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TWO SPECIES OF THE GENUS *PSECHRUS* THORELL, 1878 (ARANEAE: PSECHRIDAE) FROM NORTH SUMATRA, INDONESIA

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Summary. A new species, *Psechrus leshukovi* sp. n., is described from Sumatra Island (Indonesia) based on males collected in small caves. It is closely related to *P. singaporensis* Thorell, 1894, known from Southeast Asia, but differs from the latter by the shape of male palp. The female of *P. libelti* Kulczyński, 1908, collected in the same systems of grottos, is redescribed.

Key words: lace-sheet-weavers, hemitroglobionts, biodiversity, taxonomy, new species, redescription, Southeast Asia.

М. М. Омелько, А. А. Фомичев. Два вида рода *Psechrus* Thorell, 1878 (Araneae: Psechridae) из Северной Суматры (Индонезия) // Дальневосточный энтомолог. 2023. N 482. С. 1-9.

Резюме. Новый вид *Psechrus leshukovi* **sp. n.** описан с острова Суматра (Индонезия) по самцам, собранным в небольших пещерах. Вид близок к *P. singaporensis* Thorell, 1894 известному из Юго-Восточной Азии, но отличается от него формой пальпы самца. Переописана самка *P. libelti* Kulczyński, 1908, собранная в этой же системе гротов.

INTRODUCTION

Psechridae Simon, 1890 commonly known as lace-sheet-weavers is a relatively small family consisting of two genera: *Fecenia* Simon, 1887 and *Psechrus* Thorell, 1878. The family comprises 61 named species (WSC, 2023). Most species (57) of the family belong to *Psechrus*.

Species of the genus prefer to live in shady forest habitats and may be found at the entrances of caves, where they weave their webs that include cribellate capturing wool (Bayer, 2012). The webs feature tube-retreats, allowing the spiders to quickly escape if someone approaches, making them difficult to spot and collect (Murphy & Murphy, 2000; Bayer & Jäger, 2010).

This genus is distributed almost exclusively in Southeast Asia, with the exception of five species known from South Asia, and one species, *P. argentatus* (Doleschall, 1857), whose distribution extends to Australia.

Psechridae can be considered a comparatively well-studied family, thanks to several revisions and smaller papers published since the 1980s. The first revision of all Psechridae was made by Levi (1982). Subsequently, the Chinese fauna of the family was revised by Wang and Yin (2001). Four additional *Psechrus* species from China were recently described by Feng et al. (2016). Jäger (2007) and Bayer & Jäger (2010) described several species of *Psechrus* from Laos. Bayer (2012) conducted the most extensive revision of all known to date *Psechrus* species, describing 20 of them as new to science. Two years later, seven new species were added to the list (Bayer, 2014).

Despite the high diversity of *Psechrus* species discovered in recent decades, we expect the discovery of more new species in the future. Studying the unsorted materials stored at the Institute of Systematics and Ecology of Animals SB RAS (Novosibirsk, Russia), the authors found numerous vials with spiders collected in Sumatra Island in 1988 by an unknown collector. Among these spiders there were several specimens of *Psechrus* collected in a system of small grottos located in North Sumatra Province, belonging to two species. One of them does not conform to any known species, while the other, *P. libelti* Kulczyński, 1908, has a complicated taxonomic history and deserves redescription. The aim of the present paper is to provide a detailed description and diagnosis of the new species, as well as a redescription of *P. libelti*.

MATERIAL AND METHODS

Specimens were photographed using a Nikon DSRi2 camera attached to a Nikon SMZ25 stereomicroscope at the Far Eastern Federal University (Vladivostok, Russia),

an Olympus DP74 camera attached to an Olympus SZX16 stereomicroscope at the Altai State University (Barnaul, Russia) and Fujifilm X-T10 camera with Zeiss touit 50 mm f/2.8 macro camera lens. The photographs were taken in dishes filled with alcohol, with soft white paper or cotton at the bottom. Digital images were montaged using Zerene Stacker (<https://zerenesystems.com/cms/stacker>) and Helicon Focus software packages. Epigyne was cleared in a boiling KOH/water solution. Distribution map was produced using SimpleMappr (Shorthouse, 2010). All measurements are in millimeters. Length of leg segments were measured on the prolateral side, and are shown as: total length [femur, patella, tibia, metatarsus, tarsus]. The leg spination pattern follows Bayer (2012) with the exception that we always provide 4-digit numbers.

