

A survey of Transcaucasian *Dipoena sensu lato* (Aranei: Theridiidae) with a description of new species

Обзор закавказских *Dipoena sensu lato* (Aranei: Theridiidae), с описанием нового вида

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КЛЮЧЕВЫЕ СЛОВА: Абхазия, Грузия, Азербайджан, новый вид.

ABSTRACT. Seven species of *Dipoena sensu lato* belonging to four genera: *Dipoena* Thorell, 1869 (2 species), *Lasaeola* Simon, 1881 (3 species), *Phycosoma* O. Pickard-Cambridge, 1879 (1 species) and *Yaginumena* Yoshida, 2002 (1 species) were found in Transcaucasia. One new species, *Lasaeola dbari* sp.n. is described from Abkhazia. *Lasaeola tristis* (Hahn, 1833) is recorded from Caucasus for the first time.

РЕЗЮМЕ. Семь видов *Dipoena sensu lato* из четырёх родов обнаружены в Закавказье: *Dipoena* Thorell, 1869 (2 вида), *Lasaeola* Simon, 1881 (3 вида), *Phycosoma* O. Pickard-Cambridge, 1879 (1 вид) и *Yaginumena* Yoshida, 2002 (1 вид). Один новый вид *Lasaeola dbari* sp.n. описан из Абхазии. *Lasaeola tristis* (Hahn, 1833) отмечен на Кавказе впервые.

