed

Figs 4–6. *Dolichopus ibarakiensis* sp. n.

4 – hypopygium, lateral view; 5 – surstylus, lateral view; 6 – tip of sickle-shaped setae of cerci.

Рис. 4–6. *Dolichopus ibarakiensis* sp. n.

4 – гипопигий, вид сбоку; 5 – сурстили, вид сбоку; 6 – вершины серповидных щетинок церок.

elongate thickening on costal vein near apex of subcostal vein. R_{4+5} and M_{1+2} convergent at apex. M_{1+2} with rudiment of M_2 . Ratio of part of costa between R_{2+3} and R_{4+5} and that between R_{4+5} and M_{1+2} 2.1 : 0.9. Apical part of CuA_1 longer than $dm-cu$ – 2.8 : 1.6. Anal angle obtuse. Lower calypter yellow with black hairs. Halter yellow.

Abdomen shining green with bronze stripes along margins of segments, covered with black setae dorsally. Epaudrium brown, oblong-oval with long wedge-shaped appendage at base. Apicoventral epaudrial lobe yellow, broad, triangular in shape, with pointed apex on dorsal side, with strong seta on top. Phallus on top with short ventral tooth. Cerci oval, yellow, with wide black border at apex, with serrated margin and sickle-shaped setae.

Female unknown.

Etymology. The species is named after the prefecture of collection, Tokyo Metropolis.

Dolichopus vicfursovi Negrobov, Kumazawa et Tago, sp. n.
(Figs 3, 10–11)

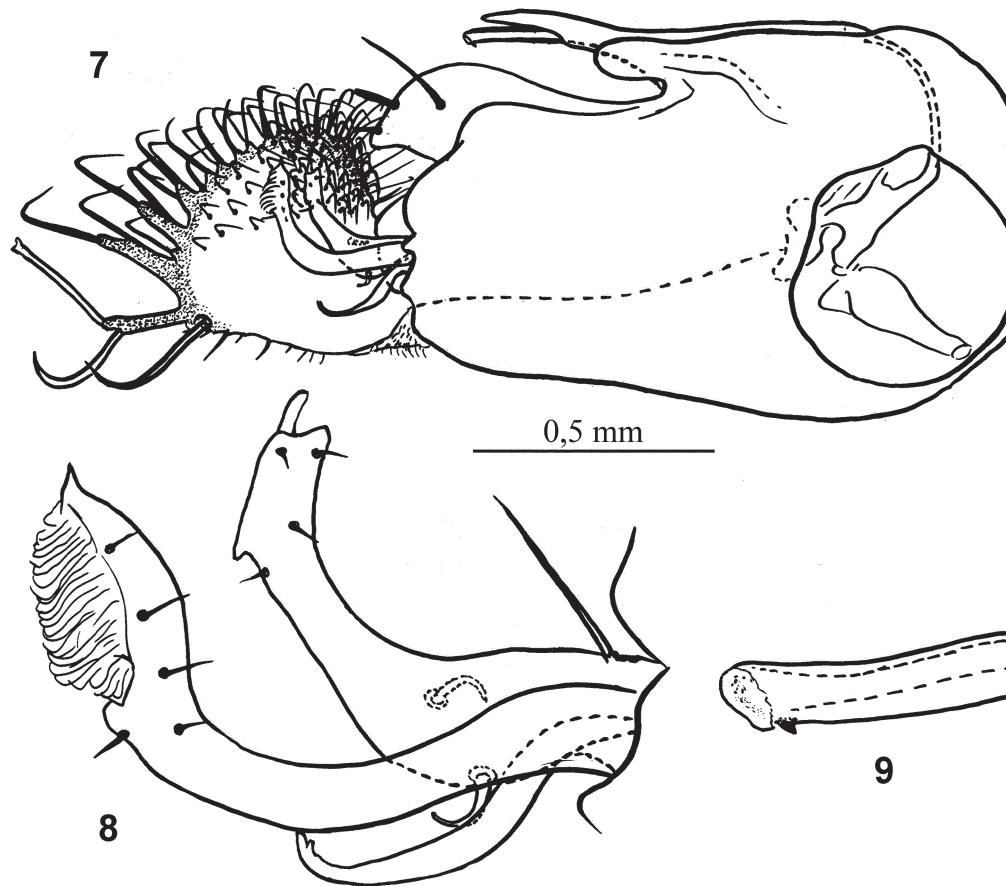
Material. Holotype, ♂: Japan, Honshu, Ibaraki Pref., Tsukuba, Sakuragaoka, 5.05.1997, leg. V. Fursov (ZIN). Paratypes: 4♂, 1♀, Japan, Honshu, Ibaraki Pref., Tsukuba, Sakuragaoka, 5.05.1997, leg. V. Fursov; 1♂, Japan, Honshu, Ibaraki Pref., Tsukuba, Sakuragaoka, Kukisakimachi, 19.04.1997, leg. V. Fursov; 1♂, Japan, Honshu, Aichi Pref., Nagoya, Shiogama-guchi, Tenpaku-ru, 29.05.1999, leg. V. Fursov; 1♂, Japan, Honshu, Aichi Pref., Nagoya, Nagakute-cho Park, 13.06.1999, leg. V. Fursov; 10♂, 2♀, Japan, Saitama Pref., Misato City, Edogawa River bank, 21, 24, 29.07.2011, leg. T. Tago (ZIN, OMNH and VSU).

