

**More about the genus *Chaerilus* Simon, 1877
in Vietnam and Cambodia, with descriptions of two new species
(Scorpiones: Chaerilidae)**

**Еще о роде *Chaerilus* Simon, 1877 во Вьетнаме и Камбодже
с описаниями двух новых видов (Scorpiones: Chaerilidae)**

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КЛЮЧЕВЫЕ СЛОВА: скорпион, *Chaerilus*, новый вид, Вьетнам, Камбоджа.

ABSTRACT. Two new species of *Chaerilus* are described from Southeast Asia: *C. aneae* sp.n. from southern Vietnam and *C. kampuchea* sp.n. from Cambodia. These new species are compared to the other *Chaerilus* species known from Southeast Asia and Indonesian islands. This study suggests that different species are not too much distinct morphologically, rather corresponding to micro-endemic populations. Molecular studies, now in preparation, are deemed to bring further evidence to favour or refute this hypothesis.

РЕЗЮМЕ. Описаны два новых вида *Chaerilus* из Юго-Восточной Азии: *C. aneae* sp.n. с юга Вьетнама и *C. kampuchea* sp.n. из Камбоджи. Эти новые виды сравниваются с другими видами *Chaerilus*, известными и Юго-Восточной Азии и островов Индонезии. Данное исследование предполагает, что различные виды не слишком сильно отличаются друг от друга морфологически, скорее соответствуя узкоэндемичным популяциям. Находящиеся в процессе обработки молекулярные данные должны либо подтвердить, либо опровергнуть эту гипотезу.

Introduction

The family Chaerilidae, with its single genus *Chaerilus* Simon, 1877, still remains poorly-known among extant scorpions. This genus was originally created to accommodate *Chaerilus variegatus* Simon 1877, a species from Java. Subsequently, several other species have been described from Indonesian islands and nearby geographic regions such as Malaysia and Singapore. The majority of these descriptions were based on very limited material, and on weak and/or unclear diagnostic characters. In many cases they were not properly illustrated, sometimes no illustrations were provided at all! This confused situation led to several

cases of misidentification by early authors [e.g. Kraepelin, 1894; Pocock, 1899; Fage, 1933, 1936, 1944].

More recently, attempts to clarify the taxonomic status of several species have been more or less successful. Kovařík [2000], in a very crude revision of *Chaerilus*, defined 18 species as valid. He clarified, however, the identity of one population from southern Vietnam which had previously been misidentified by Fage [1933, 1936, 1944] as *C. celebensis* Pocock, 1894, *C. rectinimanus* Pocock, 1899 and/or *C. variegatus*. He also described *C. petrzelkai* Kovařík, 2000. Subsequently, that species was redescribed and illustrated by Lourenço & Zhu [2008]. *C. celebensis* was also re-described and confirmed as an endemic element of the Celebes (Sulawesi) fauna [Lourenço & Ythier, 2008; Lourenço et al., 2010]. In addition, *C. philippinus* Lourenço & Ythier, 2008, *C. thai* Lourenço, Sun & Zhu, 2010 and *C. spinatus* Lourenço & Duhem, 2010 have been described from the Philippines, Thailand and the Island of Halmahera, Indonesia, respectively [Lourenço & Ythier, 2008; Lourenço & Duhem, 2010; Lourenço et al., 2010].

During the last three decades, but especially in the recent years, further new species have been revealed in tropical Asia: *C. chapmani* Vachon & Lourenço, 1985 from Sarawak, Borneo, *C. sabinae* Lourenço, 1995 from Celebes, *C. ojangureni* Kovařík, 2005 and *C. sejnai* Kovařík, 2005 from Malaysia, *C. laoticus* Lourenço & Zhu, 2008 from Laos, *C. vietnamicus* Lourenço & Zhu, 2008 from Vietnam, *C. telnovi* Lourenço, 2009 from the Moluccas, and *C. andamanensis* Lourenço, Duhem & Leguin, 2011 from the Andaman Islands [Vachon & Lourenço, 1985; Lourenço, 1995, 2009; Kovařík, 2005; Lourenço & Zhu, 2008; Lourenço et al., 2011].