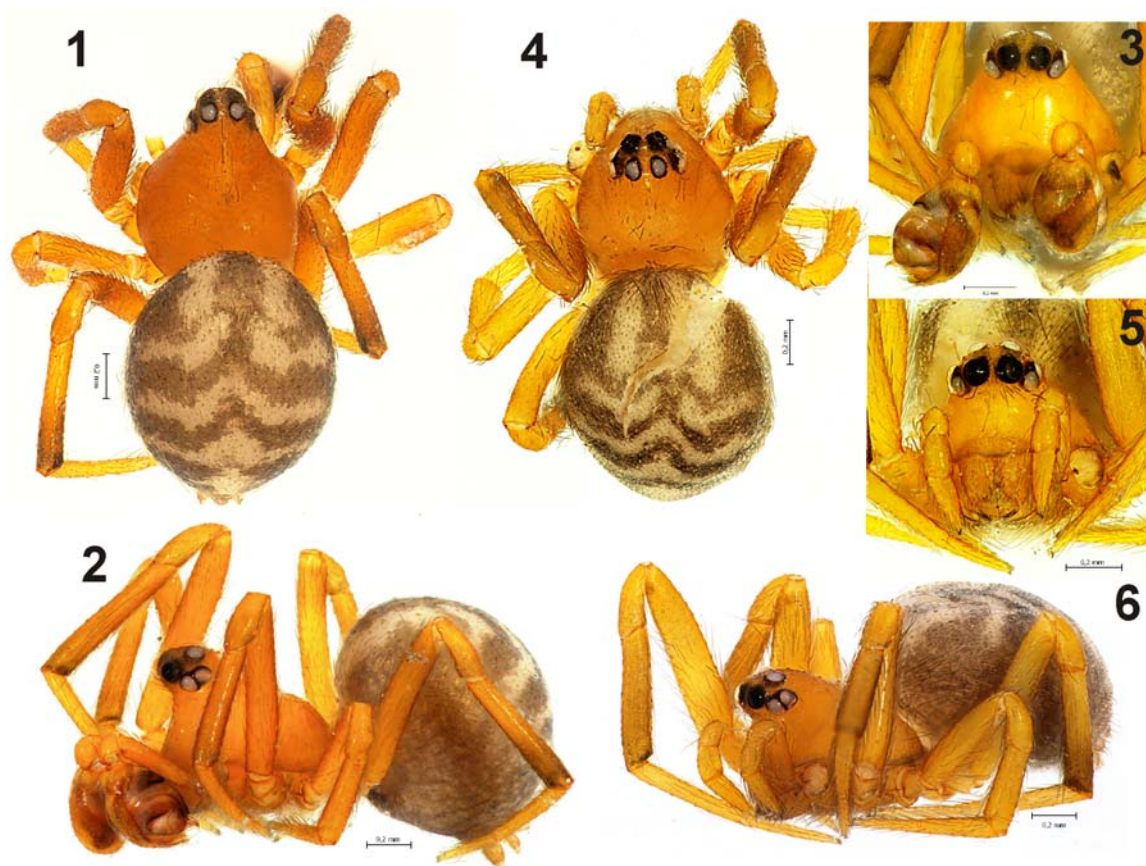
Introduction

Dipoena Thorell, 1869 is one of the largest genera in Theridiidae. Currently it includes 155 extant species [Platnick, 2012] distributed all over the globe, although most of the known species are restricted to the Holarctic. Until recently this genus encompassed several dozen more species until Wunderlich [1988] revalidated *Lasaeola* Simon, 1881 and removed several species to the new genus *Dipoenata* Wunderlich, 1988. Three species were transferred from *Dipoena* to *Yaginumena*

Yoshida, 2002. Later Fitzgerald & Sirvid [2003] revalidated *Phycosoma* O. Pickard-Cambridge, 1879 though to be a synonym of *Euryopsis* Menge, 1868, and transferred some *Dipoena* into this genus.

The taxonomic limits of *Dipoena* and the revalidated or recently described new genera are not very clear [cf. Wunderlich, 2008: 285–286]. None of them have clear diagnostic characters. Species previously considered in *Dipoena sensu lato* are relatively poorly studied in the former Soviet Union and particularly in the Caucasus. Only six species belonging to this group are known from Caucasus (North Caucasus, Armenia, Azerbaijan and Georgia). The first species, *Dipoena melanogaster* (C.L. Koch, 1837) was reported as recently as 1997 from Georgia [Mkheidze, 1997]. *Dipoena nigroreticulata* (Simon, 1879) was recorded from Azerbaijan by Guseinov [2002]. *Phycosoma inornatum* (O.Pickard-Cambridge, 1861) and *Lasaeola prona* (Menge, 1868) were reported from Azerbaijan by Marusik *et al.* [2005a]. At the same time *Yaginumena maculosa* (Yoshida et Ono, 2000) was recorded from several localities in East and West Caucasus [Marusik *et al.*, 2005b]. The fifth species *Dipoena braccata* (C.L. Koch, 1841), was reported by Ponomarev & Mikhailov [2007] from North Caucasus.

While studying Theridiidae of Caucasus we found one species new to Caucasus and one species new to science, which seems to belong to *Lasaeola*. It has an unusual abdominal pattern and an extremely long embo-



Figs 1–6. Habitus of *Lasaeola dbari* sp.n.: 1–3 — male, dorsal, lateral and frontal, respectively; 4–6 — female, dorsal, frontal and lateral, respectively. Scale 0.2 mm.

Рис. 1–6. Габитус *Lasaeola dbari* sp.n.: 1–3 — самец, дорсально, латерально и фронтально, соответственно; 4–6 — самка, дорсально, фронтально и латерально, соответственно. Масштаб 0,2 мм.

lus and insemination ducts. In this the new species is described alongside a brief survey of *Dipoena sensu lato* species in the Caucasus.

Material and methods

Specimens were photographed using either a JEOL JSM-5200 scanning electron microscope or an Olympus Camedia E-520 camera attached to an Olympus SZX16 stereomicroscope at the Zoological Museum, University of Turku. Digital images were montaged using “CombineZM” image stacking software. Photographs were taken in dishes of different sizes with paraffin at the bottom. Different sized holes were made in the bottom to keep the specimens in the correct position. Figures had been made previously and in some cases we were unable to generate scale bars for the digital photographs. All measurements are given in mm. Drawings we made either by using a grid method with a MBS-9 stereomicroscope or a Leitz stereomicroscope with a camera lucida. The bleached epigyne of the holotype female was temporarily coloured with Chlorazol Black. The epigyne was macerated using KOH solution.

Acronyms: IZA — Institute of Zoology, Baku, Azerbaijan; TNU — Zoology Department, Taurida National University, Simferopol, Ukraine; ZMMU — Zoological Museum of the Moscow State University, Russia; ZMUT — Zoological Museum, University of Turku, Finland; EFH — E.F. Huseynov; YMM — Yu.M. Marusik.

