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# Redescription of *Asagena semideserta* (Ponomarev, 2005) comb. n. (Araneae: Theridiidae)

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**Abstract:** *Asagena semideserta* (Ponomarev, 2005) comb. n. is proposed for the poorly known spider species *Steatoda semideserta* Ponomarev, 2005, previously known only from Western Kazakhstan. In order to illustrate affinities of this species, we provide a detailed redescription supported by drawings, digital photographs and SEM micrographs We report it for the first time outside of its type locality, i.e. from the Karaganda Region, Kazakhstan, and from Western Mongolia.

**Key words:** Aranei, comb-footed spiders, Kazakhstan, Mongolia, copulatory organs

## Introduction

*Steatoda semideserta* Ponomarev, 2005 was described from Western Kazakhstan on the basis of three males and seven females. The species was assigned to the *phalerata*-group. Recently, Wunderlich (2008) revalidated the genus *Asagena* Sundevall, 1833 (type species *Phalangium phaleratum* Panzer, 1801 = *Asagena phalerata*), which was earlier considered a junior synonym of *Steatoda* Sundevall, 1833. Therefore, the Ponomarev's species should be transferred to the genus *Asagena*. The original description of *S. semideserta* was supplied with three schematic drawings of the male palp and one figure of the epigyne. Previously, the peculiar habitus of the male, legs colouration, details of male palp and leg I, and vulva were described in Russian, but illustrations were not provided. Since the original publication, this species was not reported from other localities. We provide here an illustrated redescription of *S. semideserta*, discuss its distribution and new records, and transfer it to the genus *Asagena*.

## Material and methods

Specimens were photographed using a Canon EOS 7D camera attached to an Olympus SZX16 stereomicroscope or to the eye-piece of an Olympus BH-2 compound microscope, and with a SEM JEOL JSM-5200 scanning microscope at the Zoological Museum, University of Turku. Digital images were prepared using CombineZP image stacking software. Illustrations of the copulatory organs were made after clearing them in a 10% KOH aqueous solution and an exposure for a few minutes in alcohol/water solution of Chlorazol Black. Lengths of leg segments were measured dorsally. Names of administrative units of Kazakhstan and Mongolia follow Wikipedia. Description of the palp refers to the left one.

All measurements are given in mm.

The terminology follows Knoflach (1996), with some additions.

The examined material is stored in ISEA (Institute for Systematic and Ecology of Animals, Novosibirsk), ZMMU (Zoological Museum of

the Moscow State University) or PSU (Perm State University).

# Results

***Asagena semideserta* (Ponomarev, 2005), comb. nov.**

Fig. 1-29

*Steatoda semideserta* Ponomarev, 2005: 47, Fig. 4 "*г, д, е, ж*" (♂♀).

**Material examined:**

- Kazakhstan: Atyrau Region: holotype ♂ and paratype ♀ (ZMMU), 23 km SE of Inderborski Village, SE slope of Inderbor Highland, *Artemisia lercheana* and *Anabasis ramosissima* steppe, 15.05.1984 (A. Ponomarev);

- Kazakhstan: Karaganda Region: 3 ♂, 4 ♀, 3 subad. ♂ (PSU), ca 2 km W of Chubar-Tyubek Vil., Balkhash Lake shore (ca 46°46'N, 74°44'E), 15.05.2010 (T.K. Tuneva);

- Mongolia: Khovd Aimag: 1 ♂, 3 ♀ (ISEA) Baitag-Bogd-Uul Mt. Range, Baruun-Khargaityn-Gol River valley (45°17'N, 90°57'E), stony desert with rocks, 1900-2000 m, 21.05.2015 (A. A. Fomichev); 1 ♂ (ISEA) Baitag-Bogd-Uul Mt. Range, Gushoot-Shineetyin-Gol River valley (45°15'N, 91°05'E), saline desert, 2000 m, 24.05.2015 (A. A. Fomichev).

**Diagnosis:** Male of *A. semideserta* differs from congeners by having palpal tibia as long as femur and cymbium (tibia shorter than femur in other species, and at least twice shorter than cymbium), a very long embolus, three times longer than cymbium and forming several loops (in other species, the embolus is only twice or less longer than cymbium and forms one loop). Females of *A. semideserta* can be separated from the congeners by a very shallow, almost indistinct notch (*Mn*) of the median plate (well developed and distinct in other species).

