

## ABOUT THE SPECIES OF THE GENUS *CHAERILUS* SIMON, 1877 (SCORPIONES, CHAERILIDAE) DESCRIBED BY EUGÈNE SIMON

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**Abstract:** Two species of *Chaerilus*, *C. variegatus* Simon, 1877 and *C. borneensis* Simon, 1880 are confirmed for the Indonesian islands of Java and Borneo (Kalimantan). In the present note, revised diagnoses are proposed for both species in the light of the type material and several specimens collected in these two islands. These two species are confirmed as valid and distinct and are most certainly endemic elements respectively to Java and Borneo. Some comments are also given on the other species of *Chaerilus* distributed in the Indonesian islands and nearby geographic regions.

**Key words:** Scorpiones, Chaerilidae, *Chaerilus*, Indonesia, Java, Borneo.

**A propósito de las especies del género *Chaerilus* Simon, 1877 (Scorpiones, Chaerilidae) descritas por Eugène Simon**

**Abstract:** Se confirma la presencia en las islas indonesias de Java y Borneo (Kalimantán) de dos especies de *Chaerilus*, *C. variegatus* Simon, 1877 y *C. borneensis* Simon, 1880. Se proponen diagnosis revisadas para ambas especies, sobre la base del material típico y de varios especímenes recogidos en dichas islas. Se confirma la validez y caracteres identificativos de ambas especies, y que son con sin ninguna duda endémicas, respectivamente, de Java y Borneo. Se aportan también algunos comentarios sobre las otras especies de *Chaerilus* de las islas indonesias y las zonas geográficas circundantes.

**Key words:** Scorpiones, Chaerilidae, *Chaerilus*, Indonesia, Java, Borneo.

### Introduction

The genus *Chaerilus* Simon, 1877 was originally created to accommodate *Chaerilus variegatus* Simon 1877, species described from Java. Subsequently, several other new species were described from the Indonesian islands, and nearby geographic regions such as Malaysia and Singapore. The majority of the species were described based on very limited material, and on weak and/or unclear diagnostic characters. Moreover, in most cases these descriptions have not been properly illustrated or even not illustrated at all. This confused situation leads several cases of misidentifications by different 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 approximate revision of the genus, defined 18 species as valid. He clarified, however, the identity of one population of Southern Vietnam (Indochina), previously misidentified by Fage (1933, 1936, 1944), as *Chaerilus celebensis*, *Chaerilus rectinimanus* Pocock, 1899 and/or *Chaerilus variegatus* and described *Chaerilus petrzekai* Kovařík 2000. Subsequently, this species was confirmed for Vietnam and properly redescribed and illustrated by Lourenço & Zhu (2008). *Chaerilus celebensis* was redescribed and confirmed as an endemic element to the Celebes (Sulawesi) Island, and a new associated species, *Chaerilus philippinus* Lourenço & Ythier, 2008 was described from North of Luzon in the Philippines (Lourenço & Ythier, 2008; Lourenço *et al.*, 2010).

In recent years, other new species have also been described from this tropical Asiatic region. *Chaerilus chapmani* Vachon & Lourenço, 1985 from Sarawak (Borneo), *Chaerilus*

*sabinae* Lourenço, 1995 from Celebes (Sulawesi) Island, *Chaerilus ojangureni* Kovařík, 2005 and *Chaerilus sejnai* Kovařík, 2005 from Malaysia, *Chaerilus laoticus* Lourenço & Zhu, 2008 from Laos, *Chaerilus vietnamicus* Lourenço & Zhu, 2008 from North of Vietnam and finally *Chaerilus telnovi* Lourenço, 2009 from Moluccas Islands (Kovařík, 2005; Lourenço, 1995, 2009; Lourenço & Zhu, 2008; Lourenço & Ythier, 2008; Vachon & Lourenço, 1985). Naturally, not all of these species belong to the same species-group within *Chaerilus*, and some such as *C. chapmani* are not directly associated with *C. variegatus* or *C. borneensis*.