Taxonomic survey

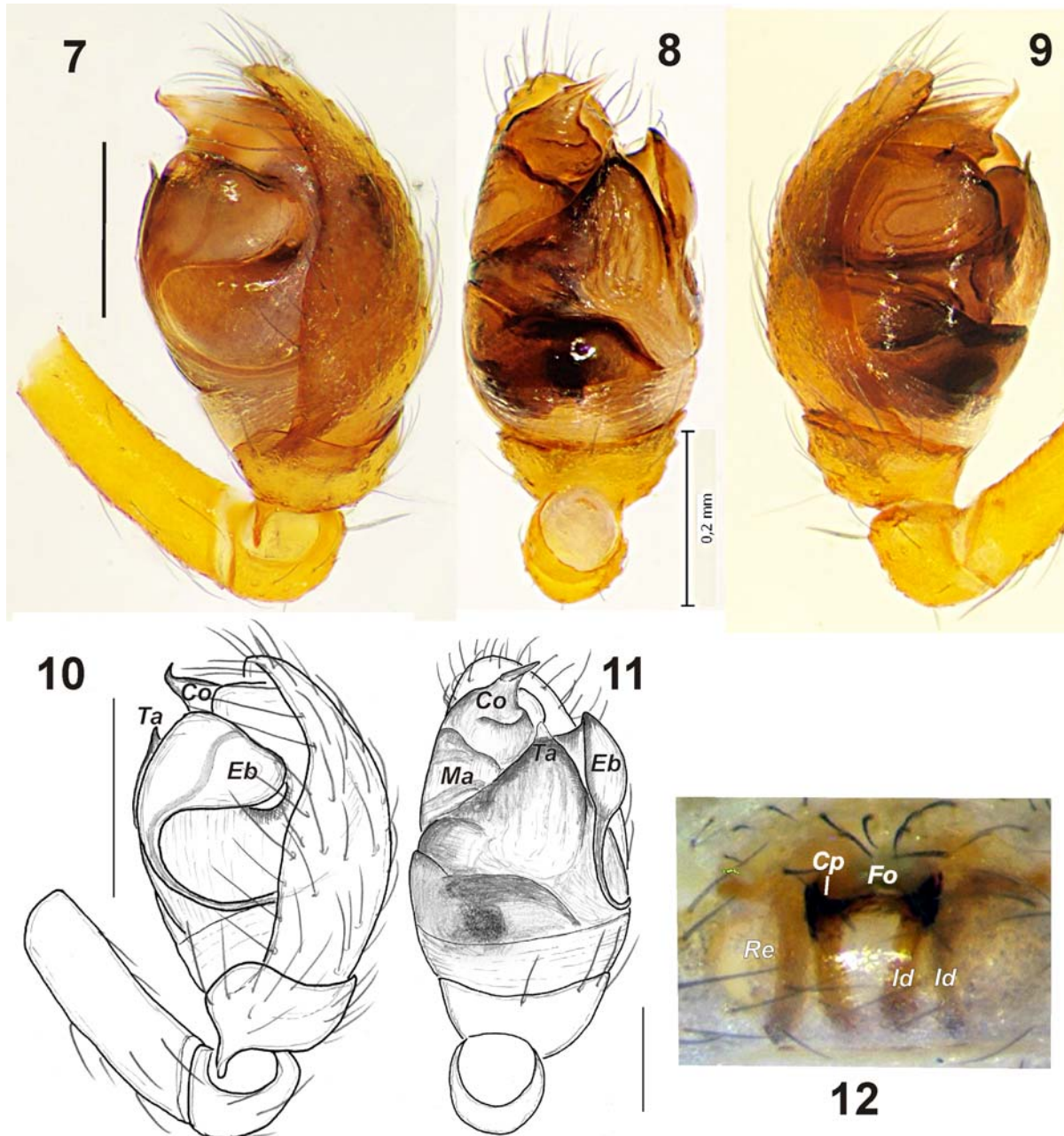
Lasaeola dbari sp.n.

Figs 1–18.

MATERIAL. Holotype ♂ (ZMMU) and paratype ♀ (ZMMU), ABKHAZIA, Gudauta District, Myusser Part of Pitsunda-Myusser Reserve, 43°10'N, 40°25'E, 23 m, moist canyon, 15–24.07.2009 (M.M. Kovblyuk & N.N. Yunakov). Paratype: 1 ♂ (ZMMU), Abkhazia, environs of Kelasur, clay shadowed cliffs, 42°58'N 41°04'E, 11.10.2004 (YMM).