So far, five species have been described from Laos and Vietnam: *C. laoticus* from Laos, *C. petrzelkai* and *C. julietteae* Lourenço, 2011 from southern Vietnam,

C. vietnamicus from northern Vietnam, and *C. phami* Lourenço, 2011 from the Island of Côn Sơn (Poulo Condore). In contrast, no *Chaerilus* species have hitherto been recorded from Cambodia [Lourenço & Zhu, 2008; Lourenço, 2011a, b]. These species belong to two distinct groups, as defined by Lourenço [2011a].

The following species can be retained as valid for the Indonesian Islands and Southeast Asia. However, those marked with an asterisk (*) have not been examined in the present study. These are probably valid species, but better descriptions with proper illustrations are required.

1. The 'variegatus species-group'

C. andamanensis Lourenço, Duhem & Leguin, 2011

C. annea sp.n.

Chaerilus borneensis Simon, 1880

Chaerilus celebensis Pocock, 1894

C. kampuchea sp.n.

Chaerilus laoticus Lourenço & Zhu, 2008

**Chaerilus ojangureni* Kovařík, 2005

Chaerilus petrzelkai Kovařík, 2000

Chaerilus philippinus Lourenço & Ythier, 2008

Chaerilus phami Lourenço, 2011

Chaerilus rectimanus Pocock, 1899

Chaerilus robinsoni Hirst, 1911

Chaerilus sabinae Lourenço, 1995

**Chaerilus sejnai* Kovařík, 2005

Chaerilus spinatus Lourenço & Duhem, 2010

Chaerilus telnovi Lourenço, 2009

Chaerilus thai Lourenço, Sun & Zhu, 2010

Chaerilus variegatus Simon, 1877

Chaerilus vietnamicus Lourenço & Zhu, 2008

2. The 'truncatus species group'

Chaerilus agilis Pocock, 1899

Chaerilus cavernicola Pocock, 1894

Chaerilus chapmani Vachon & Lourenço, 1985

Chaerilus juliettae Lourenço, 2011

Chaerilus laevimanus Pocock, 1899

**Chaerilus tichyi* Kovařík, 2000

Material and methods

All type material is deposited in the Muséum national d'Histoire naturelle, Paris, France (MNHN). Illustrations and measurements were made with the aid of a Wild M5 stereo-microscope with a drawing tube (camera lucida) and an ocular micrometer. Measurements follow Stahnke [1970] and are given in mm. Trichobothrial notations follow Vachon [1974] while morphological terminology mostly follows Hjelle [1990].

Taxonomic part

Chaerilidae Pocock, 1893

Chaerilus Simon, 1877

Chaerilus annea sp.n.

Figs 1–6.

HOLOTYPE ♀. Vietnam, Binh Thuan Province, Ta Kou (9C), 670 m alt., under stone, 13.XII.2006. leg. J. Arabi.