**Description:** *Male*: Carapace: 0.98 long, 0.78 wide. Abdomen (separated from prosoma) 1.3 long. Carapace brown, with elongate rectangular blackish median band behind the ocular area and dark radial stripes, margins of carapace with about 17 fine spines (number varies). Stridulating apparatus of carapace with about 20 large ridges and about of 15 fine ridges. Sternum dark brown. Abdomen dark brown, without pattern; stridulating apparatus with 14 tubercles. Leg I darker than other legs, femur and tibia dark; femur II dark; other leg segments yellowish. Leg I with 6-9 ventral "spines" (conical outgrowths of setae bases) on femur, and 3-4 on tibia; leg II with 2-4 ventral "spines" on femora and 2–3 on tibia; femora III with


**Fig. 1-6.** Somatic characters of *Asagena semideserta*.
1, 2, male and female habitus, dorsal view; 3, posterior part of male prosoma showing stridulating ridges; 4, 6, anterior part of male abdomen showing stridulating organ, ventral and lateral view; 5, male leg I, prolateral view. Scale = 0.2 mm if not otherwise indicated

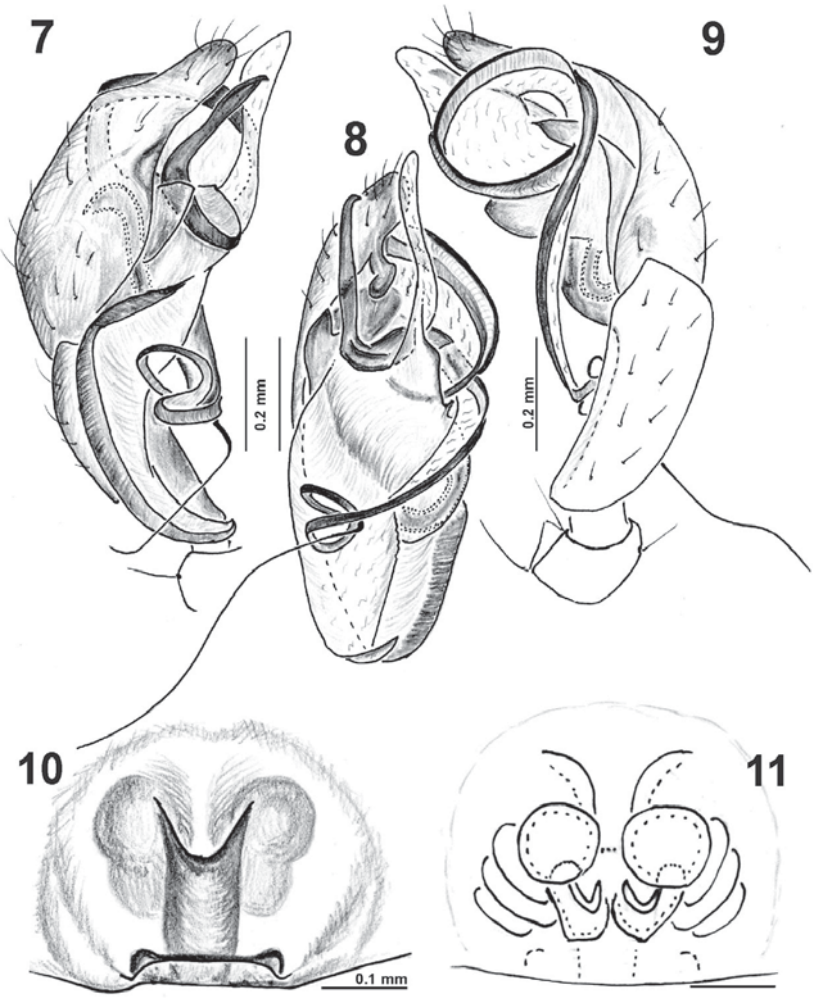


**Fig. 7-11.** Copulatory organs of *Asagena semideserta*.
7-9, male palp, prolateral, ventral and retrolateral view; 10, epigyne, ventral view; 11, endogyne, dorsal view

1-2 ventral "spines". Spines on femora represented by small protruding conical tubercles bearing long seta, and spines on tibia represented by declined conical tubercles with thick and short conical macrosetae. For leg measurements, see Table 1.

Palp as in Fig 7-9, 12-14, 20-22. Femur equal in length to tibia and cymbium; tibia flattened and wider than femur. Bulb strongly elongate, as long as tibia and cymbium taken together; tegular apophysis 1 (*T1*) elongate, cylindrical; tegular apophysis 2 (*T2*) small but with long ventral part (*Tv*) strongly extended the embolic division, with claw like tip (*Ct*) and prolateral fold (*Tf*); conductor (*Co*) about as long as tegular apophysis. Embolus (*Em*) very long, forms several coils in different planes.