ETYMOLOGY. The species name is a patronym honouring our colleague Dr. Roman S. Dbar, head of the State Ecological Service in Abkhazia, who helped to arrange the expedition of MK to Abkhazia.

DIAGNOSIS. The new species can be easily recognized by its characteristic pattern of transverse stripes,



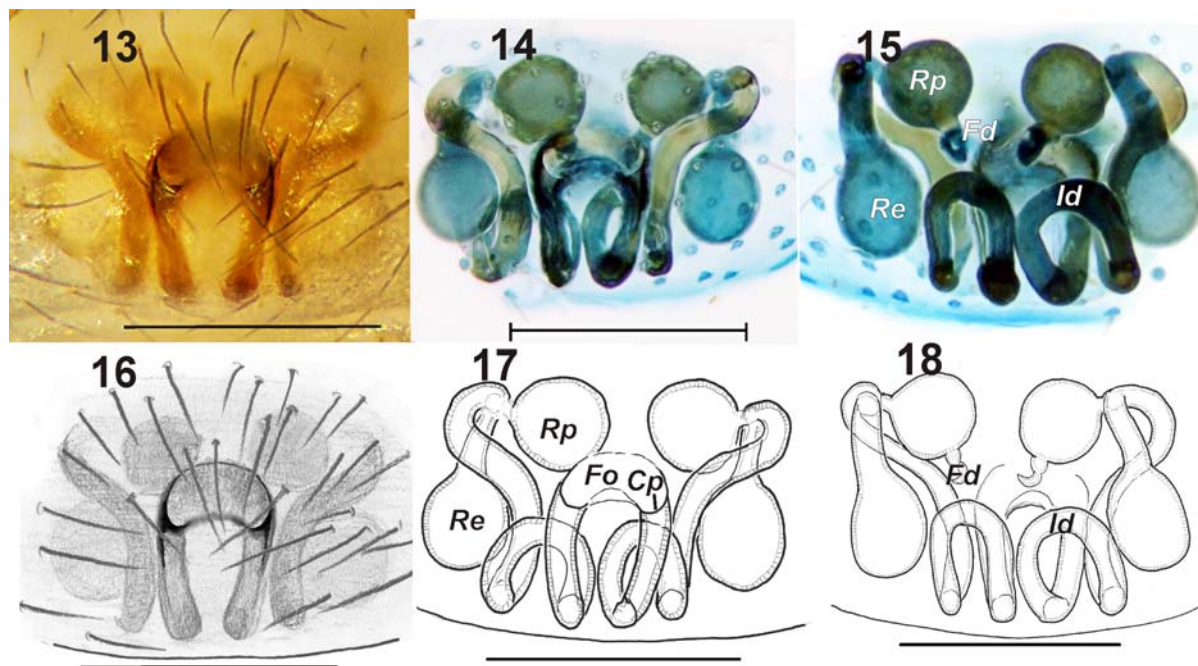
Figs 7–12. Male palp and epigyne of *Lasaeola dbari* sp.n.: 7, 10 — male palp, retrolateral; 8, 11 — male palp, ventral; 9 — male palp, prolateral; 12 — epigyne, ventral. Scale 0.2 mm. Abbreviations: *Co* — conductor; *Cp* — copulatory opening; *Eb* — base of embolus; *Fo* — fovea; *Id* — insemination duct; *Ma* — median apophysis; *Ta* — tegular apophysis.

Рис. 7–12. Пальпа самца и эпигина *Lasaeola dbari* sp.n.: 7, 10 — пальпа самца, ретролатерально; 8, 11 — пальпа самца, вентрально; 9 — пальпа самца, пролатерально; 12 — эпигина, вентрально. Масштаб 0,2 мм. Обозначения: *Co* — кондуктор; *Cp* — копулятивное отверстие; *Eb* — основание эмболюса; *Fo* — ямка эпигины; *Id* — осеменительный (копулятивный) канал; *Ma* — медиальный отросток; *Ta* — тегулярный отросток.

unusual for *Lasaeola* species. *L. dbari* sp.n. can be distinguished by the structure of the copulatory organs. Males have a very long embolus, unknown in other congeners. The base (*Eb*) and beginning of the embolus are clearly visible. Females of the new species appear to have the longest insemination ducts among all *Lasaeola* and members of related genera.