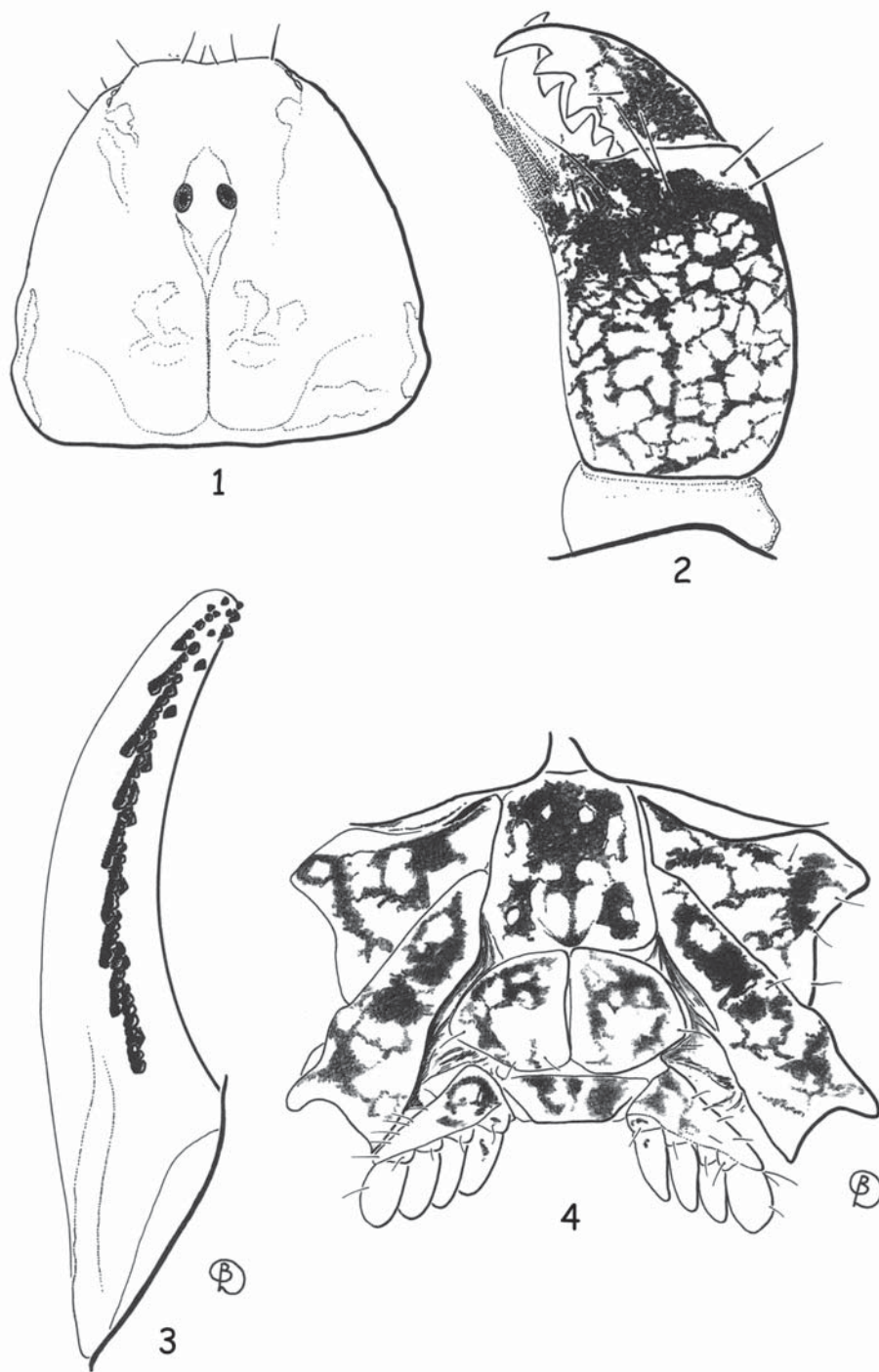
NAME. Honours Anne Bedos (MNHN) for her efforts in collecting scorpions in Southeast Asia.

DIAGNOSIS. A small species compared to other congeners, 18.2 mm in total length. General coloration reddish-brown, marked intensely with variegated brownish spots. Carapace strongly narrowed towards anterior edge; almost acarinate and moderately granulated; anterior margin weakly emarginate; furrows shallow. Metasomal carinae strongly marked; ventral carinae absent from segments I and II, weakly marked in segment III; lateroventral and ventral carinae in segment V composed of spinoid granules. Telson pyriform; aculeus weakly curved. Dentate margins of fixed and movable fingers with 9 and 10 rows of granules, respectively. Pectinal tooth count 4–4 (♀). Genital operculum plates suboval in shape. Trichobothriotaxy of type B, orthobothriotaxic.