*Female*: Body 2.28 long. Carapace 0.8 long, 0.68 wide. Abdomen 1.53 long. Coloration as in male, but tibia I yellowish. Marginal spines of carapace less pronounced than in male. Legs without

**Table 1.** Leg measurements of male

| | Fe | Pt | Ti | Mt | Ta | Total |
|---|---|---|---|---|---|---|
| **Palp** | 0.53 | 0.18 | 0.53 | - | 0.53 | 1.77 |
| **I** | 0.75 | 0.35 | 0.5 | 0.5 | 0.38 | 2.48 |
| **II** | 0.65 | 0.3 | 0.43 | 0.4 | 0.35 | 2.13 |
| **III** | 0.53 | 0.25 | 0.35 | 0.35 | 0.33 | 1.81 |
| **IV** | 0.73 | 0.33 | 0.53 | 0.48 | 0.38 | 2.45 |

**Table 2.** Leg measurements of female

| | Fe | Pt | Ti | Mt | Ta | Total |
|---|---|---|---|---|---|---|
| **I** | 0.63 | 0.28 | 0.43 | 0.35 | 0.33 | 2.02 |
| **II** | 0.5 | 0.25 | 0.33 | 0.33 | 0.3 | 1.71 |
| **III** | 0.43 | 0.23 | 0.28 | 0.25 | 0.3 | 1.49 |
| **IV** | 0.63 | 0.3 | 0.4 | 0.35 | 0.33 | 2.01 |

