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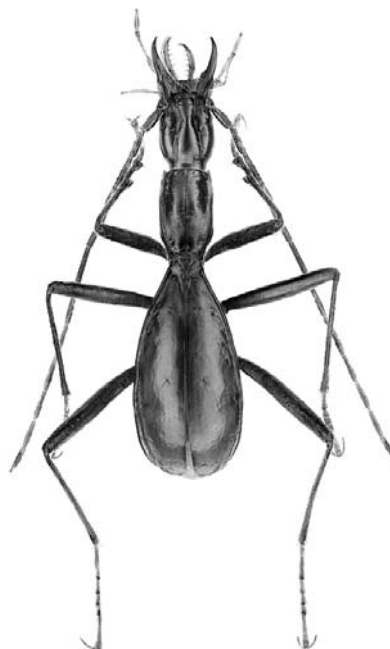


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## The *Rhaphium crassipes* species group in the Palearctic Region with the description of a new species from Uzbekistan (Diptera: Dolichopodidae)

### Палеарктические виды группы *Rhaphium crassipes* и описание нового вида из Узбекистана (Diptera: Dolichopodidae)

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**Key words:** Dolichopodidae, Dolichopodinae, *Rhaphium*, Palearctic, Uzbekistan, new species, key, systematics.

**Ключевые слова:** Dolichopodidae, Dolichopodinae, *Rhaphium*, Палеарктика, Узбекистан, новый вид, определитель, систематика.

**Abstract.** The *Rhaphium crassipes* species group in the Palearctic Region is defined and reviewed. It comprises 13 species including one new species. The species group is differentiated from other *Rhaphium* by the male mid tarsomeres 4 and 5, which are black, dilated and flattened dorsoventrally. New species *Rh. samarkandiense* Negrobov et Grichanov, **sp. n.** from Uzbekistan is described. *Rh. johnrichardi* Negrobov et Grichanov, **nom. nov.** (new name for *Rh. vockerothi* Negrobov, 1979 nec Robinson, 1964) is firstly described and illustrated. *Rh. viklundi* Grichanov, 2004 is placed in synonymy to *Systemus bipartitus* (Loew, 1850) (**syn. n.**). A key to the species group is provided, as well as new records for known species.

**Резюме.** Дан обзор палеарктических видов группы *Rhaphium crassipes*, которая содержит 13 видов, включая один новый для науки. Группа отличается от других видов рода строением средней лапки самцов (апоморфия), два последних членика которой всегда черные, сплющены и более или менее расширены. Описаны и иллюстрированы *Rh. samarkandiense* Negrobov et Grichanov, **sp. n.** из Узбекистана и *Rh. johnrichardi* Negrobov et Grichanov, **nom. nov.** (новое название для *Rh. vockerothi* Negrobov, 1979 nec Robinson, 1964). *Rh. viklundi* Grichanov, 2004 сведен в синонимы к *Systemus bipartitus* (Loew, 1850) (**syn. n.**). Приведены определитель и новые указания для известных видов группы.

#### Introduction

The *Rhaphium* Meigen, 1803 is mainly Holarctic genus with about 190 known species [Yang et al., 2006]. Negrobov [1979] has published last revision and key to Palearctic species of the genus. Later 3 new species and one subspecies of the Nearctic species were described from the Russian Far East and Siberia [Negrobov, 1986], 1 from

Georgia [Negrobov, Onishchenko 1991], 6 new species from Palearctic China [Yang, 1998; Wang et al., 2005] and 1 from Finland [Kahanpää, 2007]. Naglis [2009] has placed 3 species names proposed by Vaillant [1983] in synonymy and removed *Rh. viklundi* Grichanov, 2004 from *Rhaphium*. After the study of type material a new synonymy is here established: *Systemus bipartitus* (Loew, 1850) = *Rhaphium viklundi* Grichanov, 2004, **syn. n.**

Negrobov [1986] has published a key to Palearctic and Nearctic species of *Rh. nasutum* species group, Wang et al. [2005] have compiled a key to Palearctic and Oriental *Rhaphium* species found in mainland China, and Naglis [2009] has published a key to Palearctic species of *Rh. albifrons* species group. Here we describe 1 new species from Uzbekistan and define the limits of the *Rh. crassipes* species group, which comprises 13 species. *Rh. johnrichardi* Negrobov et Grichanov **nom. nov.** (new name for *Rh. vockerothi* Negrobov, 1979 nec Robinson, 1964) is firstly described and illustrated. New records for known species are given. *Rh. latimanum* Kahanpää, 2007 is a new species for Russia.