RELATIONSHIPS. *C. annea* sp.n. shows especially clear-cut morphological similarities to *C. petrzelkai*, also described from Vietnam. However, the new species can readily be distinguished by the following combination of characters: (i) a darker coloration, in particular in ventral view, with spots over the genital operculum and pectines, (ii) pedipalp chela fingers with 9 or 10 rows of granulations, (iii) metasomal carinae with strongly marked spinoid granules.

DESCRIPTION. Coloration: Basically reddish-brown, but intensely marked with brownish variegated spots. Carapace reddish-brown, with dark spots in central area. Tergites yellowish, strongly marked with dark confluent spots. Metasomal segments yellowish with dark variegated spots. Telson yellowish with dark variegated spots; aculeus reddish. Chelicerae yellowish, intensely marked with variegated spots; fingers blackish; teeth dark reddish. Pedipalps reddish-brown; femur more intensely spotted than patella and chela, blackish; dentate margins of fingers almost blackish. Legs yellowish with brownish variegated spots. Venter and sternites reddish-yellow to reddish-brown; genital operculum and pectines with variegated spots.

Carapace strongly narrowed anteriorly; anterior margin weakly emarginate; almost acarinate and moderately granulated; furrows shallow. Two pairs of lateral eyes, and one pair of moderate median eyes about twice the size of lateral eyes; median eyes anterior to centre of carapace. Tergites moderately to strongly granulated; carinae obsolete. Sternum pentagonal, longer than wide; genital operculum plates suboval. Pectinal tooth count 4–4 (♀). Sternites smooth, with a few minute granules on VII; spiracles small and round; carinae absent from VII. Metasomal segments I to III wider than long; segment IV as long as wide; V longer than wide. All carinae strongly granular; ventral carinae absent from segment I; weakly marked in segment II; dorsal and laterodorsal carinae with spinoid granules in segments I–IV; lateroventral and ventral carinae in segment V composed of spinoid granules. Vesicle moderately elongated, pyriform, almost smooth, with a few granules at base of aculeus; aculeus short

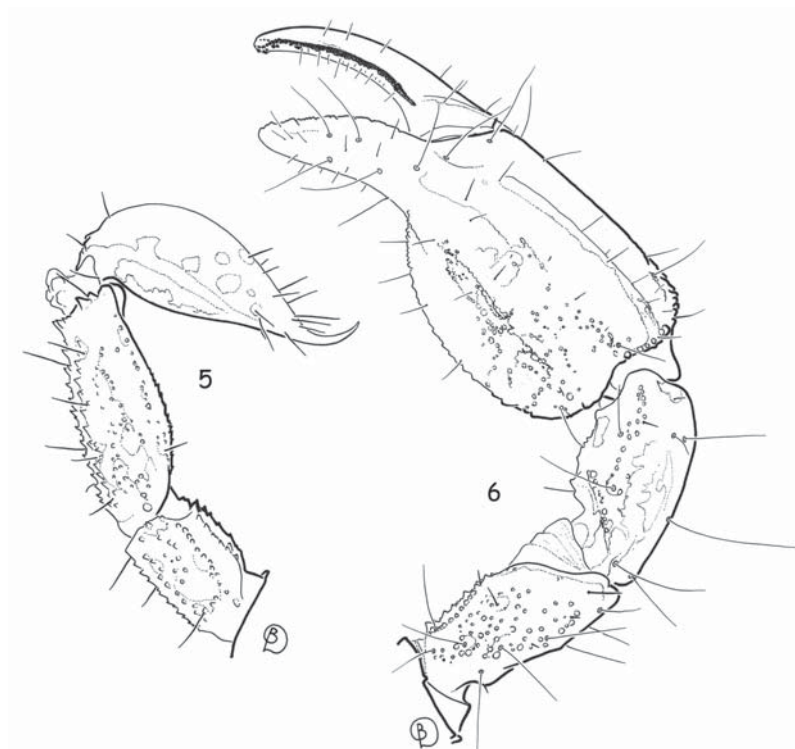


Figs 1–4. *Chaerilus annea* sp.n., ♀ holotype: 1 — carapace, dorsal aspect; 2 — chelicera, dorsal aspect; 3 — cutting edge of movable finger with rows of granules; 4 — ventral aspect, showing coxapophysis, sternum, genital operculum and pectines.

