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A review of the *Haplodrassus montanus*-group (Aranei: Gnaphosidae) in the East Palaearctic and preliminary grouping of the genus

Обзор группы видов *Haplodrassus montanus* (Aranei: Gnaphosidae) из Восточной Палеарктики и предварительное группирование видов рода

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KEY WORDS: Araneae, Russia, China, Korea, Japan, *Haplodrassus*, Maritime Province.
КЛЮЧЕВЫЕ СЛОВА: Araneae, Китай, Корея, Япония, *Haplodrassus,* Приморский край.

ABSTRACT. A preliminary grouping of *Haplodrassus* Chamberlin, 1922 is proposed and nine species groups are diagnosed. Three species, *Haplodrassus dentatus* Xu et Song, 1987*, H. hatsushibai* Kamura, 2007 and *H. montanus* Paik et Sohn, 1984 belonging to the *montanus*-group are revised and diagnostic key is provided. This species group is restricted to Far East Asia. *Haplodrassus montanus* previously known from Korea was found in Russia (Maritime Province) for the first time.

РЕЗЮМЕ. Предложено предварительное группирование видов *Haplodrassus* Chamberlin, 1922. Выделено девять групп видов. Ревизованы три вида, принадлежащие к группе видов *montanus*: *H.dentatus* Xu et Song, 1987, *H. hatsushibai* Kamura, 2007 и *H. montanus* Paik et Sohn, 1984, для них приведён определительный ключ. Эта группа видов ограничена в распространении только Дальним Востоком Азии. *Haplodrassus montanus* ранее известный только из Кореи был впервые обнаружен в России (Приморский край).

Introduction

Haplodrassus Chamberlin, 1922 is a comparatively large genus of ground spiders with 61 species and 4 subspecies distributed in the Holarctic and India [Platnick, 2012]. Most species of the genus occur in the Palaearctic and only 7 are known from the Nearctic [Platnick, 2012]. Of 20 species occurring in the former Soviet Union, only two, *H. hiemalis* (Emerton, 1909) and *H. taepaikensis* Paik, 1992, have been reported from the southern part of the Russian Far East [Mikhailov, 1997; Marusik et al., 2007]. The genus has never been revised in Russia on a broad scale. There are only two regional revisions [Ovtsharenko & Marusik, 1988; Marusik & Logunov, 1995] and a few papers dealing with the descriptions of new species [Marusik et al., 1996; Ponomarev & Tsvetkov, 2006] or redescriptions of poorly known species [Tuneva & Esyunin, 2003; Marusik et al., 2007; Piterkina & Ovtsharenko, 2007, etc.]. The genus has been comparatively well studied in Japan [Kamura, 1995, 2007, 2009], China [Song et al., 1999, 2004] and Korea [Paik & Sohn, 1984; Paik, 1992; Namkung, 2003].

A study of material from Maritime Province, Russia revealed one species belonging to the *montanus*-group. It was impossible to place it in any known species, because the *montanus*-group has never been revised. Three species were known from three different countries (Korea, China and Japan) and the diagnostic figures were made in different styles, which made comparing the three species difficult. In addition, members of this group had not previously been found in Russia. In order to determine whether our specimens belonged to an undescribed species or one of the known species we decided to revise the group. Our study revealed that the specimens from Maritime Province belonged to *H. montanus*, a species known previously only from the

Korean Peninsula. The main goals of our paper are as follows: 1) to make a preliminary grouping of *Haplodrassus*; 2) to define the *montanus*-group; 3) to provide a key to all three species of the *montanus*-group; 4) to provide detailed illustrations and redescriptions of the three species in the *montanus*-group.

Material and methods

Specimens were photographed using an Olympus Camedia E-520 camera attached to an Olympus SZX16 stereomicroscope. The images were montaged using "CombineZP" image stacking software. Photographs were taken in dishes of different sizes with paraffin in the bottom. Different-sized holes were made in the paraffin to keep the specimens in the correct position. Figures of *H. dentatus,* holotype male and paratype female stored in the Zoological Institute of the Chinese Academy of Sciences, Beijing were made by Shuqiang Li.

The specimens treated here are deposited in the two following museums: IZCAS — Institute of Zoology, Chinese Academy of Sciences; ZMMU — Zoological Museum of Moscow State University.

All measurements are in mm.

Haplodrassus Chamberlin, 1922

Type species: *Drassus hiemalis* Emerton, 1909.

COMMENTS. This genus has never been subdivided into subgenera or species groups, even though it encompasses 65 taxa. Like many species-rich genera, *Haplodrassus* can be split into a few easily delimited species groups or to many species groups without clear limits, including mono-specific groups. Although the main goal of this paper is to revise three closely related species, we decided to propose preliminary species groups within the genus, based mainly on the shape of the male palp. Some comments on the terminology used for describing the male palp are required. All authors [Platnick & Shadab, 1975; Marusik & Logunov, 1995; Levy, 2004; Piterkina & Ovtsharenko, 2007; Kovblyuk et al., 2012, etc.] use the term terminal apophysis for the apophysis emerging from the base of the embolus, which is located in the center of the bulbus (Figs 1, 7, 10, 13). The median apophysis also has a terminal (retrolateral) position (Figs 1, 9, 12, 15). Here, we prefer to use the term embolic apophysis, just to indicate the origin of this structure. In some species, such as *H. hiemalis* (Fig. 25), *H. signifer* (C.L. Koch, 1839) (Fig. 26) and *H. mediterraneus* Levy, 2004 it is very clear that the terminal apophysis belongs to the embolic division. It is especially clearly visible in *H. tegulatus* (Schenkel, 1963). However, in several species the embolic division is almost [*H. minor* (O. Pickard-Cambridge, 1879), Fig. 27] or totally fused (Figs 1–2, 7–8, 10–11, 13–14, 28).