#### Material and methods

The holotype of the new species described in this study is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg (ZIN). Other material cited is deposited in ZIN, in the Zoological Museum of Moscow State University, Russia (ZMU) and Voronezh State University, Voronezh, Russia (VSU).

Morphological terminology follows Grichanov [2007] and Cumming and Wood [2009]. The relative lengths of the podomeres should be regarded as representative ratios and not measurements. Body length is measured from the base of the antenna to the tip of abdominal segment 7. Wing length is measured from the base to the wing apex. Male

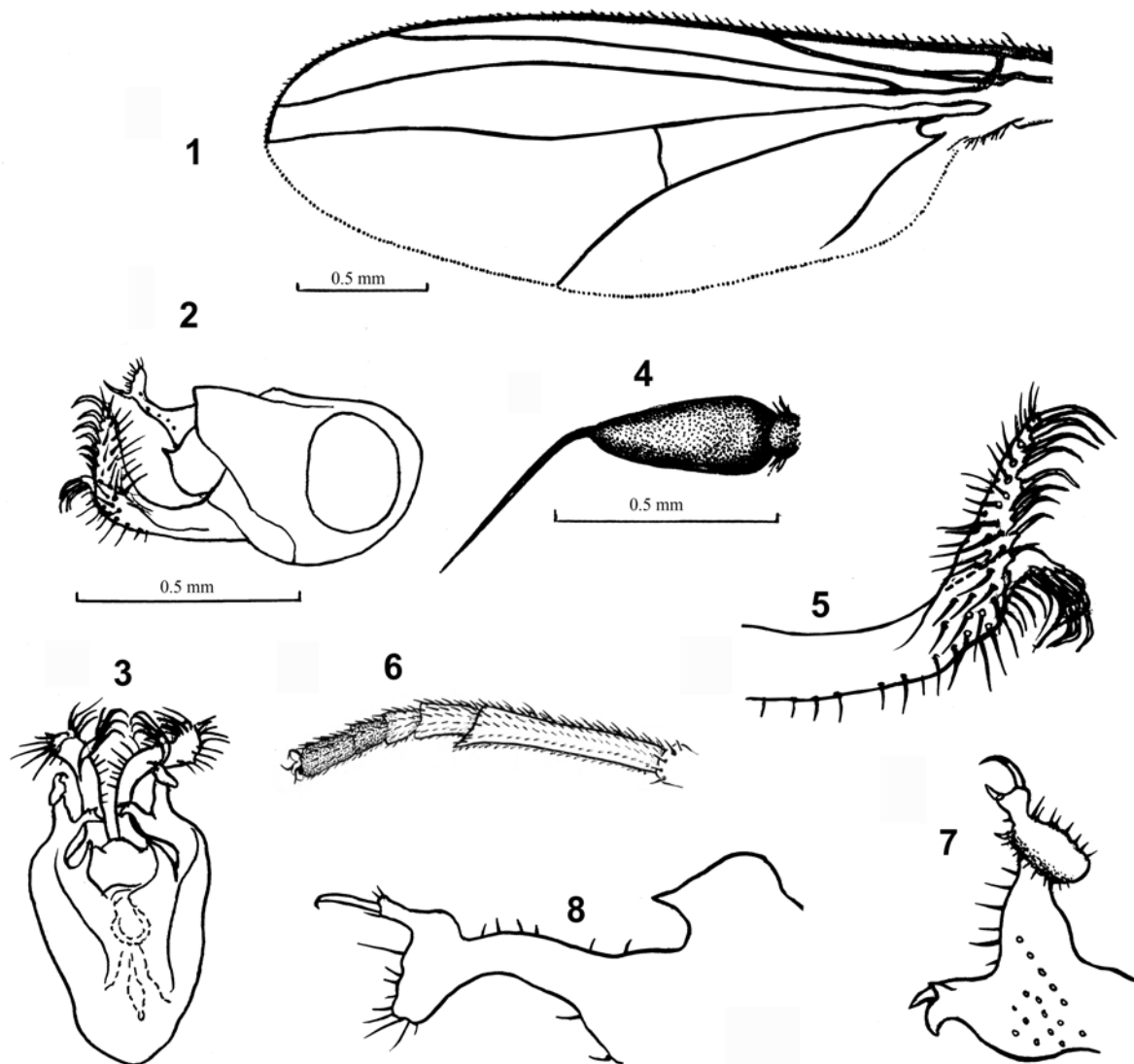


Fig. 1–8. *Rhapsium samarkandiense* Negrobov et Grichanov, *sp. n.*

1 – wing; 2 – hypopygium, left lateral aspect; 3 – hypopygium, ventral aspect; 4 – antenna; 5 – cercus, lateral aspect; 6 – fore tarsus, lateral aspect; 7 – surstylus, dorsolateral aspect; 8 – surstylus, ventral aspect.