Рис. 1–4. *Chaerilus annea* sp.n., голотип ♀: 1 — карапакс, сверху; 2 — хелицера, сверху; 3 — режущий край подвижного пальца с рядами гранул; 4 — вид снизу с изображением коксапофиза, стернита, крышечки гениталий и пектин.

and weakly curved. Pedipalps not elongated; femur with five carinae; internal with a few spinoid granules. Patella with 6 or 7 vestigial carinae. Chela weakly enlarged, with 7 or 8 moderately granular carinae. Tegument moderately granular. Fixed and movable fingers shorter than manus, with 9 and 10 rows of granulations

at dentate margins. Chelicerae characteristic of the family Chaerilidae [Vachon, 1963]. Trichobothriotaxy of type B; orthobothriotaxic [Vachon, 1974]; femur with nine trichobothria, patella with 14, chela with 14. Legs with pedal spurs moderately developed. Tarsi with two rows of setae. Hemispermaphore unknown.



Figs 5 & 6. *Chaerilus anneae* sp.n., ♀ holotype: 5 — metasomal segments IV & V, and telson, lateral aspect; 6 — right pedipalp, dorsal aspect, showing trichobothrial pattern.

Рис. 5–6. *Chaerilus anneae* sp.n., голотип ♀: 5 — сегменты IV и V метасомы и тельсон, сбоку; 6 — правая педипальпа, сверху, с изображением характера распределения трихоботрий.

Morphometric values (in mm). Total length (including telson), 18.2. Carapace: length, 2.6; anterior width, 1.5; posterior width, 3.3. Mesosoma length, 6.2. Metasomal segments. I: length, 0.8; width, 1.7; II: length, 1.0; width, 1.4; III: length, 1.1; width, 1.3; IV: length, 1.2; width, 1.2; V: length, 2.4; width, 1.1; depth, 0.9. Telson length, 2.9. Vesicle: width, 1.3; depth, 1.1. Pedipalp: femur length, 2.1, width, 0.9; patella length, 2.2, width, 1.0; chela length, 4.6, width, 1.6, depth, 2.1; movable finger length, 2.2.

Chaerilus kampuchea sp.n.

Figs 7–12.

HOLOTYPE ♂, Cambodia, Kampot Prov., Phnom Laang, near Cave Kien Krol, in litter, Berlese extraction, 20.XI.2005, leg. L. Deharveng & A. Bedos (KAM05-23).

Paratypes: 1 ♂ juv., 1 ♀ juv., same locality, together with holotype.