All examined material is deposited in the Zoological Museum of the Moscow State University, Moscow, Russia (ZMMU; curator K.G. Mikhailov) and the Institute of Systematics and Ecology of Animals SB RAS, Novosibirsk, Russia (ISEA; curator G.N. Azarkina).

Abbreviations used in text and the format of description follow Bayer (2012), with some modifications. Eyes: ALE – anterior lateral eye, AME – anterior median eye, PLE – posterior lateral eye, PME – posterior median eye. Copulatory organs: C – conductor, CD – copulatory duct, CS – cymbial scopula, E – embolus, EB – embolic base, EP – epigynal plate, FB – femur bulge, FD – fertilization duct, EM – epigynal muscle sigilla, LL – lateral lobe, MC-I, MC-II – macrosetae on coxa of leg I and II, LM – lateral margin, MT-I, MT-II – macrosetae on trochanter of leg I and II, RB – receptacle base, S – septum, SD – sperm duct, RH – receptacle head, ST – subtegulum, T – tegulum.

RESULTS

Psechrus leshukovi sp. n.

<https://zoobank.org/NomenclaturalActs/B055F3D3-8B2E-4371-8424-2D5FEDB32CAF>

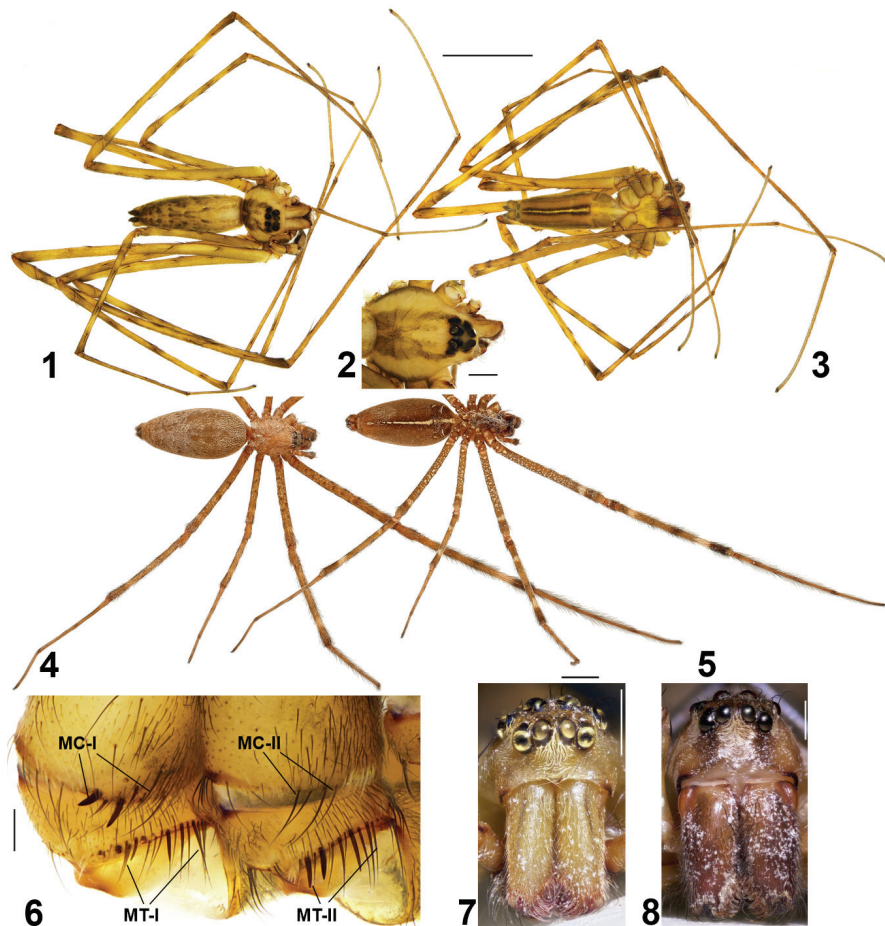
Figs 1–3, 6, 7, 9–16

TYPE MATERIAL. Holotype – ♂, **Indonesia**: Sumatra Island, North Sumatra Prov., env. of Bukit Lawang Vill. [03°33' N, 98°07' E], 250 m, hand picking from web in small grottos, 1988 (precise date unknown), unknown collector (ZMMU). Paratypes: 2♂, same place and data (ISEA 001.8985).

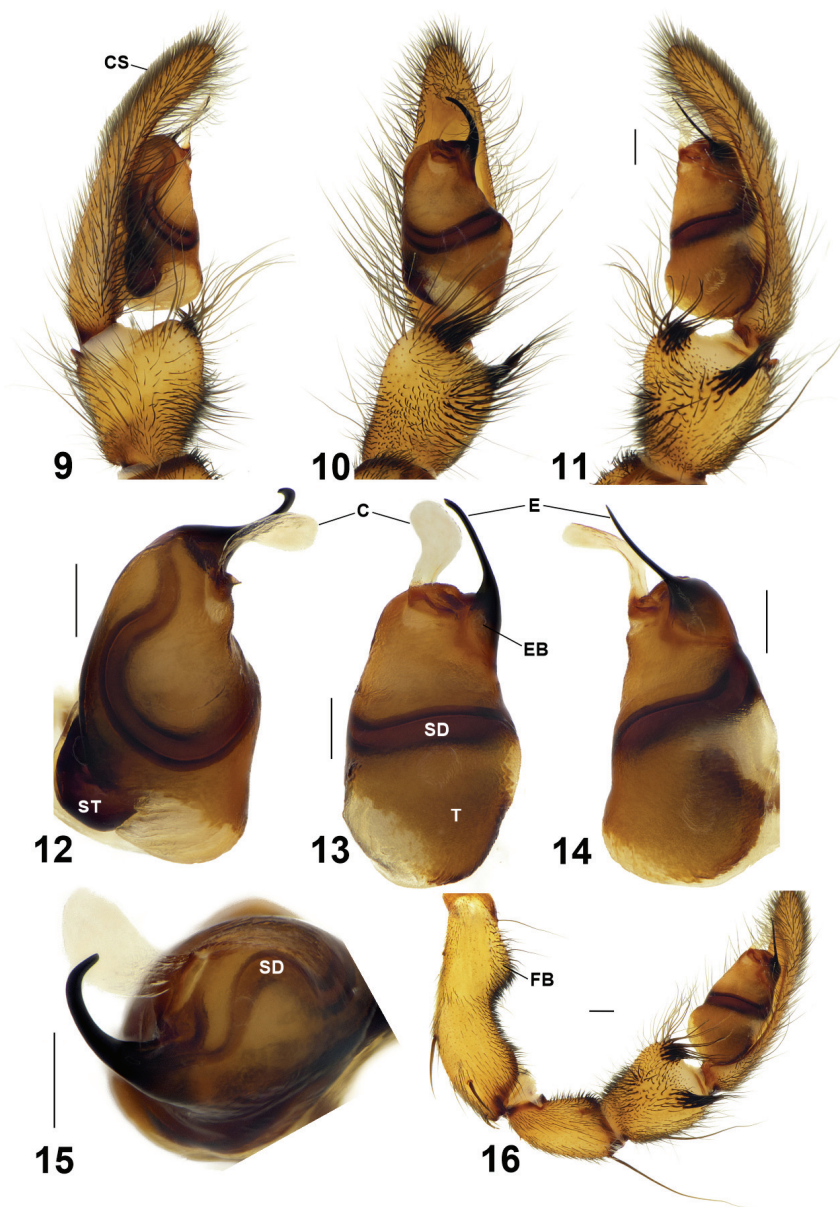
DIAGNOSIS. By palp structure (cymbium dorsally with dense scopula, shape of tegulum, embolus, conductor and sperm duct) males of *P. leshukovi* sp. n. are most similar to those of *P. singaporensis* Thorell, 1894 (cf. Figs 9–16 and 15a–d, 84h in Bayer (2012)). The new species can be easily distinguished from the latter by long, thin, noticeably curved embolus (E) (vs. short, thick, almost straight), extending to the anterior edge of conductor (C) (vs. not reaching), base of embolus (EB) in ventral view 4 times broader than embolus itself (vs. 1.2 times), and conductor O-shaped (vs. C-shaped) in ventral view (left palp) and strongly curved in retrolateral view (vs. not curved).