Although some recent progress was accomplished on the knowledge of these tropical species of *Chaerilus*, the status of some old species remained unclear. This is the case for *C. variegatus* and *C. borneensis*, species described by Simon (1877, 1880), from Java and Borneo. Kraepelin (1894) was the first to suggest that both species should be placed in synonymy. This opinion was confirmed by Kovařík (2000). In the present note, we bring the necessary justification to establish that both species are valid and distinct.

### Methods

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) and morphological terminology mostly follows Hjelle (1990).

## Taxonomic treatment

### Chaerilidae Pocock, 1893

#### *Chaerilus* Simon, 1877

#### *Chaerilus variegatus* Simon, 1877

Fig. 1-2, 6-8, 9-14, 15, 17-20. Table I.

#### REVISED DIAGNOSIS

Scorpions of moderate size in relation to the other species of the genus, with a total length of 38 to 42 mm for both males and females [we did not observe adults reaching to 50 mm, as stated by Vachon & Abe (1988), or Kovařík (2000); Pocock (1894) gives a maximum length of 42.5 mm for this species]. General coloration blackish to blackish-brown with reddish-yellow spots on pedipalps, legs and vesicle. This pattern of pigmentation proves also to be predominant in juveniles; only very young juveniles may present a variegated pattern of pigmentation. Carinae moderately to weakly marked; tegument with moderately marked granulations. Chela hand flattened, strongly enlarged and deep, in particular in males; movable finger in males with a basal lobe. Pectinal tooth count 4-4 on female holotype; for the other examined specimens the following counts were observed. Males: 4 pectines with 7 teeth; 24 pectines with 6 teeth. Females: 30 pectines with 4 teeth; 18 pectines with 5 teeth. We did not observe any pectines with 3 or 8 teeth as stated by Vachon & Abe (1988) and Kovařík (2000). Fixed and movable chela fingers shorter than manus in both sexes, with 12 to 14 and 13 to 15 rows of granules on the dentate margins. This character is diagnostic to distinguish the species from *C. borneensis*.

**MATERIAL USED FOR THE DIAGNOSIS.** Indonesia, Java, 1 female (juvenile) holotype, MNHN-RS-0596 (ES-17061). 1006-77 (Raffray), 4 males, 3 females, MNHN-RS-0608. Java, Batavia (now Jakarta), 1885 (M. Maindron), 7 males, 3 females, MNHN-RS-0590. (M. Maindron), 1 male, 1 female, MNHN-RS-0590. 1904 (P. Serre), 1 female, MNHN-RS-0603. Java, Gedeh, 1898 (R. Oberthür), 2 males, 14 females, MNHN-RS-0609. Pulau Panaitan (an island SW from Java), 19/X/1982, 1 female, MNHN-RS-8493.

**NOTE ON *CHAERILUS VARIEGATUS NIGRICOLOR* POCOCK, 1899.** This subspecies was also described from Java, and subsequently also cited from the Krakatau (Vachon & Abe, 1988). There is no doubt, however, that the diagnostic characters proposed by Pocock (1899), correspond only to intraspecific variation; the darker pigmentation in particular. The examination of some of the specimens reported by Vachon & Abe (1988) from the Krakatau, confirms this position. Consequently, we can only confirm at present, the previous decision of Kovařík (2000) to place *C. variegatus nigricolor* in the synonymy of *C. variegatus*.

**MATERIAL EXAMINED:** Indonesia, Rakata Besar (Krakatau Islands), 1 male, MNHN-RS-8493. 1 female, MNHN-RS-8492.

#### *Chaerilus borneensis* Simon, 1880

Fig. 3-4, 5, 16, 21. Table I.