COMMENTS. We placed the new species into *Lasaeola* because of some similarity in the epigyne of *L. dbari* sp.n. with that of the type species *L. prona* (Menge, 1868).

DESCRIPTION. Male/female. Total length 1.88/1.80. Carapace: 0.85/0.77 long, 0.72/0.70 wide, 0.6/0.42 high. Abdomen: 1.12/1.20 long, 1.0/1.0 wide. Eyes (after larg-



Figs 13–18. Epigyne of *Lasaeola dbari* sp.n.: 13–14, 16–17 — ventral; 15, 18 — dorsal. 14–15, 17–18 — after maceration. Scale 0.2 mm. Abbreviations: *Cp* — copulatory opening; *Fd* — fertilization duct; *Fo* — fovea; *Id* — insemination duct; *Re* — accessorial receptaculum, *Rp* — proper receptaculum.

Рис. 13–18. Эпигина *Lasaeola dbari* sp.n.: 13–14, 16–17 — вентрально; 15, 18 — дорсально. 14–15, 17–18 — после мацерации. Масштаб 0,2 мм. Обозначения: *Cp* — копулятивное отверстие; *Fd* — оплодотворительный канал; *Fo* — ямка эпигины; *Id* — осеменительный (копулятивный) канал; *Re* — дополнительная рецептакула, *Rp* — настоящая рецептакула.

est diameter): AM 0.098/0.07; AL 0.084/0.07; PM 0.098/0.098; PL 0.084/0.084. Eyes interdistances: AM–AM 0.07/0.098; AM–AL 0.014/0.028; PM–PM 0.056/0.056; PM–PL 0.056/0.042; AM–PM 0.07/0.07; AL–PL 0/0; AM–clypeus 0.378/0.252; AL–clypeus 0.364/0.28.

Habitus and pattern as in Figs 1–6. General coloration is yellow. Tibia I and IV slightly darkened distally. Abdomen is grey with two white median bands and four pairs of white stripes. Leg podomere lengths (σ^7/f)

	femur	patella	tibia	metatarsus	tarsus	Total
I	0.90/0.85	0.33/0.35	0.70/0.60	0.68/0.6	0.38/0.40	2.98/2.80
II	0.88/0.75	0.33/0.33	0.58/0.45	0.55/0.425	0.38/0.35	2.70/2.30
III	0.63/0.55	0.25/0.30	0.43/0.40	0.43/0.4	0.35/0.35	2.08/2.00
IV	0.88/0.80	0.33/0.35	0.63/0.60	0.65/0.63	0.38/0.35	2.85/2.73

Male palp as in Figs 7–11. Tegular apophysis (*Ta*) triangle-shaped in ventral view with a pointed tip; conductor (*Co*) elongate, sharply pointed; embolus long and thin with a massive base (*Eb*).

Epigyne as in Figs 12–18, with bean shaped fovea (*Fo*), long insemination ducts (*Id*) and two pairs of receptacula (*Re* and *Rp*) subequal in size. Proper receptacula (*Rp*) round with short converging fertilization ducts (*Fd*). Accessorial receptacula (*Re*) droplet shaped.

DISTRIBUTION. Known only from the type locality.

Lasaeola prona (Menge, 1868)
Figs 19–22.

Dipoena p.: Miller, 1967: 290, pl. XIII, f. 16–19 (σ^7/f).
Dipoena p.: Roberts, 1985: 176, f. 78b (σ^7/f).

Dipoena p.: Roberts, 1995: 269, f. (σ^7/f).

Dipoena p.: Roberts, 1998: 284, f. (σ^7/f).

Dipoena p.: Paquin & Dupérré, 2003: 215, f. 2402–2404 (σ^7/f).
For complete list of references see Platnick [2012].

MATERIAL EXAMINED: AZERBAIJAN: 2 σ^7 , 4 f (ZMMU), NE part of Naxçývan, Shakhbuz Dist., Batabat locality, 39°31.9'N 45°47.3'E, 2100 m, subalpine meadows & under stones, 3.06.2003 (YMM).

CAUCASIAN RECORDS. This species has been reported from Naxçývan only [Marusik *et al.*, 2005a].