Species grouping

Several species either known by one sex or poorly described are not placed in a specific group.

Haplodrassus signifier-group

This group can be easily diagnosed by the straight or turned embolic apophysis lacking any processes. The embolic apophysis is subequal in width to the embolus and not concealed by it. In some species the embolic division is well separated from the tegulum (Fig. 26), while in another the embolic division is almost fused with the tegulum (Fig. 27).

COMPOSITION: *H. aenus* Thaler, 1984; *H. atarot* Levy, 2004; *H. bohemicus* Miller et Buchar, 1977; *H. chamberlini* Platnick et Shadab, 1975; *H. concertor* (Simon, 1878); *H. deserticola* Schmidt et Krause, 1996 (?); *H. dixiensis* Chamberlin et Woodbury, 1929; *H. invalidus* (O. Pickard-Cambridge, 1872); *H. lilliputanus* Levy, 2004; *H. macellinus* (Thorell, 1871); *H. maculatus* (Banks, 1904); *H. mimus* Chamberlin, 1922; *H. minor* (O. Pickard-Cambridge, 1879); *H. morosus* (O. Pickard-Cambridge, 1872) (?); *H. ovtchinnikovi* Ponomarev, 2008; *H. pargongsanensis* Paik, 1992 (possible synonym of *H. pugnans*); *H. pseudosignifer* Marusik, Hippa et Koponen, 1996; *H. pugnans* (Simon, 1880); *H. signifer* (C.L. Koch, 1839); *H. taibo* (Chamberlin, 1919); *H. vastus* (Hu, 1989) (possible synonym of *H. pugnans*).

Haplodrassus dalmatensis-group

This species group resembles the *signifier*-group, but the embolic apophysis lacks a ridge or furrow and has a small spine.

COMPOSITION: *H. dalmatensis* (L. Koch, 1866); *H. isaevi* Ponomarev et Tsvetkov, 2006; *H. severus* (C.L. Koch, 1839).

Haplodrassus umbratilis-group

This is an easily diagnosed group based on the flat outgrowth of the embolic apophysis.

COMPOSITION: *H. belgeri* Ovtsharenko et Marusik, 1988; *H. eunis* Chamberlin, 1922; *H. rugosus* Tuneva, 2005; *H. soerenseni* (Strand, 1900); *H. umbratilis* (L. Koch, 1866).

Haplodrassus kulczynskii-group

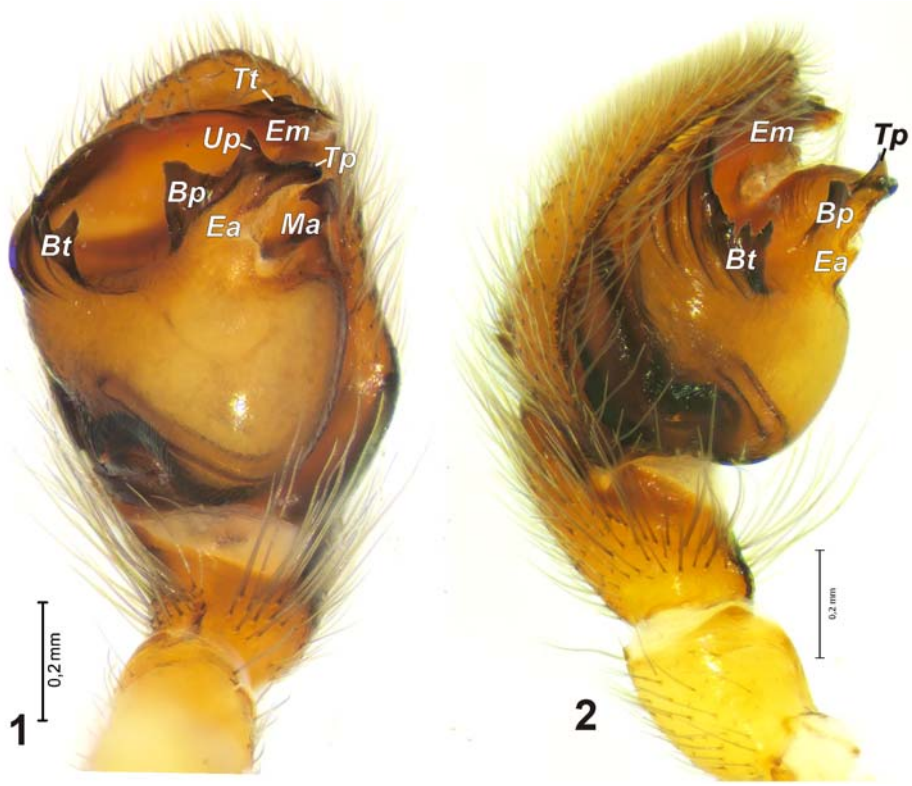
This group can be distinguished by the embolic apophysis being widened to the top (Fig. 28) and in carrying spines or triangular lobes. The embolic apophysis is directed upward-retrolaterally.