#### REVISED DIAGNOSIS

Scorpions of moderate size in relation to the other species of the genus, with a total length of 30 to 35 mm for both males

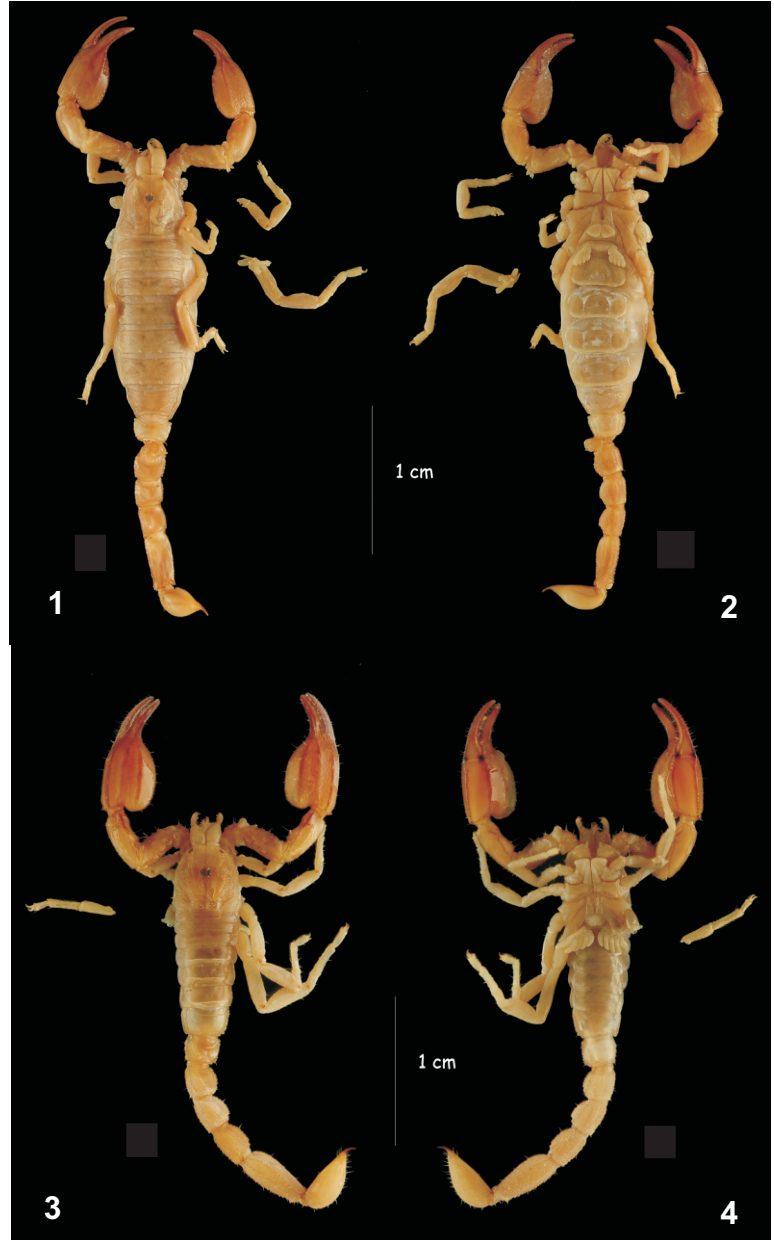
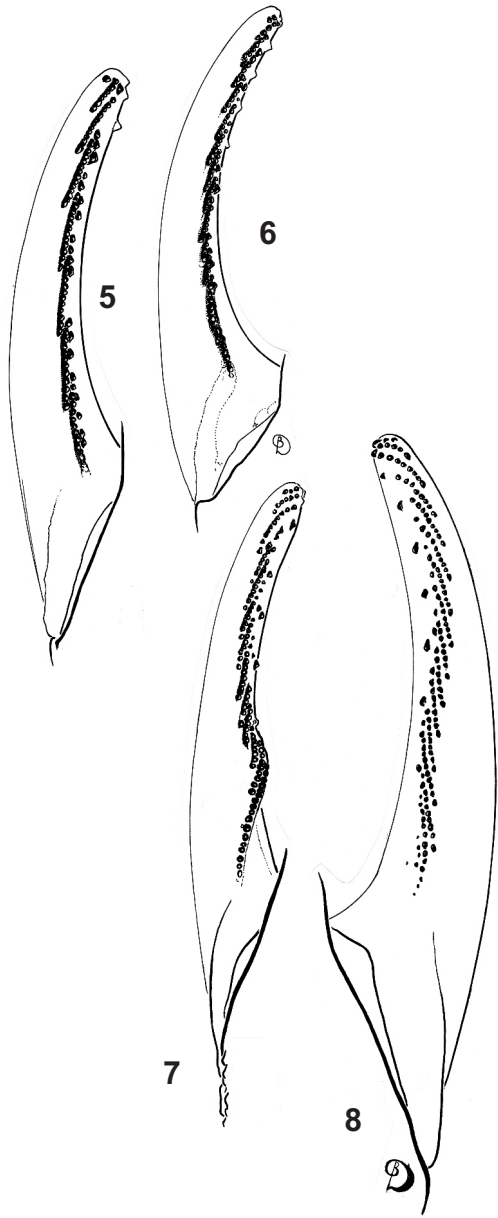
**Table I. Morphometric values (in mm) of *Chaerilus variegatus*, male and female adults from Java and *Chaerilus borneensis* male holotype from Borneo.**