Рис. 1–8. *Rhapsium samarkandiense* Negrobov et Grichanov, *sp. n.*

1 – крыло; 2 – гипопигий, вид слева; 3 – гипопигий, вентрально; 4 – усик; 5 – церка, вид сбоку; 6 – передняя лапка, вид сбоку; 7 – сурстий, дорсо-латерально; 8 – сурстий, вентрально.

genitalia were macerated in 10% KOH. Figure showing the male genitalia in lateral view are oriented as they appear on the intact specimen (rotated 180° and lateroflexed to the right), with the morphologically ventral surface of the genitalia facing up, dorsal surface down, anterior end facing right and posterior end facing left. Distribution of known species follows those of Negrobov [1991] and Grichanov [2006, 2007].

*Rhapsium samarkandiense* Negrobov et Grichanov,

*sp. n.*

(Fig. 1–8)

**Type material.** Holotype ♂: Uzbekistan: Samarkand env., Dargom river bank, on wet ground at water edge, 18.06.1982, coll. Grichanov [ZIN].

**Description.** Male. Head: face silvery white, not reaching lower eye margins, in middle barely less wider than postpedicel height (8/10). Proboscis brown, palps dark-red, silvery pollinose, with white hairs. Frons green, silvery pollinose. Antenna (fig. 4) black; postpedicel elongate-triangular, gradually narrowing apicad, 2.5 times as long as width at base; stylus apical. Length ratio of postpedicel to stylus, 2.6/3.1. Lower postocular setae white.

Thorax green; mesonotum shining with bronze tinge; pleura greyish-white pollinose. Propleuron with fine white hairs. 5 pairs of strong dorsocentral setae with small seta anteriorly; acrostichals biseriata, in anterior 2/3 of mesonotum. Scutellum with 2 strong marginal setae.

Legs: with coxae green, white haired; mid tarsus with black apical spine of dense setae; hind tarsus without strong seta, with group of white hairs. Trochanters, fore and mid femora at base and at apex, hind femur mainly, fore and mid tibia, 1<sup>st</sup>–3<sup>rd</sup> segments of