COMMENTS. This species is properly described in the above-mentioned papers. Specimens from Finland and Naxçývan have a slightly different median apophysis.

DISTRIBUTION. This species has a Holarctic range.

Lasaeola tristis (Hahn, 1833)
Figs 23–26.

Dipoena t.: Miller, 1967: 289, pl. XIII, f. 1–4 (σ^7/f).

Dipoena t.: Roberts, 1995: 269, f. (σ^7/f).

Dipoena t.: Roberts, 1998: 284, f. (σ^7/f).

L. t.: Knoflach & Pfäler, 2004: 137, f. 20f (σ^7).

For complete list of references see Platnick [2012].

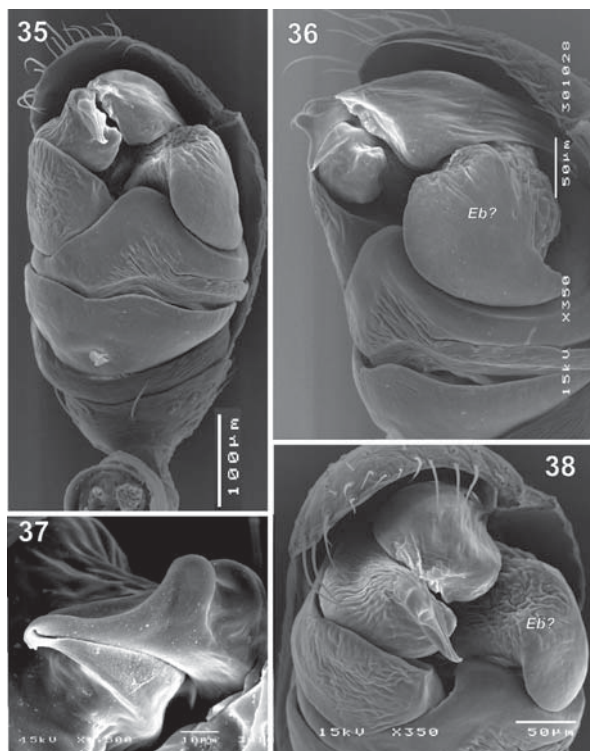
MATERIAL EXAMINED: AZERBAIJAN: 1 σ^7 , 14 f (ZMMU), SE Azerbaijan, Lenkoran District, environs of Aurora Vill., 38°40'N 48°52'E, 23–28.04.2001 (YMM).

COMMENTS. The species is well described in the above-mentioned papers. Here we provide SEM figures of the palp. Caucasian specimens have no differences with those from Finland.



Figs 19–34. Male palps of *Lasaeola prona* (19–22), *L. tristis* (23–26), *Dipoena melanogaster* (27–30) and *D. nigroreticulata* (31–34): 19, 26, 29, 33 — prolateral; 20, 23, 27, 31 — ventral; 21, 24, 28, 32 — retrolateral; 22 — prolateral-anterior; 25 — ventro-anterior; 30, 34 — anterior. 19–22 — from Naxçývan (Azerbaijan); 22–30 — from Lenkoran (Azerbaijan); 31–34 — from Baku (Azerbaijan). Abbreviations: *Co* — conductor; *Eb* — base of embolus; *Em* — embolus; *Ma* — median apophysis; *Ta* — tegular apophysis.

Рис. 19–34. Пальпы самцов *Lasaeola prona* (19–22), *L. tristis* (23–26), *Dipoena melanogaster* (27–30) и *D. nigroreticulata* (31–34): 19, 26, 29, 33 — пролатерально; 20, 23, 27, 31 — вентрально; 21, 24, 28, 32 — ретролатерально; 22 — пролатерально-спереди; 25 — вентрально-спереди; 30, 34 — спереди. 19–22 — из Нахичевани (Азербайджан); 22–30 — из Ленкорани (Азербайджан); 31–34 — из Баку (Азербайджан). Обозначения: *Co* — кондуктор; *Eb* — основание эмболуса; *Em* — эмболус; *Ma* — медиальный отросток; *Ta* — тегулярный отросток.



Figs 35–38. Male palp of *Phycosoma inornatum* from Finland: 35 — ventral; 36 — retrolateral; 37 — conductor; 38 — anterior. Abbreviations: *Eb?* — base of embolus.