COMPOSITION: *H. kulczynskii* Lohmander, 1942; *H. taepaikensis* Paik, 1992.

Haplodrassus silvestris-group

This group can be distinguished by the wide embolic apophysis that hides the embolus (Fig. 25). The apophysis lacks outgrowths and is wider distally.

COMPOSITION: *H. cognatus* (Westring, 1861); *H. creticus* (Roewer, 1928); *H. hiemalis* (Emerton, 1909); *H. kanenoi* Kamura, 1995; *H. moderatus* (Kul-



Figs 1–2. Male palp of *Haplodrassus montanus*: 1 — ventral view; 2 — prolateral view. Abbreviations: *Bp* — basal process; *Bt* — basal tooth; *Ea* — embolic apophysis; *Em* — embolus; *Ma* — median apophysis; *Tp* — terminal process; *Tt* — terminal tooth; *Up* — upper process.

Рис. 1–2. Пальпа самца *Haplodrassus montanus*: 1 — вентрально; 2 — пролатерально. Сокращения: *Bp* — базальный отросток; *Bt* — базальный зубец; *Ea* — отросток эмболюса; *Em* — эмболюс; *Ma* — медиальный отросток; *Tp* — терминальный отросток; *Tt* — терминальный зубец; *Up* — верхний отросток.

czyński, 1897); *H. paramecus* Zhang, Song et Zhu, 2001; *H. ponomarevi* Kovblyuk et Seyyar, 2009; *H. silvestris* (Blackwall, 1833).

Haplodrassus mediterraneus-group

This monotypic group has a strongly reduced embolic apophysis, which gradually tapers.

COMPOSITION: *H. mediterraneus* Levy, 2004.

Haplodrassus tegulatus-group

This monotypic group can be easily recognized by the strongly reduced embolic apophysis, thin embolus (Fig. 29); gradually tapering tibial apophysis; heavily sclerotized apical pocket of the epigyne with a distinct hood. *Tuvadrassus* Marusik et Logunov, 1995 was described for this species, but Murphy [2007] considered *Tuvadrassus* as a synonym of *Haplodrassus*.

COMPOSITION: *H. tegulatus* (Schenkel, 1963).

Haplodrassus caspius-group

Although this monotypic group was previously based on female characters, we had the opportunity to study the male of *H. caspius* Ponomarev et Belosludtsev, 2008. Unique for this genus, it has a droplet-shaped cymbium, sharply pointed tibial apophysis, and the tip of the embolus has a hook [Kovblyuk et al., 2013].

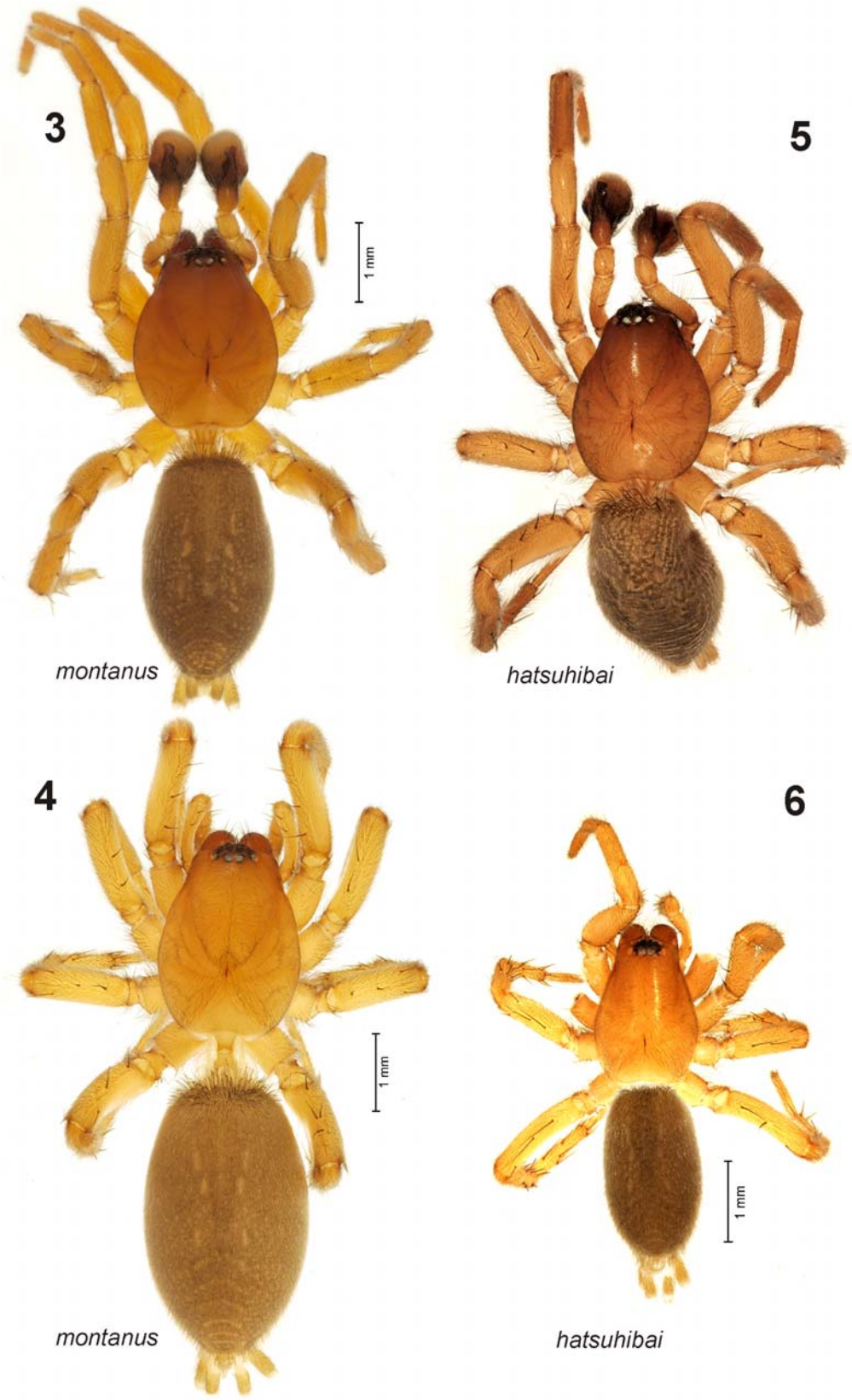
COMPOSITION: *H. caspius* Ponomarev et Belosludtsev, 2008.