DESCRIPTION. Male (holotype). Body and eye measurements. Total length 10.59, carapace length 4.66, carapace width 2.88, anterior width of carapace 1.49, opisthosoma length 5.88, opisthosoma width 2.05. Eyes: AME 0.37, ALE 0.36, PME 0.34, PLE 0.29, AME–AME 0.10, AME–ALE 0.03, PME–PME 0.18, PME–PLE 0.22, AME–PME 0.26, ALE–PLE 0.28, clypeus height at AME 0.39, clypeus height at ALE 0.33.

Carapace yellow with narrow (ca. 1x diameter of PME), gray, slightly serrated lateral bands. Median band gray with yellow mark anteriorly, slightly serrated. Chelicerae



Figs 1–8. *Psechrus leshukovi* sp. n. (1–3, 6–7) and *P. libelti* (4–5, 8). 1, 4 – whole habitus, dorsal; 3, 5 – ditto, ventral; 2 – carapace, dorsal; 6 – coxae and trochanters I–II; 7, 8 – cephalic part, anterior. Abbreviations: MC-I, MC-II – macrosetae ventrally on coxa of leg I and II; MT-I, MT-II – macrosetae on trochanter of leg I and II. Scale bars = 5 mm (1, 3, 4, 5), 1 mm (2, 7, 8), 0.2 mm (6).



Figs 9–16. Palp (9–11, 16) and bulb (12–15) of *Psechrus leshukovi* sp. n. 9, 12 – prolateral; 10, 13 – ventral; 11, 14, 16 – retrolateral; 15 – anterior. Abbreviations: C – conductor, CS – cymbial scopula, E – embolus, EB – embolic base, FB – femur bulge, SD – sperm duct, ST – subtegulum, T – tegulum. Scale = 0.2 mm.

yellowish with 3 promarginal and 4 retromarginal teeth. Maxillae light brown. Sternum yellowish at lateral margins with dark brown, triangle patch centrally. Legs and palps yellow, with vague dark annulations. Opisthosoma dorsally yellowish (grayish posteriorly), laterally grayish, ventrally light brown with narrow, yellow and black longitudinal line.

Measurements of palp and legs. Palp: 5.49 [1.79, 1.03, 0.86, 1.81]; Legs: I 56.75 [15.34, 1.87, 15.85, 16.49, 7.20], II 41.04 [11.06, 1.58, 10.65, 11.76, 5.99], III 27.03 [7.62, 1.35, 6.71, 7.53, 3.82], IV 45.23 [12.52, 1.52, 11.22, 13.59, 6.38].

Spination. Palp: 1410, 0000, 0000 (all palpal tibia spines small, some of them are setae-like); legs: femur I 6560, II 7650, III 5430, IV 5730; patella I–IV 0000; tibia I 3049, II 2036, III 3235, IV 3035; metatarsus I 3036, II 3036, III 3036, IV 4035.

Macrosetae ventrally on coxae I and trochanter I–II present, well developed (Fig. 6).

Palp as in Figs 9–16. Femur modified with a flat ventral bulge (FB). Cymbium (length/width ratio ca. 3.9) dorsally with scopula (CS), covering almost half of cymbium. Conductor (C) wide, hyaline, poorly visible when bulbous not cut off from cymbium. Conductor 1.5 times wider in middle part, than at its base, strongly curved in pro- and retrolateral view. Embolus (E) long (about 1/3 of tegulum length) with broad base (EB) in ventral view.