Рис. 35–38. Пальпа самца *Phycosoma inornatum* из Финляндии: 35 — вентрально; 36 — ретролатерально; 37 — кондуктор; 38 — спереди. Обозначения: *Eb?* — основание эмболуса.

DISTRIBUTION. This species is distributed from Western Europe to Altai, south to the Mediterranean and Tajikistan. The record from Azerbaijan is the first for the entire Caucasus.

Dipoena melanogaster (C.L. Koch, 1837)
Figs 27–30.

- D. m.*: Miller, 1967: 286, pl. XII, f. 1–3 (♂♀).
D. m.: Roberts, 1985: 176, f. 78f (♂♀).
D. m.: Roberts, 1995: 270, f. (♂♀).
D. m.: Roberts, 1998: 285, f. (♂♀).

For complete list of references see Platnick [2012].

MATERIAL EXAMINED: AZERBAIJAN: 1 ♂ (IZA), CN Azerbaijan, Khyzy Dist., env. of Yarymja Vill., 6.06.2000 (EFG); 1 ♀ (IZA), N Azerbaijan, Ismailly Dist., Ismailly Reserve, 1200 m, 11.07.2001 (EFG); 1 juv. [a05] SE Azerbaijan, Lenkoran Dist., env. of Aurora Vil., 38°40'N 48°52'E, 23–28.04.2001 (YMM); 1 ♂ (IZA), SE Azerbaijan, Lenkoran Dist., env. of Apo Vill., 28.05.2003 (EFG).

CAUCASIAN RECORDS. Khosta (Krasnodar Area, Russia), Abkhazia, Central and West Georgia [Otto & Tramp, 2011] and Azerbaijan [Dunin, 1989].

COMMENTS. This species is well described in several of the papers mentioned above.

DISTRIBUTION. This species is restricted to the West Palaearctic and known from Western Europe to Azerbaijan.

Dipoena nigroreticulata (Simon, 1879)
Figs 31–34.

D. n.: Miller, 1967: 287, pl. XII, f. 4–9 (♂♀).

D. n.: Finch, 1999: 66, f. 1a–b (♂♀).

For complete list of references see Platnick [2012].

MATERIAL EXAMINED: AZERBAIJAN: 1 ♂ (IZA) Absheron Peninsula, Baku, Institute of Zoology garden, 11.09.2001 (EFG).

CAUCASIAN RECORDS. Absheron Peninsula [Guseinov, 2002].

COMMENTS. Here we provide the first SEM figures of the male palp because this species is rather poorly known. The structure of the male palp is rather different from that seen in *D. melanogaster* (Figs 27–30), the type species of the genus.

DISTRIBUTION. The species is known from Portugal to Poland [Helsdingen, 2010] and from Azerbaijan.

Phycosoma inornatum (O. Pickard-Cambridge, 1861)
Figs 35–38.

Dipoena inornata: Wiehle, 1937: 187, f. 186–189 (♂♀).

Dipoena inornata: Roberts, 1985: 176, f. 78c (♂♀).

Dipoena inornata: Roberts, 1995: 268, f. (♂♀).

Dipoena inornata: Roberts, 1998: 283, f. (♂♀).

For complete list of references see Platnick [2012].

MATERIAL EXAMINED: AZERBAIJAN: 1 ♀ (ZMMU), Naxçıvan, ca 3 km E of Akhura Vill., 39°34'N 45°11'E, 1400m, 2.06.2003 (YMM).

CAUCASIAN RECORDS. Within the Caucasus this species has been recorded from Naxçıvan only [Marusik *et al.*, 2005a].

COMMENTS. This species is well described in the above-mentioned papers. Here we provide figures of the male palp made from Finnish specimens.

DISTRIBUTION. This species is restricted to the West Palaearctic and known from Western Europe to Azerbaijan.

Yaginumena maculosa (Yoshida et Ono, 2000)
Figs 39–42.

Dipoena m. Yoshida & Ono, 2000: 147, f. 37–39 (♂).