Haplodrassus montanus-group

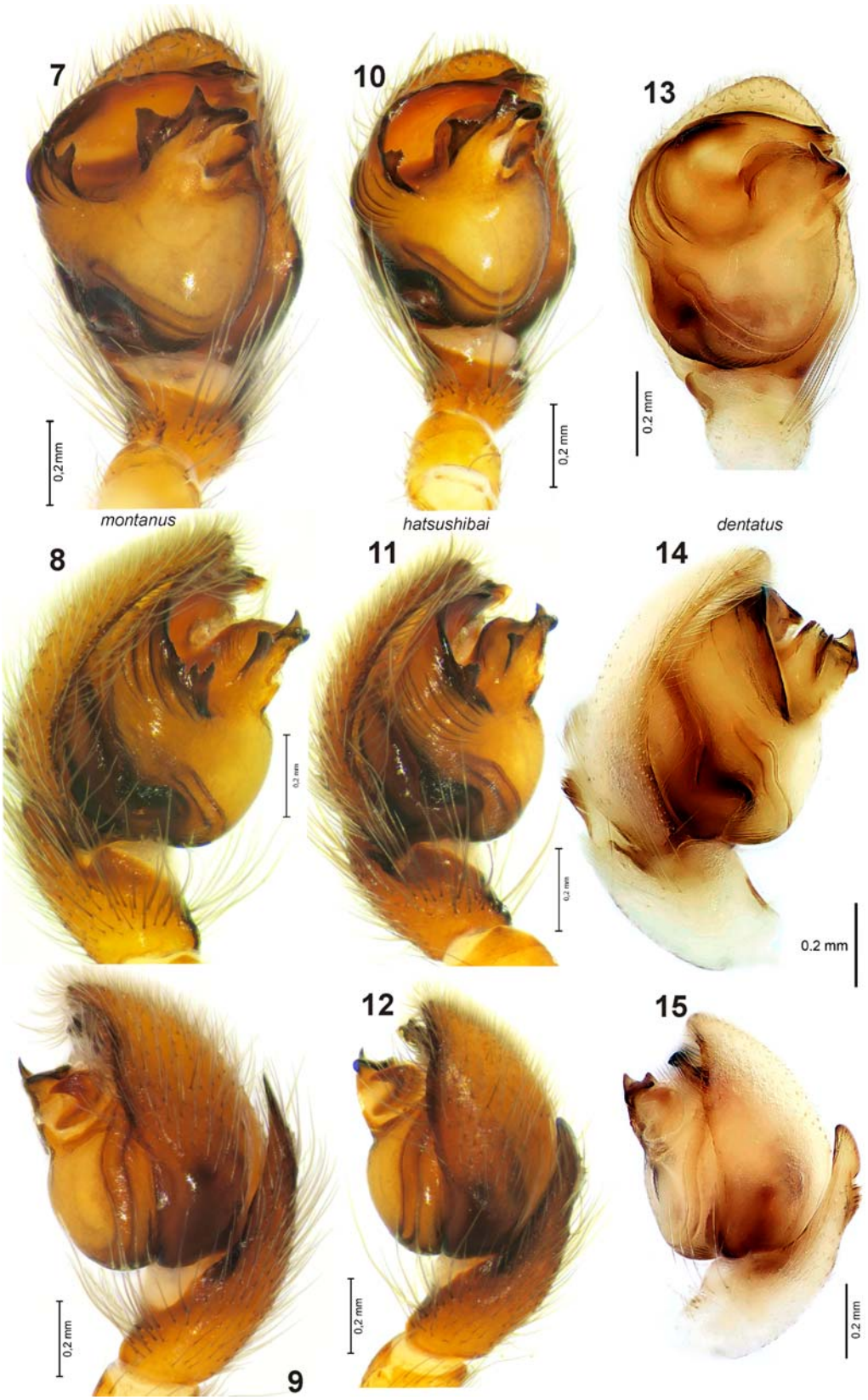
This group can be distinguished by having spines (teeth) on the tibial apophysis (Figs 16–19), a wide (in prolateral view) trilobate embolic apophysis and a long embolus. In comparison to other species groups it has the widest bulbus: width of bulbus measured near the base of the embolus exceeds the height of the terminal part of the bulbus (embolic division).