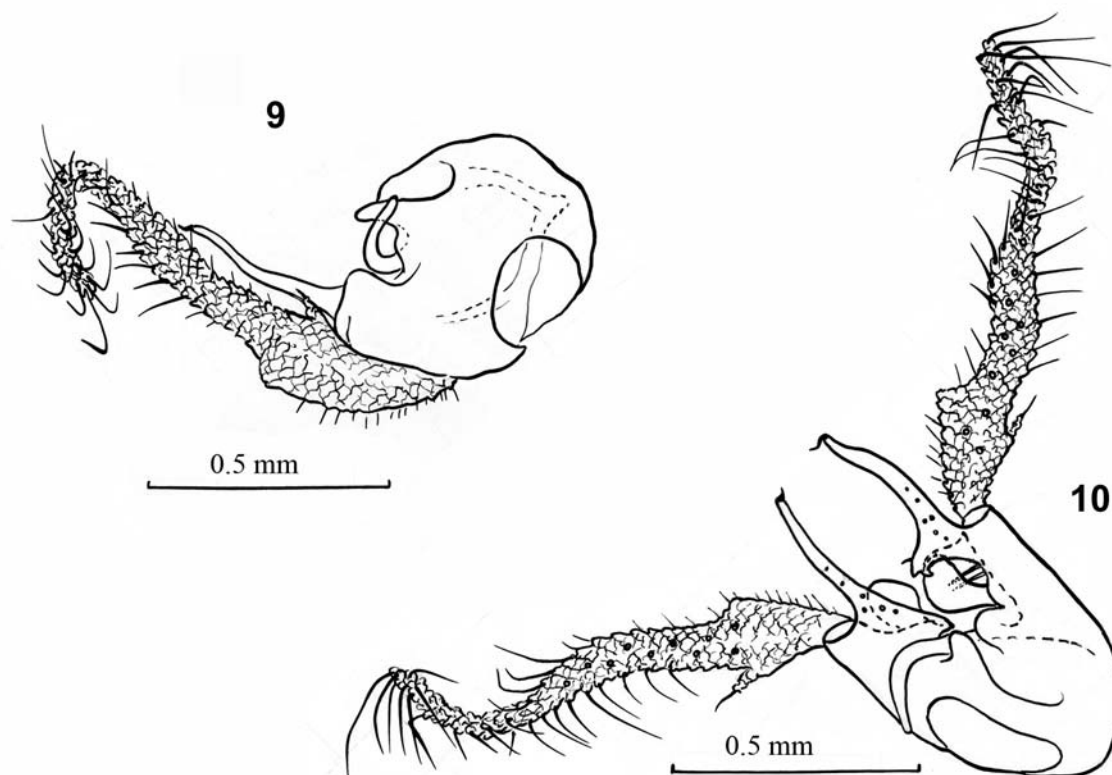


Fig. 9–10. *Rhaphium johnrichardi* Negrobov et Grichanov, **nom. nov.**  
 9 – hypopygium, left lateral aspect; 10 – hypopygium, ventral aspect.  
 Рис. 9–10. *Rhaphium johnrichardi* Negrobov et Grichanov, **nom. nov.**  
 9 – гипопигий, вид слева; 10 – гипопигий, вентрально.

fore and mid tarsi yellow; fore and mid femora mostly, hind femur in distal third, 4–5<sup>th</sup> segments of fore and mid tarsi, hind tibia at apex and hind tarsus dark. Femora without long hairs. Fore basitarsus with triangular ventral process at apex; 2<sup>nd</sup>–3<sup>rd</sup> segments of same tarsus thickened ventrally at apex; 4–5<sup>th</sup> segments of fore and mid tarsi slightly widened; fore tibia with 2–3 short anterodorsal setae and with row of very short posteroventral setae. Mid femur with black subapical seta; mid tibia with 3 anterodorsal, 3 posterodorsal, 1 anteroventral setae; mid basitarsus with 2–3 strong black ventral setae. Hind tibia slightly thickened, with 4 dorsal and 3 posterodorsal setae; hind basitarsus slightly thickened, without strong setae. Fore leg length ratio (from tibia to tarsomere 5): 65/31/8/7/6/8; mid leg: 82/38/18/13/8/7; hind leg: 105/30/28/20/13/10.

Wing (fig. 1) slightly darkened;  $R_{4+5}$  and  $M_{1+2}$  parallel at apex;  $M_{1+2}$  slightly curved in distal part. Ratio of part of costa between  $R_{2+3}$  and  $R_{4+5}$  to this between  $R_{4+5}$  and  $M_{1+2}$ , 37/13. Ratio of basal and apical parts of  $M_{1+2}$ , 90/105. Ratio of *m-cu* to distal part of  $CuA_1$ , 25/43. Lower calypter yellow, with yellowish-white cilia; halter yellow.

Abdomen green, with bronze tinge along margins of segments; shining dorsally, silvery-white pollinose laterally and ventrally. Setae and hairs black; 1<sup>st</sup> segment laterally and ventrally with white hairs. Hypopygium (fig. 2–3) hidden, with only cerci free, dark-brown; surstylus (fig. 7–8) curved ventrad, hook-like, widened at apex, with straight apical process, with 2 bladelike processes at base. Cercus shorter than epandrium, bilobate, with longer lateral lobe, with long hairs, with setae at apex and in basal half dorsally (fig. 5).

Female unknown.

Length (mm): body 3.7, wing 3.3.

**Diagnosis.** The new species is included in *Rhaphium crassipes* group. This species group belongs to former subgenus *Porphyrops* Meigen, 1824, differing distinctly from all other Palearctic *Rhaphium*, first of all, in male mid tarsomeres 4 and 5 being black, dilated and flattened dorsoventrally (apomorphy). Hind coxa without strong external seta, with hairs only; fore tarsomeres 2 to 5 often shortened; postpedicel relatively short; antennal stylus simple; face silvery white (but black in *Rh. neolatifacies*). Male cercus usually elongated, often with small lateral lobe; surstylus often thin and pointed at apex. Members of related Palearctic *Rhaphium confine* species group differ in 4<sup>th</sup> segment of mid tarsus simple; only 5<sup>th</sup> segment of mid tarsus more or less distinctly widened. *Rh. samarkandiense* **sp. n.** keys to *Rh. bidilatatum* (Parent) (see key below), differing in mainly black femora and in morphology of hypopygium.

*Rhaphium johnrichardi* Negrobov et Grichanov,  
**nom. nov.**  
 (Fig. 9–10)

= *Rhaphium vockerothi* Negrobov, 1979: 479 (in key) (nec Robinson, 1964).