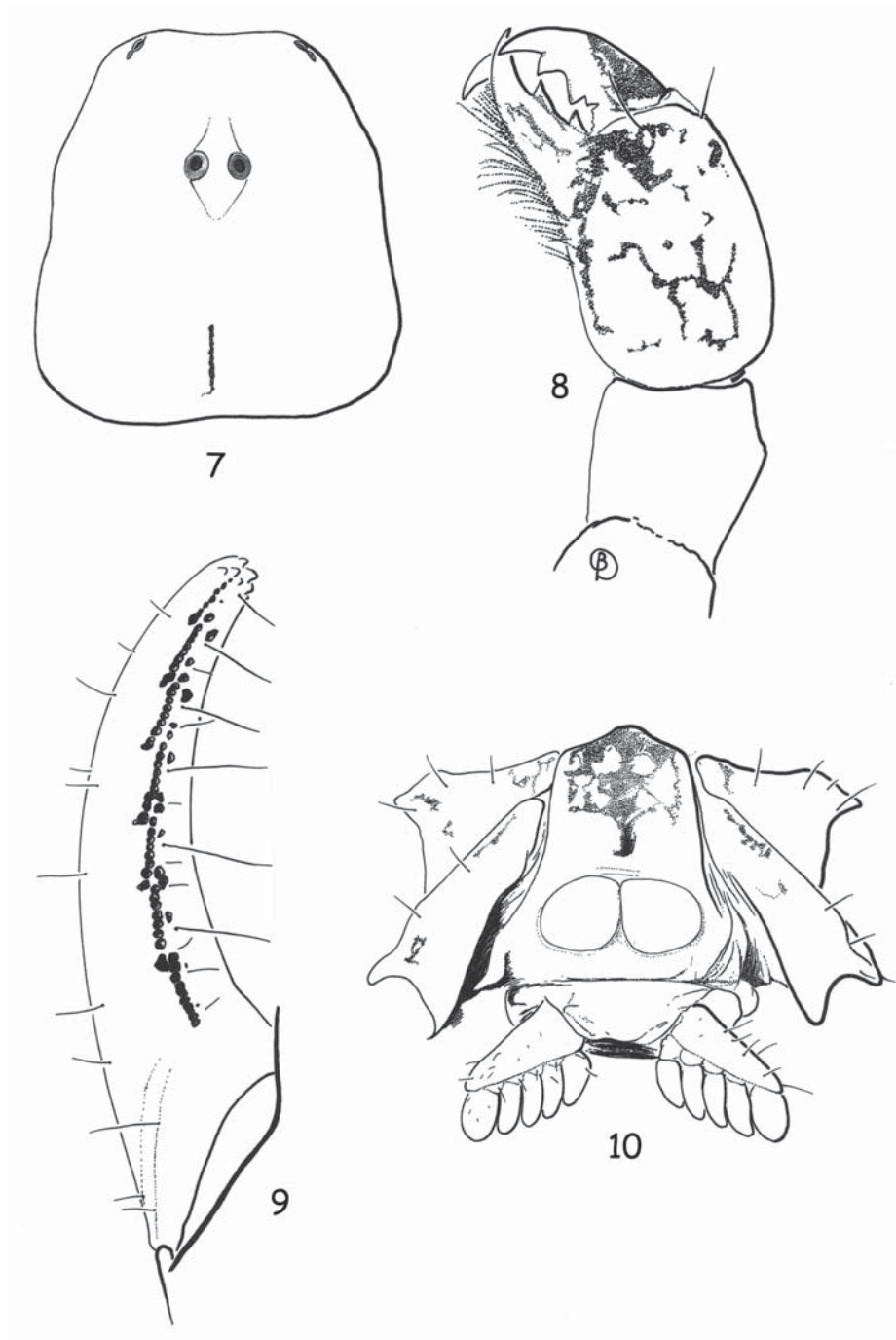
NAME. The specific name is placed in apposition to the generic name and refers to Kampuchea, the name of Cambodia in the Khmer language.

DIAGNOSIS. A small species compared to other congeners, 13.5 mm in total length. General coloration yellowish, marked intensely with variegated brownish spots. Carapace strongly narrowed towards anterior edge; acarinate and almost smooth; anterior margin almost straight, without any concavity; furrows shallow. Metasomal carinae moderately marked; ventral

carinae absent from or obsolete in segments I and II, weakly marked in segments III and IV; lateroventral and ventral carinae in segment V composed of spinoid granules. Telson moderately elongated, pyriform; aculeus weakly curved. Dentate margins of fixed and movable fingers with 8–8 rows of granules. Pectinal tooth count 5–5 (♂) or 3–3 (♀). Genital operculum plates oval. Trichobothriotaxy of type B, orthobothriotaxic. Hemispermaphore unknown.

RELATIONSHIPS. *C. kampuchea* sp. n. shows especially clear-cut morphological similarities to *C. anneae* sp.n. and *C. petzelkai*, both described from Vietnam. However, the new species can readily be distinguished by the following combination of characters: (i) a paler coloration with distinct variegated pigmentation, (ii) less well marked carinae and granulations: carapace and tergites smooth, (iii) pedipalp chela fingers with 8–8 rows of granulations.