Diagnosis. Face silvery-white. Antenna yellow, 2/3 of the apical part of postpedicel dark. Stylus located in the middle part of postpedicel. Postocular bristles in ventral part of head light yellow. Legs yellow, apex of front and

middle tarsus and 2–5 segments of hind tarsus dark. Tarsomere of fore and mid legs not expanded. Fore tibia without apicoventral seta. Hind femur without long ventral seta. Wing finely infuscate, at top with dark spot, M_{1+2} with rudiment of M_2 .

Description. Male. Body length 2.8–3.3 mm, wing length 3.2–3.4 mm. Head. Face silvery-white, without hairs, not reaching lower margin of eyes, its width in middle approximately equal to width of postpedicel. Proboscis dark-brown. Palpus yellow with black seta and hairs. Frons shining green with purple tint and grey pollination along margins. Antenna yellow, 2/3 of apical part of postpedicel dark. Postpedicel reniform with pointed apex, longer than wide. Stylus located in middle part of postpedicel, with very short hairs. Ratio of postpedicel length to its width to stylus length 1.6 : 1 : 3.6. Postocular bristles in ventral part of head light yellow, on upper part of head black.

Thorax green with bronze shade, pleura grey pollinose, with bronze spots. Mesonotum shining metallic. Proepisternum with black seta and white hairs. 6 strong dorsocentral bristles. Acrostichal setae well developed. Scutellum with 2 strong, 2 small black marginal bristles and with small hairs. Legs. Coxae with black setae. Middle and hind coxae dark, yellow at apex, with black setae and hairs. Legs yellow, apex of front and middle tarsus and 2–5 segments of hind tarsus dark, pulvilli white. Tarsomeres of fore and mid legs simple. Fore femur without strong setae and long hairs. Fore tibia without apicoventral seta, with 2 anterodorsal, 2 posterodorsal and 1 posteroventral setae. Length ratio of fore tibia and tarsus (from 1st to 5th): 5.8 : 3.1 : 1.3 : 0.9 : 0.7 : 0.5. Mid femur with 1 strong preapical bristle. Mid tibia with 4 anterodorsal, 2 posterodorsal and 1 posteroventral setae. Mid basitarsus without strong setae on the ventral side and with few small bristles. Length ratio of mid tibia and tarsus (from 1st to 5th): 10 : 8.8 : 4.7 : 2.6 : 2 : 1. Hind femur without long ventral setae, with 1 strong preapical

Figs 7–9. *Dolichopus tokyoensis* sp. n.

7 – hypopygium, lateral view; 8 – surstylus and postgonit, lateral view; 9 – tip of aedeagus.

Рис. 7–9. *Dolichopus tokyoensis* sp. n.

7 – гипопигий, вид сбоку; 8 – сурстили и постгонит, вид сбоку; 9 – вершина эдеагуса.

seta. Hind tibia with 4 anterodorsal, 6 posterodorsal strong setae, 1 anteroventral seta and short ventral seta. Hind basitarsus with 3 strong setae. Length ratio of hind tibia and tarsus (from 1st to 5th): 9.4 : 3.9 : 4 : 2.7 : 1.8 : 1.1. Wing finely infusate anteriorly, at top with dark spot, with well-developed elongate thickening on costal vein near apex of subcostal vein. R_{4+5} and M_{1+2} parallel at apex. M_{1+2} with rudiment of M_2 . Ratio of part of costa between R_{2+3} and R_{4+5} and that between R_{4+5} and M_{1+2} 2.5 : 1.3. Apical part of CuA_1 longer than $dm-cu$ – 3.3 : 1.8. Anal angle obtuse. Lower calypter yellow with black hairs. Halter yellow.

Abdomen shining green with bronze tint and with dark bronze stripes along margins of segments, covered with black setae. Hypopygium large. Epandrium brown, oblong-oval with long appendage at base. Apicoventral epandrial lobe yellow, broad, straight at apex, with 8 strong setae at apex. Cerci yellow, with wide black border at apex, with serrated margin and sickle-shaped setae, triangular from ventral aspect.