Type locality: Russia: Maritime Territory, Sikhote Alin reserve, Ust-Serebryannyi cordon. Palearctic: Russia (Primorsk Prov.).

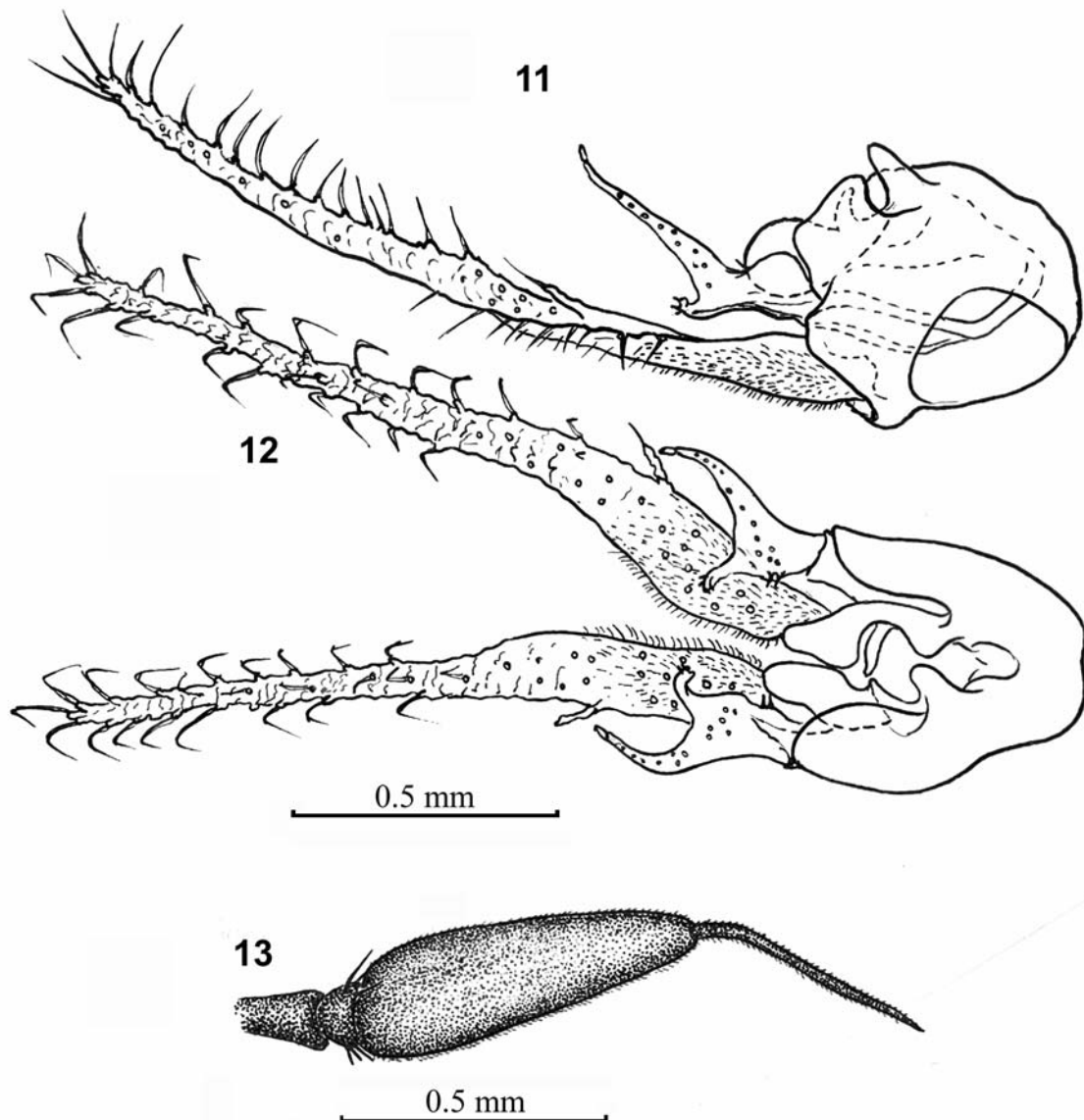


Fig. 11–13. *Rhaphium patellitarse* (Becker, 1900).  
 11 – hypopygium, left lateral aspect; 12 – hypopygium, ventral aspect; 13 – antenna.  
 Рис. 11–13. *Rhaphium patellitarse* (Becker, 1900).  
 11 – гипопигий, вид слева; 12 – гипопигий, вентрально; 13 – усик.