COMPOSITION: *H. dentatus* Xu et Song, 1987; *H. montanus* Paik et Sohn, 1984; *H. hatsushibai* Kamura, 2007.

DISTINGUISHING THE SPECIES. Species of this group can be separated by the following characters: number of teeth on the tibial apophysis; outline of tip of tibial apophysis; shape of the embolic apophysis; shape of the processes of the embolic apophysis; presence or absence of a basal tooth on the embolus and its shape; length and width of the embolus; shape of the receptacles, septum and inner margin of the fovea.

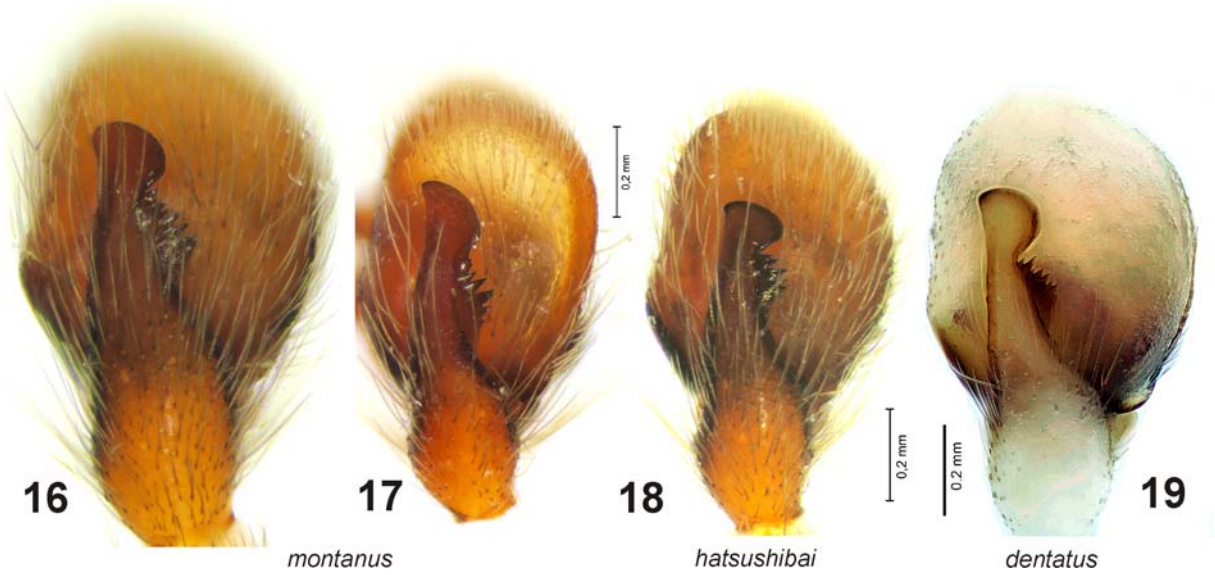


Figs 3–6. Habitus of *Haplodrassus montanus* (3–4) and *H. hatsushibai* (5–6): 3, 5 — males; 4, 6 — females.
Рис. 3–6. Внешний вид *Haplodrassus montanus* (3–4) и *H. hatsushibai* (5–6): 3, 5 — самцы; 4, 6 — самки.



Figs 7–15. Male palp of *Haplodrassus montanus* (7–9), *H. hatsushibai* (10–12) and *H. dentatus* (13–15): 7, 10, 13 — ventral view; 8, 11, 14 — prolateral view; 9, 12, 15 — retrolateral view.

Рис. 7–15. Пальпа самца *Haplodrassus montanus* (7–9), *H. hatsushibai* (10–12) и *H. dentatus* (13–15): 7, 10, 13 — вентрально; 8, 11, 14 — пролатерально; 9, 12, 15 — ретролатерально.



Figs 16–19. Male palp of *Haplodrassus montanus* (16, 17), *H. hatsushibai* (18) and *H. dentatus* (19), dorsal view.
Рис. 16–19. Пальпа самца *Haplodrassus montanus* (16, 17), *H. hatsushibai* (18) и *H. dentatus* (19), дорсально.

KEY TO THE *HAPLODRASSUS MONTANUS*-GROUP

1. Male 2
– Female 4
2. Base of embolus without tooth or teeth, processes of embolic apophysis not triangular (Fig. 13) ..... *H. dentatus*
– Base of embolus either with one serrated tooth or with 1–2 large teeth, embolic apophysis with two large triangular processes visible in ventral view (Figs 7, 8, 10, 11) 3
3. Upper process of embolic apophysis small; distance between base of embolus and base of embolic apophysis about 1/5 of bulbus width; base of embolus noticeably prominent with 5–6 ridges (visible in retrolateral view); most teeth on RTA located in upper part of apophysis (Figs 10–12, 18) ..... *H. hatsushibai*
– Upper process of embolic apophysis long, distance between base of embolus and base of embolic apophysis approximately 1/4 of bulbus width; base of embolus is slightly prominent and has 3–4 ridges (visible in retrolateral position); most teeth on RTA located in middle part of apophysis or along its full length (Figs 7–9, 16, 17) ..... *H. montanus*
4. Receptacles oval, septum poorly developed, with parallel margins (Fig. 25) ..... *H. dentatus*
– Receptacles as long as wide (Figs 22, 24) 5
5. Septum narrowing anteriorly (Fig. 20)..... *H. montanus*
– Septum narrowing posteriorly (Fig. 23)... *H. hatsushibai*

Survey of species

Haplodrassus dentatus Xu et Song, 1987
Figs 13–15, 19, 25.