Female. Face grey, wider than that in male. Ratio of postpedicel length to its width to face length 1.3 : 2.1 : 3.4. Wing with simple costal vein.

Etymology. The new species is named for Dr. Victor Fursov (Kiev, Ukraine), who collected part of the type series.

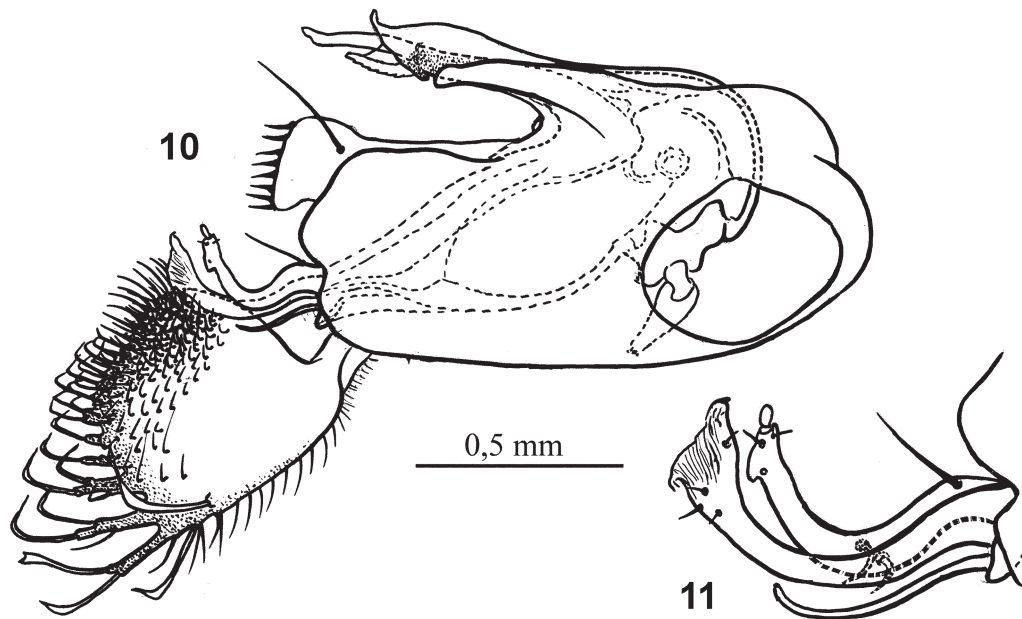
Remarks

In the key to Palearctic species [Negrobov et al., 2005], new species *Dolichopus ibarakiensis* sp. n.,

D. vicfursovi sp. n. and *D. tokyoensis* sp. n. run to *Dolichopus smirnovianus* Negrobov, 1977 and can be distinguished from the latter by following characters:

1. Wing without stigma. Hind basitarsus black, with 2 setae *Dolichopus smirnovianus*
– Wing stigma well-developed, elongate. Hind basitarsus mostly yellow, with 3 setae 2
2. Face light yellow. Wing stigma long, running behind posterior transverse wing vein. Cerci large, their ventral side rounded *Dolichopus ibarakiensis* sp. n.
– Face silvery white. Stigma short, about 3–4 times longer than its width 3
3. Postpedicel length approximately 1.5 times greater than its width. Wing at top with dark spot. Apicoventral epandrial lobe straight at apex, with 8 strong setae at apex *Dolichopus vicfursovi* sp. n.
– Postpedicel length about or barely greater than its width. Wing without dark spot. Apicoventral epandrial lobe with pointed apex, with 2 strong setae at apex
..... *Dolichopus tokyoensis* sp. n.

In the key to species of this genus from China [Yang et al., 2011], new species run to *Dolichopus ringdahli* Stackelberg, 1929 and can be distinguished from the latter by following characters:



Figs 10–11. *Dolichopus vicfursovi* sp. n.
 10 – hypopygium, lateral view; 11 – surstylus and postgonite, lateral view.
 Рис. 10–11. *Dolichopus vicfursovi* sp. n.
 10 – гипопигий, вид сбоку; 11 – сурстили и постгонит, вид сбоку.

- Costa without stigma. Antenna black. M_{1+2} without rudiment of M_2 *Dolichopus ringdahli*
- Costa with stigma. Antenna yellow, apical part of postpedicel dark. M_{1+2} with rudiment of M_2
 *Dolichopus ibarakiensis* sp. n., *Dolichopus vicfursovi* sp. n. and *Dolichopus tokyoensis* sp. n.

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