DESCRIPTION. Coloration: Basically yellowish, intensely marked with a variegated brownish pattern. Carapace yellowish, with dark spots anteriorly and laterally. Tergites yellowish with variegated spots. Metasomal segments yellowish with variegated spots. Telson yellowish with diffused variegated spots; aculeus reddish. Chelicerae yellowish with variegated spots, better marked internally; fingers yellowish with dark spots; teeth reddish. Pedipalps yellowish; femur more intensely spotted than patella and chela; fingers dark;



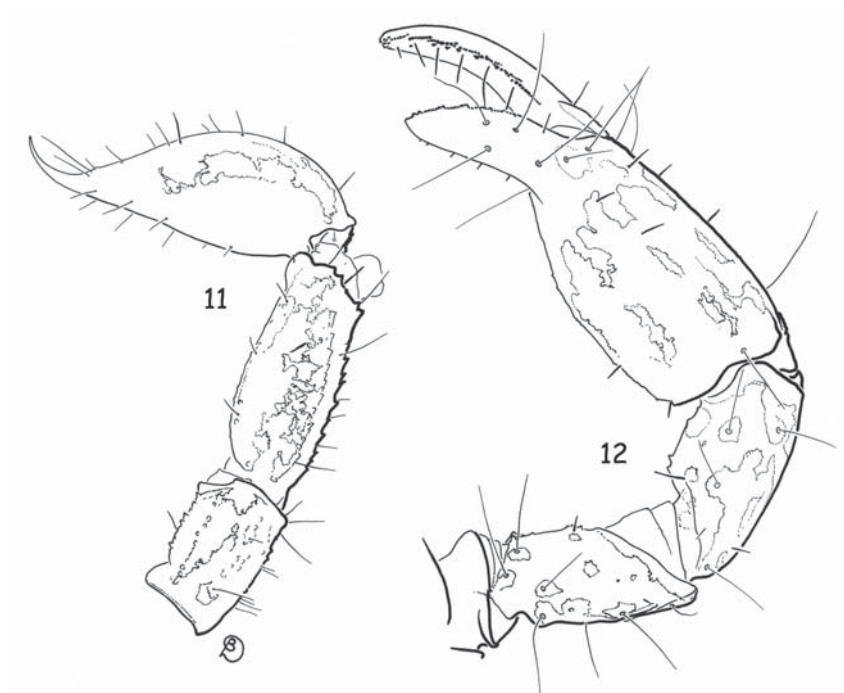
Figs 7–10. *Chaerilus kampuchea* sp.n., ♂ holotype: 7 — carapace, dorsal aspect; 8 — chelicera, dorsal aspect; 9 — cutting edge of movable finger with rows of granules; 10 — ventral aspect, showing coxapophysis, sternum, genital operculum and pectines.

Рис. 7–10. *Chaerilus kampuchea* sp.n., голотип ♂: 7 — карапакс, сверху; 8 — хелицера, сверху; 9 — режущий край подвижного пальца с рядами гранул; 10 — вид снизу с изображением коксапофиза, стернита, крышечки гениталий и пектин.

dentate margins of fingers reddish. Legs pale yellow with diffused brownish spots. Venter and sternites yellowish with some diffused spots; pectines pale yellow.

Carapace strongly narrowed anteriorly; anterior margin almost straight, without any concavity; acarinate and almost smooth, with some minute granulations anteriorly; furrows shallow. Two pairs of lateral

eyes, and one pair of large median eyes about twice the size of lateral eyes; median eyes anterior to centre of carapace. Tergites smooth; carinae obsolete. Sternum pentagonal, longer than wide; genital operculum plates oval. Pectinal tooth count 5–5 (♂) or 3–3 (♀). Sternites smooth with spiracles small and rounded; carinae absent from VII. Metasomal segments I and II wider than



Figs 11 & 12. *Chaerilus kampuchea* sp.n., ♂ holotype: 11 — metasomal segments IV & V, and telson, lateral aspect; 12 — right pedipalp, dorsal aspect, showing trichobothrial pattern.