H. d. Xu & Song, 1987: 83, f. 1–4 (♂♀).
H. d.: Xu, 1991: 37, f. 15 (♀).
H. d.: Song et al., 1999: 451, f. 263B, J (♂♀).
H. d.: Song et al., 2004: 132, f. 77A–D (♂♀).

MATERIAL EXAMINED. Holotype ♂ and allotype ♀ from Guniujiang Natural Reserve, Anhui Province, 900 m, 8.07.1983 (Y.J. Xu, L. Wang) in IZCAS. Digital figures made by S. Li.

DIAGNOSIS. Males of *H. dentatus* differ from other species of this group by the absence of teeth (or a tooth) on the base of the embolus, a comparatively short tegular apophysis and a small median apophysis. Males of this species can also be recognized by the shape of the tip of the tibial apophysis, which is almost half-round (Fig. 19). Females of this species can easily be distinguished from *H. hatsushibai* by the shape of the septum and their large receptacles.

DESCRIPTION (measurements after Song et al. [2004]). Male. Total length 4.2; carapace 1.95 long and 1.58 wide. General coloration light brown, abdomen without pattern. Palp as in Figs 13–15, 19. Tip of tibial apophysis semi-round. Median apophysis almost invisible in ventral view, hidden by embolic apophysis; embolic apophysis wider than tall, with small upper tooth, basal tooth undeveloped; embolus long and broad, without basal tooth and with small terminal tooth.

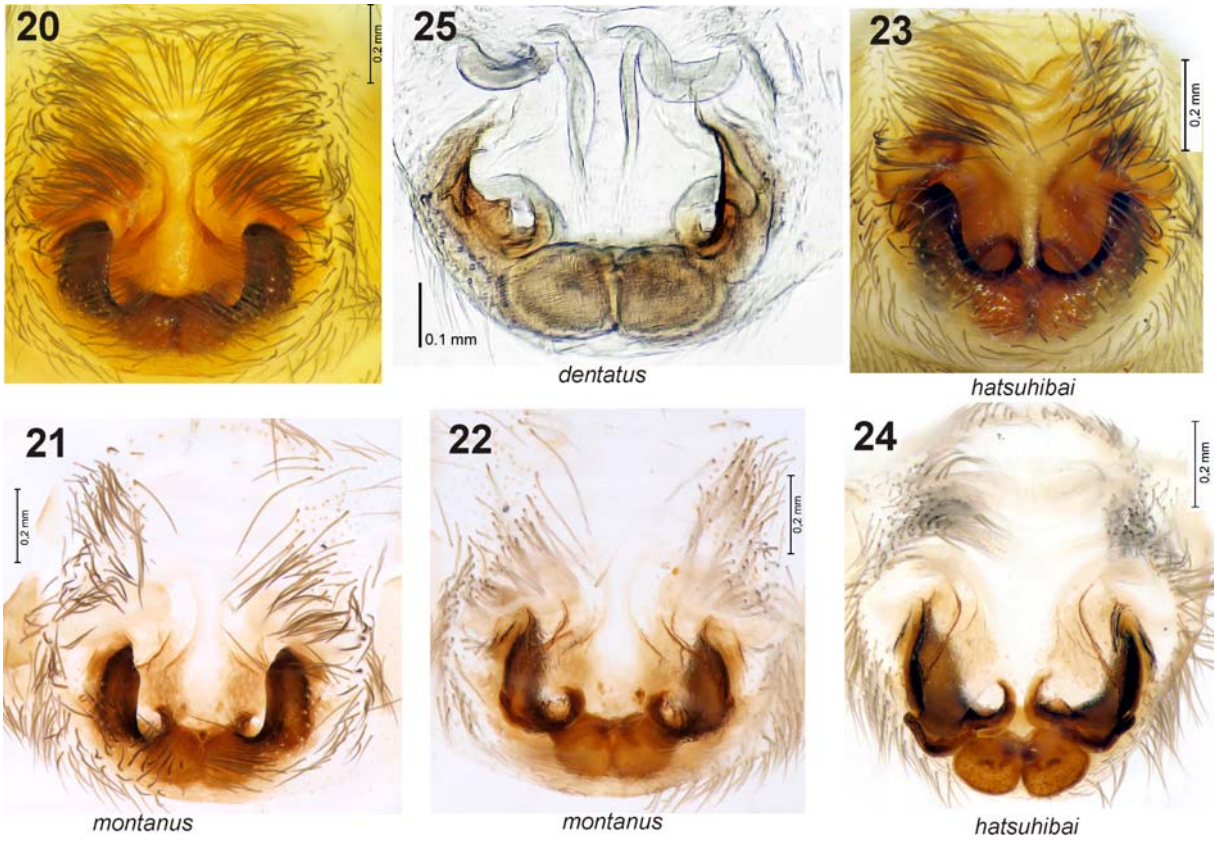
Female. Total length 4.1, carapace 1.94 long, 1.45 wide. Coloration as in male. Epigyne as in Fig. 25. Fovea without distinct septum, macerated epigyne has septum with parallel margins; receptacles large, oval-shaped.