	<i>C. variegatus</i>		<i>C. borneensis</i>
	♂	♀	♂
Total length*	38.5	38.9	30.3
Carapace:			
- length	6.0	6.6	4.8
- anterior width	3.0	3.1	2.5
- posterior width	6.3	6.6	4.7
Metasomal segment I:			
- length	2.2	2.2	1.8
- width	3.2	3.4	2.4
Metasomal segment II:			
- length	2.4	2.6	2.1
- width	2.8	3.0	2.3
Metasomal segment III:			
- length	2.6	2.8	2.2
- width	2.7	2.9	2.3
Metasomal segment IV:			
- length	3.0	3.0	2.6
- width	2.5	2.7	2.1
Metasomal segment V:			
- length	5.7	5.4	4.2
- width	2.3	2.5	2.0
- depth	2.0	2.2	1.8
Telson length	6.4	6.0	5.3
Vesicle:			
- width	2.4	2.2	2.3
- depth	2.2	2.0	2.0
Pedipalp:			
- Femur length	4.4	4.6	4.1
- Femur width	1.9	2.2	1.7
- Patella length	4.4	4.9	4.0
- Patella width	2.2	2.4	1.8
- Chela length	10.9	10.6	8.4
- Chela width	3.9	3.6	3.2
- Chela depth	6.2	5.6	3.7
Movable finger:			
- length	5.4	5.8	4.2

\*Including telson

and females [the holotype specimen is a small adult male and not a juvenile as suggested by Fet (2000) and Kovařík (2000)]. General coloration reddish-yellow with intense blackish-brown variegated pigmentation; this pattern remains in adults at least during the first months after the last molt. While getting older, scorpions become darker but the variegated pigmentation can yet be visible. Carinae crenulated; more strongly marked than in *C. variegatus*; tegument with weakly marked granulations, tergites almost smooth. Chela hand moderately flattened; less deep than that of *C. variegatus* [in the original description, Simon (1880) stated the opposite situation, however, he compared and adult male with a juvenile female]; movable finger in males without a basal lobe. Pectinal tooth count 5-5 on male holotype (not 4-4 as stated in the original description); for the other examined specimens we observed always 5 teeth in males and 4 teeth in females. Fixed and movable chela fingers shorter than manus in both sexes, with 6-7 rows of granules on the dentate margins. This character is diagnostic to distinguish the species from *C. variegatus*.

**NOTE:** The pattern of pigmentation observed for *C. borneensis* seems to associate this species rather to *Charerilus celebensis* Pocock, 1894 than to *C. variegatus*. Even if Kraepelin (1894) considered *C. borneensis* as a synonym of *C. variegatus*, in some non-published notes present in the registrations of the Museum in Paris, this author associates