Y. m.: Yoshida, 2003: 169, f. 462–465, 593 (♂).

Y. m.: Marusik *et al.*, 2005b: 125, f. 1–12 (♂♀).

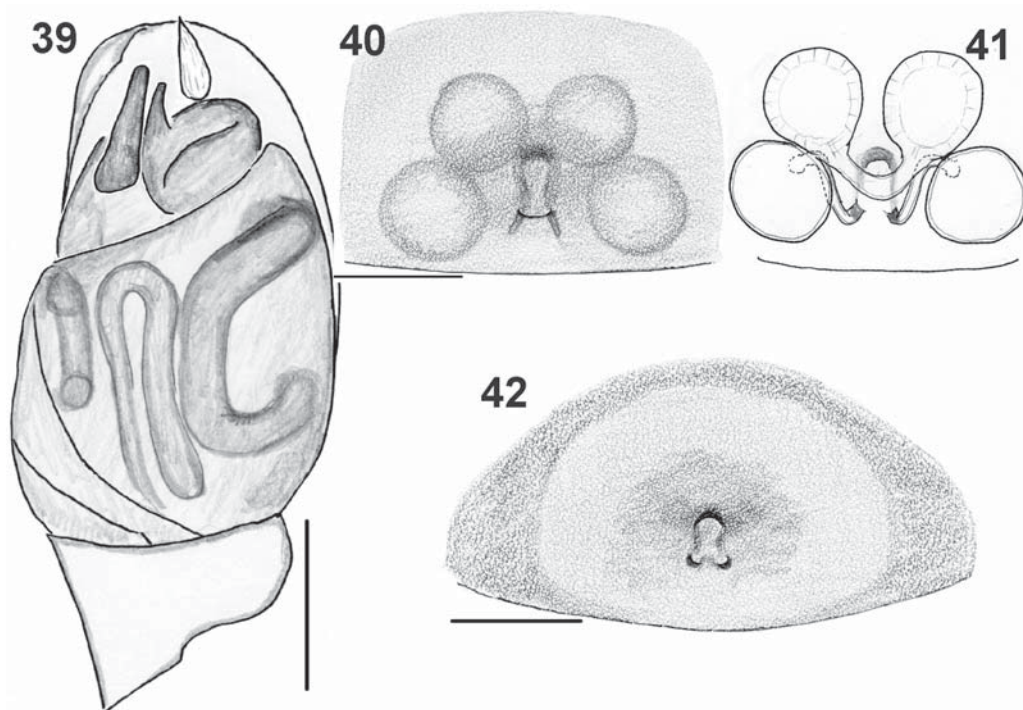
Y. m.: Yoshida, 2009: 389, f. 324–325 (♂♀).

MATERIAL EXAMINED: AZERBAIJAN: 4 ♂♂, 5 ♀♀ (ZMMU), Lenkoran Distr., environs of Aurora Vill., 38°41'N 48°17'E, 36 m, 21–29.05.2003 (YMM); 1 ♀ (ZMMU), Lenkoran Distr., Hyrcan Reserve, 38°38,5'N 48°47,5'E, 23.05.2003 (YMM); 2 ♀♀ (ZMMU), Absheron Peninsula, env. of Baku, Mardakyan, 40° 29.26'N 50°09.6'E, 14.08.1994 (EFG); 2 ♂♂, 1 ♀ (IZA), same locality, 27.06.1996 (EFG). ABKHAZIA: 1 subad. ♀ (ZMMU), environs of Pitsunda, Ldzaa Vill., *Pinus pityusa* along seashore, litter, 43°10.255'N, 40°22.370'W, 16.10.2004 (YMM).

CAUCASIAN RECORDS. Abkhazia, SE Azerbaijan [Marusik *et al.*, 2005b].

COMMENTS. This species was well described by Marusik *et al.* [2005b]. Judging from the shape of the male palp it seems that the species does not belong to the genus *Yaginumena* (type species *Y. castrata* (Bösenberg et Strand, 1906)).

DISTRIBUTION. This species is known from the Caucasus and Japan only [Marusik *et al.*, 2005b].



Figs 39–42. Male palp and epigyne of *Yaginumena maculosa* after Marusik *et al.* [2005b]: 39 — male palp, ventral; 40, 42 — epigyne, ventral; 41 — epigyne, dorsal.

Рис. 39–42. Пальпа самца и эпигина *Yaginumena maculosa*, по: Marusik *et al.* [2005b]: 39 — пальпа самца, вентрально; 40, 42 — эпигина, вентрально; 41 — эпигина, дорсально.

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