DISTRIBUTION. It is known only from the type locality, Anhui Province of China (Fig. 30).

Haplodrassus hatsushibai Kamura, 2007
Figs 5–6, 10–12, 18, 23–24,

H. montanus: Chikuni 1989: 121, f. 17 (♂♀, misidentified).
H. h. Kamura, 2007: 100, f. 23–31 (♂♀).
H. h.: Kamura, 2009: 487, f. 43–45 (♂♀).

MATERIAL EXAMINED. **JAPAN**: 1♂ 1♀ (ZMMU), Yaho, Kunitachi-shi, Tokyo, 21.03.2007 (S. Hatsushiba).



Figs 20–24. Epigynes of *Haplodrassus montanus* (20–22), *H. hatsushibai* (23–24) and *H. dentatus* (25): 20, 21, 23 — ventral view, 22, 24, 25 –view dorsal.

Рис. 20–24. Эпигины *Haplodrassus montanus* (20–22), *H. hatsushibai* (23–24) и *H. dentatus* (25): 20, 21, 23 — вентрально, 22, 24, 25 — дорсально.

DIAGNOSIS. *Haplodrassus hatsushibai* is very similar to *H. montanus*. Males of these species can be distinguished by the less developed upper process of the embolic apophysis in *H. hatsushibai*, and the less prominent base of the embolus. From *H. denatatus* it can be easily separated by having a basal tooth on the embolus (lacking in *H. dentatus*) and three well developed processes of the embolic apophysis (only one in *H. dentatus*). Females of *H. montanus* can be distinguished from *H. hatsushibai* by the shape of the septum, which is widened anteriorly (narrowing anteriorly in *H. dentatus*). The inner margins of the epigynal pockets diverge slightly in *H. hatsushibai* and are subparallel in *H. dentatus*.

DESCRIPTION (measurements after Kamura [2007]). Male. Total length 4.23, carapace 2.0 long, 1.58 wide. General coloration brownish (Fig. 5). Carapace without any pattern, somewhat lighter than abdomen. Legs brownish, metatarsi I darker than other segments. Palps brownish, RTA and base of cymbium dark brown. Palp as in Figs 10–12. Retrolateral tibial apophysis with five spines fused at the base, tip of apophysis oval-shaped on mesal side. Embolic apophysis with three well developed processes; basal and upper processes well separated, basal process triangular, twice as wide as it is tall, upper process not sharply pointed; embolus with triangle-shaped basal tooth and a small terminal tooth.

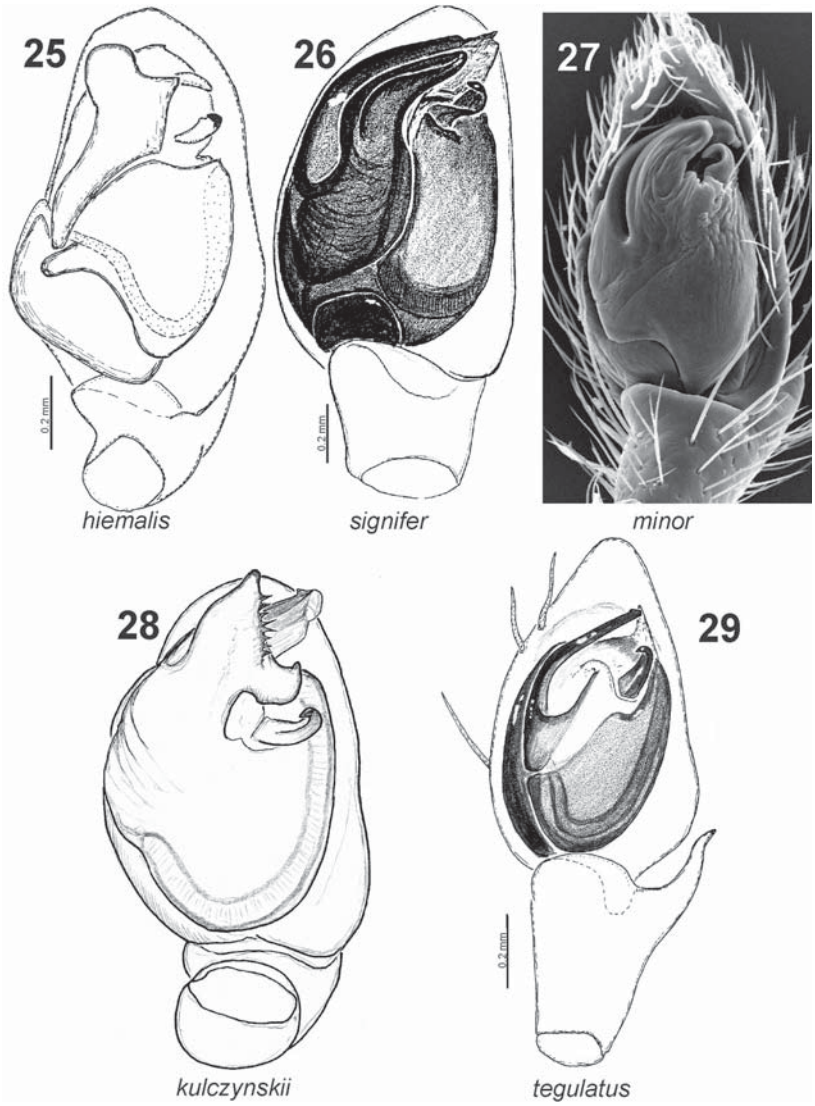
Female. Total length 4.43, carapace 1.9 long, 1.38 wide. General coloration as in male, but somewhat lighter (Fig 6). Epigyne as in Figs 23–24. Margins of fovea diverging, septum well developed, widening anteriorly; receptacles as long as wide.