**Type material.** Holotype ♂: [Russia:] Maritime Territory, Sikhote Alin reserve, Ust-Serebryanyi cordon, 18.06.1974, coll. Zlobin [ZIN]. Paratypes: 1♂, same label, 21.06.1974; 1♂, Primorje, Sichote-Alinskiy reserve, 3.07.1974 (Zlobin) [ZIN].

**Additional material:** 1♂, Vladivostok, Sedanka, 23.05.1998, coll. Zinovyev [ZIN].

**Description.** Male. Head: frons metallic-green, shining, grey pollinose; face silvery white, half as wide as postpedicel width. Proboscis brownish-yellow; palps reddish-yellow at base, yellow at apex, with white hairs. Antenna black; postpedicel elongate-triangular; stylus simple, apical. Ratio of postpedicel length to its height to stylus length, 4.6/1.6/4.1. Lower postocular setae white.

Thorax green; mesonotum shining; pleura grey pollinose. Propleuron with fine white hairs. 6 pairs of strong dorsocentral setae; acrostichals well developed; posterior ones longer than distance between dorsocentrals and acrostichals. Scutellum with 2 strong marginal setae and 4 fine lateral hairs.

Legs: mainly black; fore and mid femora at apex, fore and mid tibia, 1<sup>st</sup>–3<sup>rd</sup> segments of fore and mid tarsi yellow; fore and mid

coxae white haired; mid tarsus with black apical setae not forming spine; hind tarsus without strong seta, with white hairs. Fore femur with long posterior hairs and 1–2 small subapical posterior setae. Fore tibia with 2–3 anterodorsal and 2 posterodorsal setae. Fore basitarsus with oval ventral thickening at apex; 4<sup>th</sup> segment of fore tarsus and 4–5<sup>th</sup> segments of mid tarsus slightly widened. Mid femur with white hairs, with black subapical seta anteriorly and posteriorly; mid tibia with 2 anterodorsal, 2 posterodorsal, 1 anteroventral and 1 posteroventral setae. Hind femur without long hairs; hind tibia with 2 anterodorsal and 2 posterodorsal setae; hind basitarsus simple, without strong setae. Fore leg length ratio (from tibia to tarsomere 5): 82/39/16/12/8/9; mid leg: 111/59/28/24/5/8; hind leg: 165/58/48/33/20/16.

Wing slightly darkened, veins yellow;  $R_{4+5}$  and  $M_{1+2}$  convergent, parallel at apex;  $M_{1+2}$  slightly curved in distal part. Ratio of part of costa between  $R_{2+3}$  and  $R_{4+5}$  to this between  $R_{4+5}$  and  $M_{1+2}$ , 58/18. Ratio of basal and apical parts of  $M_{1+2}$ , 131/135. Ratio of *m-cu* to distal part of  $CuA_1$ , 31/63. Lower calypter yellow, with yellowish-

white cilia; halter yellow.

Abdomen green, grey pollinose; setae and hairs mainly black; sternites and 1<sup>st</sup>–4<sup>th</sup> tergites with white hairs. Hypopygium (fig. 9–10) dark, hidden, with only cerci free, dark-brown; surstylus black, brown at apex, curved ventrad, hook-like, strongly thickened at base, reaching 4<sup>th</sup> segment of abdomen. Cercus long, narrow, widened at base, much longer than epandrium, with short ventral process at base, with long white hairs ventrally and at apex, reaching 3<sup>rd</sup> segment of abdomen.

Female unknown.

Length (mm): body 4.2–4.7, wing 4.2–4.4.

**Remark and diagnosis.** *Rh. vockerothi* Negrobov was included in key to Palearctic species [Negrobov, 1979], but its description was never published. The name was preoccupied by Robinson [1964]; therefore, we give here a new species name in honour of dipterologist John Richard Vockeroth. *Rh. johnrichardi* **nom. nov.** is close to *Rh. gravipes* Haliday (see key below), differing in hind basitarsus simple, hypopygial cercus in distal half being thicker than surstylus, bearing small process at base. *Rh. gravipes* has setose hind basitarsus, cercus being thinner than surstylus, simple.