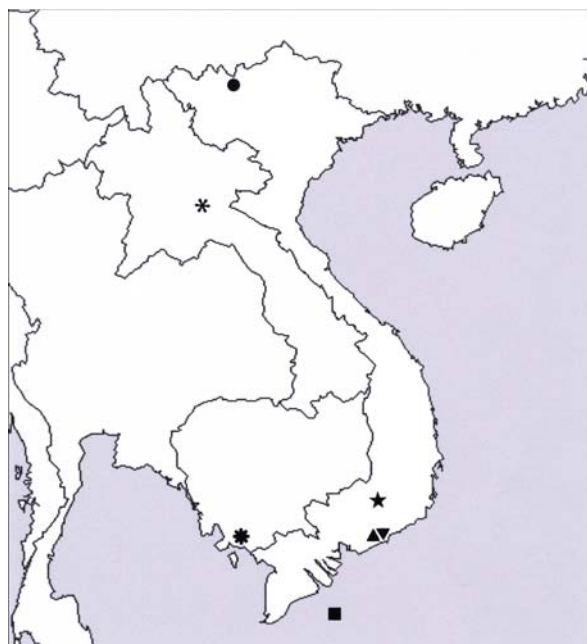
Рис. 11–12. *Chaerilus kampuchea* sp.n., голотип ♂: 11 — сегменты IV и V метасомы и тельсон, сбоку; 12 — правая педипальпа, сверху, с изображением характера распределения трихоботрий.

long; segment III as long as wide; segments IV and V longer than wide. All carinae moderately granular; ventral carinae absent from or obsolete in segments I and II, weakly marked in segments III and IV; lateroventral and ventral carinae in segment V composed of spinoid granules. Vesicle moderately elongated, pyriform, smooth; aculeus short and weakly curved. Pedipalps not elongated; femur with five carinae; internal without spinoid granules. Patella with vestigial carinae. Chela weakly enlarged and with carinae, weakly granular. Tegument almost smooth, with some minute granulations. Fixed and movable fingers shorter than manus, with 8–8 rows of granulations at dentate margins. Chelicerae characteristic of the family Chaerilidae [Vachon, 1963]. Trichobothriotaxy of type B; orthobothriotaxic [Vachon, 1974]; femur with nine trichobothria, patella with 14, and chela with 14. Legs with pedal spurs strongly developed. Tarsi with two rows of spiniform setae. Hemispermatophore unknown.

Morphometric values (in mm) of holotype. Total length (including telson), 13.5. Carapace: length, 2.0; anterior width, 1.0; posterior width, 2.0. Mesosoma length, 4.5. Metasomal segments. I: length, 0.6; width, 1.2; II: length, 0.7; width, 0.9; III: length, 0.8; width, 0.8; IV: length, 1.0; width, 0.7; V: length, 1.6; width, 0.7; depth, 0.6. Telson length, 2.3. Vesicle: width, 1.0;

Fig. 13. Map of Southeast Asia, showing the distribution of the *Chaerilus* species known from this region: *C. annea* sp.n. (black triangle); *C. juliettea* (inverted black triangle); *C. kampuchea* sp.n. (black asterisk); *C. laoticus* (black flower); *C. petrzelkai* (black star); *C. phami* (black square); *C. vietnamicus* (black circle).

Рис. 13. Карта Юго-Восточной Азии, показывающая распространение видов рода *Chaerilus*, известных из этого региона: *C. annea* sp.n. (черный треугольник); *C. juliettea* (перевернутый черный треугольник); *C. kampuchea* sp.n. (черная звездочка); *C. laoticus* (черный цветок); *C. petrzelkai* (черная звезда); *C. phami* (черный квадрат); *C. vietnamicus* (черный круг).



depth, 0.7. Pedipalp: femur length, 1.3, width, 0.8; patella length, 1.5, width, 0.8; chela length, 3.1, width, 1.0, depth, 1.1; movable finger length, 1.5.

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