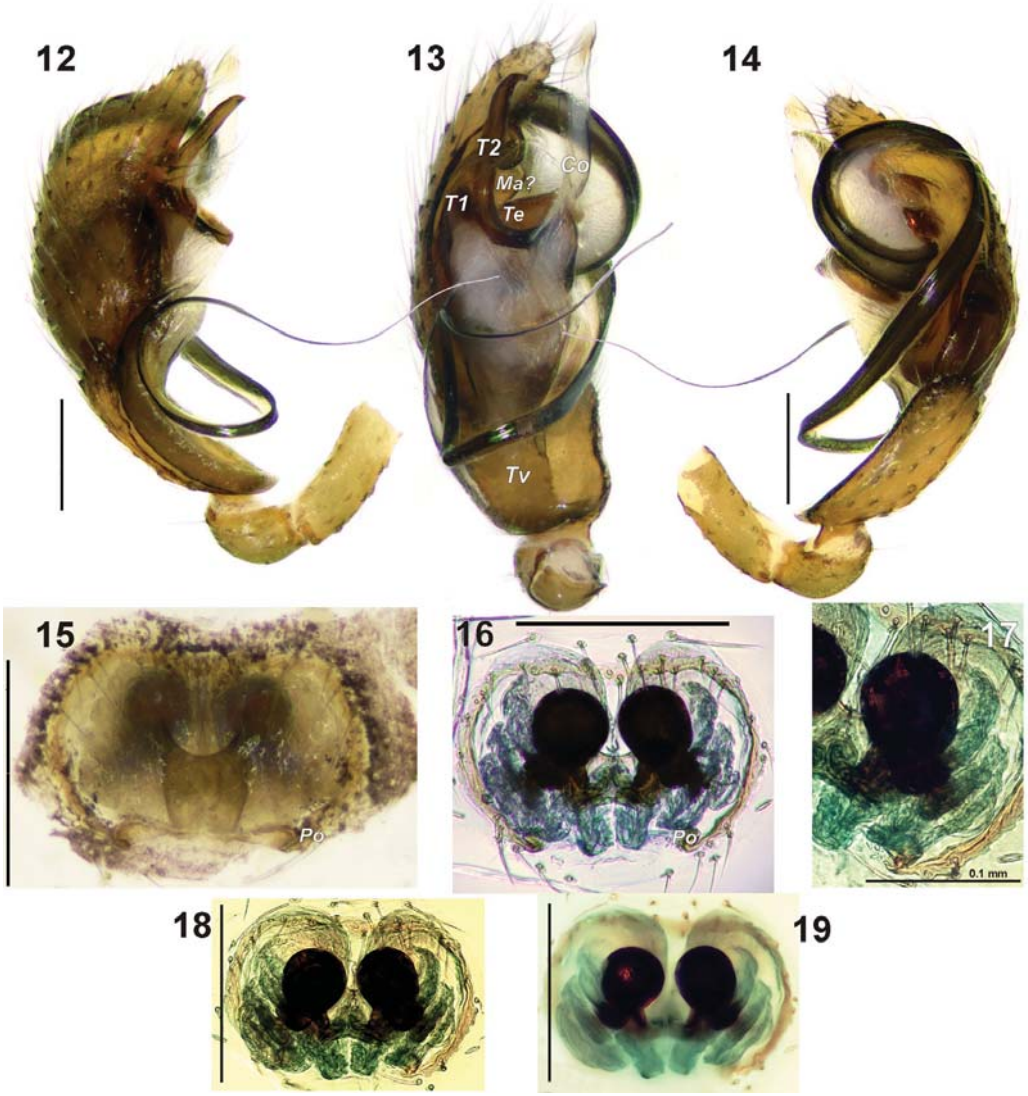


**Fig. 12-19.** Male (12-14) and female (15-19) copulatory organs of *Asagena semideserta*.
12-14, male palp, prolateral, ventral and retrolateral view; 15, intact epigyne, ventral view; 16, 18-19, endogyne, dorsal view; 17, right side of endogyne under higher magnification. Scale = 0.2 mm if not otherwise indicated.
Abbreviations: *Co* – conductor, *Ma* – median apophysis, *Po* – pocket, *T1* – tegular apophysis 1, *T2* – tegular apophysis 2, *Tv* – ventral part of the tegular apophysis 2, *Te* – tegulum


**Fig. 29.** Collecting localities of *Asagena semideserta*


**Fig. 20-28.** SEM micrographs of copulatory organs of *Asagena semideserta*.
20-22, male palp, pro-, retrolateral and ventral view; 23, epigyne, ventral view; 24, endogyne, dorsal view; 25, 27, receptacles and insemination ducts, ventro-lateral and ventral view; 26, epigynal plate with removed receptacles and insemination ducts, dorsal view; 28, epigynal plate (dorsal) and dissected receptacles (ventral view).
**Abbreviations:** *At* – epigynal atrium, *Bh* – basal haematodocha, *Co* – conductor, *Ct* – claw like tip of the embolic division, *Ef* – epigynal furrows, *Id* – insemination ducts, *Id1–3* – 3 coils of insemination ducts, *Mn* – notch of the median plate, *Mp* – median plate, *Ms* – Internal shields of epigyne, *Po* – pocket, *St* – subtegulum, *Tf* – prolateral fold of the embolic division, *T1* – tegular apophysis 1, *T2* – tegular apophysis 2, *Te* – tegulum, *Tv* – ventral part of the tegular apophysis 2

spines. For leg measurements, see Table 2.

Epigyne as in Fig. 10-11; 15-19; 23-28. Median plate (*Mp*) with a shallow notch (*Mn*) and two posterior pockets (*Po*); anterior-lateral parts of median plate form shields (*Ms*) on the dorsal (inner) side of epigynal plate. Furrows (*Ef*) formed between the plate and the shields lead to joint "atrium" (*At*). Insemination ducts (*Id*) long, weakly sclerotised, flattened, forming three coils (*Id*1–3), wrapping around the lateral side of the receptacle.

**Size variation:** Carapace in males from 0.93 to 0.98 in length and from 0.75 to 0.78 in width; length of abdomen from 1.15 to 1.3 (n=2). Body length of the second examined male 2.03. Females from 2.28 to 2.75 in the body length, carapace 0.8-0.93 long and 0.65-0.73 wide, abdomen 1.53-1.95 long (n=3).

# Discussion

*Asagena semideserta* has the longest male palpal tibia among all congeners, and appears to be the only theridiid species that has male palpal tibia longer than palpal femur. This is due to its very long bulb and embolus, with the tip located far away from conductor (in other *Asagena* and Theridiidae they are close to each other), and modified ventral extension of the tegular apophysis 1 (*Tv*) with a prolateral fold (*Tf*), serving as the functional conductor.

Internal shields (*Ms*) of the epigyne are not found in any other studied and illustrated *Asagena* species. Anterior notch of median plate in other species is much longer and heavily sclerotised (cf. Knoflach 1996). It is worth mentioning that insemination ducts in other *Asagena* are more sclerotised and cylindrical, at least in *A. phalerata* (see Knoflach 1996: Fig. 32).

Concerning the geographical range of this species, it is known from West Kazakhstan to Western Mongolia (Fig. 29). In addition to these two extreme localities, it has been found in South-Eastern Kazakhstan at the shores of the Balkhash Lake (present study).

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