Female unknown.

BIOLOGY. *Psechrus leshukovi* sp. n., similar to many of its congeners appears to be a hemitroglobionts, meaning it is found both in caves and similar habitats without specific morphological adaptations to cave conditions (Birshtein, 1985).

NOTES. Based on the structure of its male palp, coloration, and legs spination *P. leshukovi* sp. n. belongs to *P. singaporensis*-group. Thus, this group comprises five species: *P. arcuatus* Bayer, 2012, *P. elachys* Bayer, 2012, *P. leshukovi* sp. n., *P. norops* Bayer, 2012 and *P. singaporensis*. Two species of the group (*P. arcuatus* and *P. singaporensis*) are known from Sumatra, other from Malaysian Peninsula and Thailand. It is worth noting that Bayer (2012) reported *P. singaporensis* from Bohorok Town [03°31' N, 98°09' E], which is in close proximity to Bukit Lawang Village (the distance is ca. 5 km). Bayer mentioned this record based on several female and juvenile specimens as doubtful. There is a high probability that these females from Bohorok Town actually belong to *P. leshukovi* sp. n. Specimens from Bohorok Town are stored in Nationaal Natuurhistorisch Museum Naturalis in Leiden (Netherlands) (RMNH). We don't have the opportunity to study them.

DISTRIBUTION. Type locality only (Figs 20, 21).

ETYMOLOGY. The specific name is a patronym in honor of Ivan Leshukov (Jakarta, Indonesia), Russian biologist and tourist guide working in Indonesia.

***Psechrus libelti* Kulczyński, 1908**

Figs 4, 5, 8, 17–19

P. libelti Kulczyński, 1908: 561, pl. 23, fig 31 (♀).

P. libelti: Bayer, 2012: 21, figs 5a–e, 6a–e, 82a, 84b–c, 87b, 90b (♂♀).

For the complete list of references see WSC (2023).

MATERIAL EXAMINED. **Indonesia:** Sumatra Island, North Sumatra Prov., env. of Bukit Lawang Vill. [03°33' N, 98°07' E], 250 m, hand picking from web in small grottos, 1988 (precise date unknown), unknown collector, 1♀ (ISEA 001.8986).

DIAGNOSIS. The female of *P. libelti* is most similar to those of *P. argentatus* (Doleschall, 1857) in having broad and flat copulatory ducts (CD) and receptacle heads (RH) on long stalks but can be distinguished from it by septum (S) approximately as long as wide (vs. twice wider than long) and converging lateral margins (LM) (vs. parallel) (cf. Figs 17–18 and fig. 2g in Bayer (2012)). Endogyne of both species are nearly indistinguishable.

REDESCRIPTION. Female. Body and eye measurements. Total length 19.7, carapace length 7.0, carapace width 5.3, anterior width of carapace 3.1, opisthosoma length 14.0, opisthosoma width 6.7. Eyes: AME 0.43, ALE 0.46, PME 0.49, PLE 0.44, AME–AME 0.29, AME–ALE 0.13, PME–PME 0.21, PME–PLE 0.4, AME–PME 0.49, ALE–PLE 0.57, clypeus height at AME 1.09, clypeus height at ALE 0.93.



Figs 17–19. Epigyne of *Psechrus libelti*. 17 – ventral, intact; 18 – ditto, macerated; 19 – ditto, dorsal. Abbreviations: CD – copulatory duct, EP – epigynal plate, FD – fertilization duct, EM – epigynal muscle sigilla, LL – lateral lobe, LM – lateral margins, RB – receptacle base, S – septum, RH – receptacle head.

Carapace and chelicerae light brown. Chelicerae with 3 promarginal and 3 retro-marginal teeth. Maxillae brown, darker distally. Sternum brown, with light setae at the edges. Legs and palps light brown with vague dark annulations. Opisthosoma cream-colored dorsally, ventrally brown, with narrow, white and dark brown longitudinal line.