## New records

### *Rhaphium crassipes* (Meigen, 1824)

**Material.** Russia: 3♂, Chersky Peak, Irkutsk Region, 14.07.1984, Zlobin [ZIN]; 2♂, Zhupanovo, Kamchatka, 30.07.1985, Zlobin [ZIN]; 1♂, Polar Ural, 141 km station, Krasnyi Kamen Mt. slope, tundra at lakes, 400 m, 6.07.1994, Malozemov [ZIN]; 1♂, Moscow Region, Burtsevo env., 55°58.708 N / 35°35.390 E, 25.05.2006, A.L. Ozerov [ZMU]; 1♂, 60 km N Narjan Mar, Pechora river, 10.07.2008, N. Vikhrev [ZMU]; 1♂, Voronezh Reserve, 16.05.1982, sweeping on grass in oak forest, Fursov; 4♂, Caucasian Reserve, Abago pasture, 25.06.1982, Fursov; 1♂, Teberda Reserve, 15.05.1986, Negrobov [VSU]; 2♂, 32 km S Irkutsk, 11.06.1975, floodplain, Rikhter [VSU].

### *Rhaphium dichromum* Negrobov, 1976

**Material.** Russia: 4♂, [Republic of Altay:] Ulagansk distr., Kuraiskii ridge, 2500–2800 m, 50°33' N / 87°75' E, 3.07.2008, tundra, Barkalov [VSU]; 1♂, Magadan Region, 15 km SSE Atka vil., 29.06.1981, rivulet bank, sweeping on grass and moss, Lebedev [VSU].

### *Rhaphium latimanum* Kahanpää, 2007

**Material.** Russia: 34♂, Yamalo-Nenets Okrug, South Yamal, Khadyta River, 15–19.07.1978, Tolstykh [VSU]; 5♂, Khaptagai, 35 km from Yakutsk, Lena River right bank, 5–7.06.1974, Bagachanova [VSU]; 1♂, 24 km W Magadan, Snezhnyi vil., 10.07.1975, sweeping on cereals, Barkalov [VSU].

### *Rhaphium patellitarse* (Becker, 1900) (Fig. 11–13)

**Material.** Russia: 3♂, [Republic of Altay:] Ulagansk distr., Kuraiskii ridge, 2500–2800 m, 50°33' N / 87°75' E, 3.07.2008, tundra, Barkalov [VSU]; 3♂, Barguzinsk Reserve, 16–24.07.1965, birch-firry forest, at rivulet [VSU]; 1♂, Voikar River basin, B. Ural, Obdorsk, 20.08.1925, Fridolin [VSU].

### *Rhaphium tridactylum* (Frey, 1915)

**Material.** Russia: 2♂, Sakhalin, Urozhaynoe, 16.06.1973, Logvinovskiy [VSU].

## Key to Palearctic species of the *Rhaphium crassipes* group

1. Face black; 5 ..... *neolatifacies* Yang et Wang  
– Face silvery white ..... 2
2. 5<sup>th</sup> segment of mid tarsus strongly widened, usually convex laterally ..... 3  
– 5<sup>th</sup> segment of mid tarsus weakly widened, with straight margins ..... 6
3. 5<sup>th</sup> segment of mid tarsus wider than long; 3.7–4.2 .....  
..... *latimanum* Kahanpää  
– 5<sup>th</sup> segment of mid tarsus longer than wide ..... 4
4. Femora yellow; cercus forked; 4.5 ..... *bidilatatum* (Parent)  
– Femora mostly dark ..... 5
5. Cercus with very small appendage at basal third bearing single cilium, with rows of hairs in distal half; 4.8 .....  
..... *patellitarse* (Becker)  
– Cercus forked near middle, with unequal lobes and bunches of hairs at apex of both lobes; 4.4–5.2 ..... *crassipes* (Meigen)
6. Mid coxa with ventral setae forming spine ..... 7  
– Mid coxa without spine ..... 10
7. Cercus forked; femora mostly dark; 3.7 .....  
..... *samarkandiense* **sp. n.**  
– Cercus not forked ..... 8
8. Mid coxa with ventral spine of light setae; femora yellow; 2.8–3.1 .....  
..... *turanicola* (Stackelberg)  
– Mid coxa with ventral spine of dark setae; femora dark ..... 9
9. Cercus longer than epandrium, filiform; surstylus baculiform; 6.1 .....  
..... *baihuashanum* Yang  
– Cercus shorter than epandrium, broad; surstylus relatively broad; 4.6–4.9 .....  
..... *stackelbergi* Negrobov
10. Cercus lobated ..... 11  
– Cercus not lobated ..... 12
11. Fore basitarsus about as long as rest tarsomeres combined; 3.5–4.9 .....  
..... *dichromum* Negrobov  
– Fore basitarsus much shorter than rest tarsomeres combined; 4.4–5 .....  
..... *tridactylum* (Frey)
12. Hind basitarsus with short middorsal spine; 4.3–5.5 .....  
..... *gravipes* Haliday  
– Hind basitarsus without middorsal spine; 4.2–4.7 .....  
..... *johnrichardi* **nom. nov.**

## List of known Palearctic species of the *Rhaphium crassipes* group

*Rhaphium baihuashanum* Yang, 1998: 162. Type locality: China: Beijing, Baihuashan Mountain. Distribution: Palearctic China.