DISTRIBUTION AND COMMENTS. So far it is known from Honshu (environs of Tokyo) and Hokkaido (SSE shore) only (Fig. 30). Judging from the figures of the male palp provided by Kamura [2007] for specimens from Hokkaido [cf. Kamura, 2007: Figs 30–31], the Hokkaido population may belong to a separate species. Males from this population have a smaller embolus (less protruding prolaterally), the embolic basal tooth is not triangle-shaped but represented by a series of denticles. There are differences in the basal process of the embolic apophysis.

Haplodrassus montanus Paik et Sohn, 1984
Figs 1–4, 7–9, 16–17, 20–22.

H. m. Paik & Sohn, 1984: 107, f. 14–26 (♂♀).
H. m.: Namkung, 2002: 470, f. 37.11a–b (♂♀).
H. m.: Namkung, 2003: 473, f. 37.11a–b (♂♀).
H. m.: Jung et al., 2005: 182, f. 65, 128 (♂♀).

MATERIAL EXAMINED. **RUSSIA**, ***Maritime Province***: 31♂♂ 9♀♀ (ZMMU), Ussuriysk Dist., Gornotaezhnaya station,



Figs 25–29. Ventral view of male palp of *Haplodrassus hiemalis* (25), *H. signifier* (26), *H. minor* (27), *H. kulczynskii* (28) and *H. tegulatus* (30): 25, 30 — after Marusik & Logunov [1995], 26 — after Marusik et al. [1996].

Рис. 25–29. Вентральный вид пальпы самца *Haplodrassus hiemalis* (25), *H. signifier* (26), *H. minor* (27), *H. kulczynskii* (28) и *H. tegulatus* (30): 25, 30 — по Marusik & Logunov [1995], 26 — по Marusik et al. [1996].

Lysaya sopka, 43°42’00”N, 132°08’60”E, April & May 2002 & 2003 (M.M. Omelko); 8♂♂ 2♀♀ (ZMMU), Ussuriysk Dist., environs of Zarechnoe Village, 43°42’02”N, 137°07’09”E, meadow, 2-16.05.2006 (M.M. Omelko). **KOREA**: 1♂ 1♀ (ZMMU), Gangwon-do, Gwangmijang, Mt. Odaesan, 37°49’19’’N 128°38’19’’E, 357 m, 11.07.2005 (B.W. Kim).

DIAGNOSIS. Differences between *H. montanus* and other species of this group are indicated in the diagnoses above.

DESCRIPTION. Male. Total length 4.90–5.90. Carapace: 2.05–2.40 long, 1.55–1.90 wide. Leg I segments: 1.50–1.70 femora, 0.80–1.00 patellae, 1.20–1.45 tibiae, 0.95–1.05 metatarsi, 0.75–0.90 tarsi. General coloration yellowish brown (Fig. 3). Abdomen somewhat darker than carapace. Abdomen with light spots on anterior half and thin lines on the posterior half. Legs and palps yellowish.

Palp as in Figs 1–2, 7–9, 16–17. Retrolateral tibial apophysis with eight spines fused together at the base. Embolic apophysis with three well developed processes, basal process triangular, as wide as high, bases of basal and upper processes touch each other; upper process triangular, as wide as high; embolus with large serrated basal tooth and small terminal tooth.

Female. Total length 5.50–6.95. Carapace: 2.20–2.60 long, 1.60–1.95 wide. Leg I segments: 1.30–1.75 femora, 0.80–1.00 patellae, 1.05–1.35 tibiae, 0.80–0.95 metatarsi, 0.55–0.90 tarsi. Coloration as in males but lighter (Fig. 4). Epigyne as in Figs 20–22. Inner margins of fovea parallel to each other; septum narrowing anteriorly; receptacles as long as wide.

BIOLOGICAL NOTES. Most of the specimens were collected by pitfall traps in dry meadows. All adult specimens were collected in April and May.

DISTRIBUTION. South Korea and Maritime Province of Russia (Fig. 30).

Fig. 30. Distribution of *Haplodrassus montanus* (●), *H. hatsushibai* (■) and *H. dentatus* (▲).
Рис. 30. Распространение *Haplodrassus montanus* (●), *H. hatsushibai* (■) and *H. dentatus* (▲).

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