Measurements of palp and legs. Palp: 9.4 [3.0, 1.3, 1.7, 3.4]; Legs: I 57.6 [16.3, 3.5, 16.2, 15.3, 6.3], II 42.1 [12.5, 3.0, 11.0, 11.0, 4.6], III 28.9 [8.9, 2.3, 7.0, 7.3, 3.4], IV 43.2 [13.0, 2.6, 11.0, 11.4, 5.2].

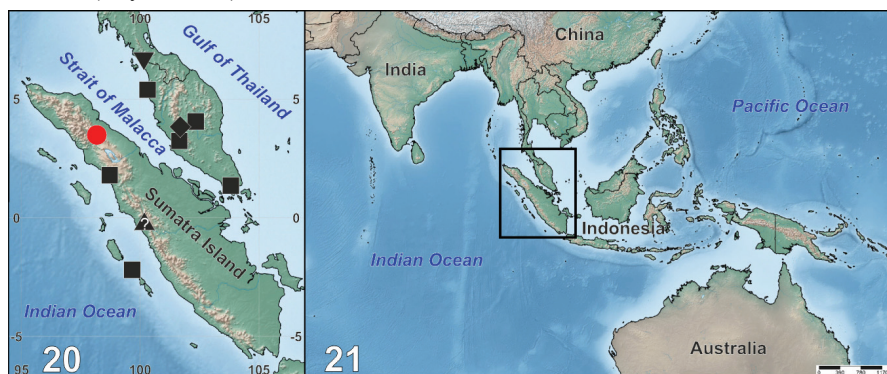
Spination. Palp: 1310, 1400, 2100, 2210; Legs: femur I 7770, II 7670, III 6560, IV 6740; patella I–IV 0000; tibia I 3034, II 3036, III 3135, IV 3034; metatarsus I 3035, II 3035, III 3035, IV 3034.

Epigyne structure (Figs 17–19). Epigynal plate (EP) 3 times longer than septum (S). Septum trapezoidal, nearly as long, as wide. Lateral margins (LM) converging. Epigynal muscle sigilla (EM) adjoining to epigynal plate. Copulatory ducts (CD) twice wider than receptacle base (RB). Spermathecal bases bent anteriad. Stalks of receptacle heads (RH) approximately twice shorter than receptacle bases. Receptacle heads bear distinct glands.

BIOLOGY. The same is in *P. leshukovi* sp. n.

NOTES. At the beginning of this research we initially believed that the treated female belonged to *P. leshukovi* sp. n. Later, after studying vulva of this specimen we concluded that it belongs to another species, even from a different species group. We identified this female as *P. libelti*, species described from Palembang (Sumatra). This case highlights that different species of *Psechrus* are able to inhabit the same cave, leading to the potential mismatching of males and females during the description of new species. A similar example of such syntopy, where two different species of *Psechrus* belonging to different species groups is already known from Laos. *Psechrus laos* Bayer, 2012 and *P. luangprabang* Jäger, 2007 were recorded from the same cave in Lak Sao [18°13'38.2" N, 104°44'47.3" E] (Bolikhamsay Province) (Bayer, 2012). Thereby, repeatedly discovered syntopy/cohabitation of *Psechrus* species, combined with high diversity of this genus, should make the taxonomists working on this group careful when describing new species or missing sexes. Currently, about a quarter of *Psechrus* species (15 species out of 57) are known based on only one sex (WSC, 2023).

DISTRIBUTION. Distributed in Malay Peninsula and Sumatra and Kalimantan Islands (Bayer, 2012).



Figs 20–21. Localities of *Psechrus singaporensis*-group species. Circle – *P. leshukovi* sp. n., square – *P. singaporensis*, diamond – *P. norops*, triangle – *P. arcuatus*, inverted triangle – *P. elachys*. One symbol may refer to more than one closely located collecting locality. Question mark denote locality without accurate coordinates. The frame on Fig. 21 refers to the content of Fig. 20.

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