*Rhaphium bidilatatum* (Parent, 1954): Negrobov, 1979: 487. Type locality: France: “Epfach sur Lech, Haute Baviere”. Distribution: Austria, Germany, France.  
= *Porphyrops bidilatata* Parent, 1954: 229.

*Rhaphium crassipes* (Meigen, 1824): Zetterstedt, 1843: 466. Type locality: not given. Distribution: Austria, Belgium, Czech, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Netherlands, Norway, Poland, Romania, Russia (Arkhangelsk, Karelia, Leningrad, Lipetsk, Moscow, Murmansk, Nenetsia, Voronezh, Adygea, Alania, Karachai-Cherkessia, Krasnodar, Baikal, Irkutsk, Kamchatka, Primorsk Prov., Yamal), Slovakia, Sweden, Switzerland, UK; Nearctic: Canada: Yukon Terr., Northwest Terr., British Columbia, Alberta to Quebec; USA: Alaska.  
= *Porphyrops crassipes* Meigen, 1824: 50.

*Rhaphium dichromum* Negrobov, 1976: 863. Type locality: Russia: Buryatskaya ASSR, Barguzinskii Reserve. Distribution: Russia (Altay, Buryatia, Magadan).

*Rhaphium gravipes* Haliday, in: Walker et al., 1851: 200. Type locality: ?England. Distribution: Austria, Germany, Norway, Romania, Russia (Leningrad), Sweden, UK.  
= *Porphyrops gravipes* (Haliday, 1851): Bezzi, 1903: 329.  
= *Rhaphium longilamellatum* (Kowarz, 1867): Negrobov, 1979: 509.  
= *Porphyrops longilamellata* Kowarz, 1867: 319. Type locality: Mährisch-Schonberg.

*Rhaphium johnrichardi* Negrobov et Grichanov, **nom. nov.** Type locality: Russia: Maritime Territory, Sikhote Alin reserve, Ust-Serebryanyi cordon. Distribution: Russia (Primorsk Prov.).

= *Rhaphium vockerothi* Negrobov, 1979: 479 (in key) (nec Robinson, 1964).

*Rhaphium latimanum* Kahanpää, 2007: 228. Type locality: Finland: Kilpisjärvi. Distribution: Finland, Russia (Yamal, Yakutia, Magadan). New for Russia.

*Rhaphium neolatifacies* Yang et Wang, in Yang et al., 2006: 15 (nom. nov.). Type locality: Russia: Sakhalin, 41 km N Yuzhno-Sakhalinsk, Pokrovka. Distribution: Russia (Sakhalin).  
= *Rhaphium latifacies* Negrobov, 1986: 165 (nec Van Duzee, 1930).

*Rhaphium patellitarse* (Becker, 1900): Negrobov, 1979: 516; Kahanpää, 2007: 231. Type locality: Russia: Khantaika [Taimyr]. Distribution: Russia (Altay, Buryatia, Salekhard, Taimyr).  
= *Porphyrops patellitarsis* Becker, 1900: 36.

*Rhaphium samarkandiense* Negrobov et Grichanov, **sp. n.** Type locality: Uzbekistan: Samarkand env., Dargom river. Distribution: Uzbekistan.

*Rhaphium stackelbergi* Negrobov, 1976: 864. Type locality: Russia: Maritime Territory, Tigrovaya pad reserve. Distribution: Russia (Primorsk Prov.).

*Rhaphium tridactylum* (Frey, 1915): Negrobov, 1979: 527. Type locality: Finland: Muonio, bei Ounasjoki; Kelottijarvi. Distribution: Finland, Mongolia, Russia (Murmansk, Khabarovsk, Sakhalin), Sweden.  
= *Porphyrops tridactyla* Frey, 1915: 37.

*Rhaphium turanicola* (Stackelberg, 1927): Negrobov, 1979: 529. Type localities: Uzbekistan: "Turkestan: Tashkent; Woruch, Chanaum Kokand". Distribution: Uzbekistan.  
= *Porphyrops turanicola* Stackelberg, 1927: 227.

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