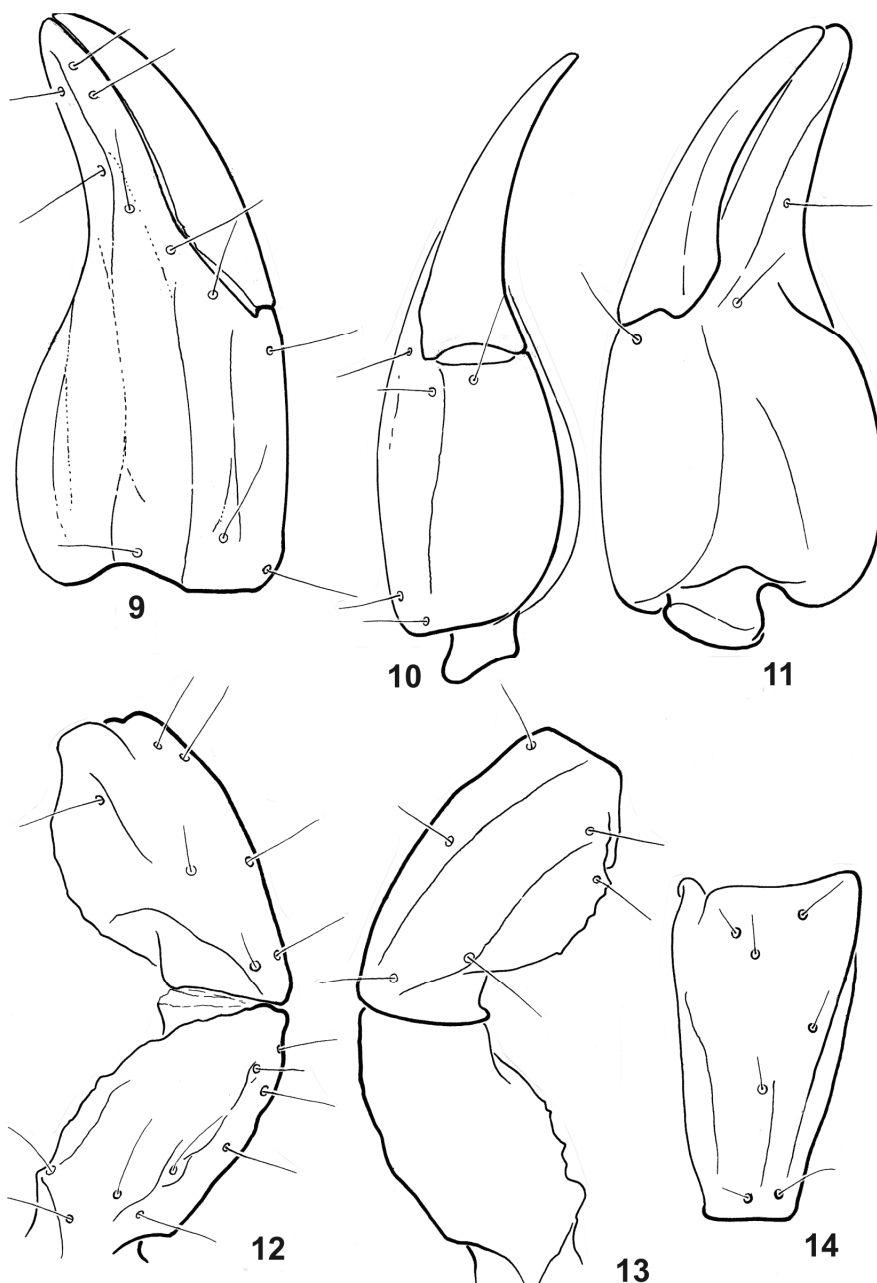
**Fig. 1-2.** *Chaerilus variegatus*, female holotype. Dorsal and ventral aspects.

**Fig. 3-4.** *Chaerilus borneensis*, male holotype. Dorsal and ventral aspects.

**Fig. 5-8.** Cutting edge of movable finger with rows of granules. **5.** *Chaerilus borneensis*, male holotype, without a basal lobe. **6-8.** *Chaerilus variegatus*. **6.** Female holotype. **7.** Male from Java, with a basal lobe. **8.** Male from Java, preserved when still soft, after molting.

**Fig. 21.** *Chaerilus borneensis*. Male specimen from the North of Borneo, just after molting. Pigmentation pattern is very characteristic.





**Fig. 9-14.** *Chaerilus variegatus*, female holotype. Trichobothrial pattern. **9-11.** Chela, dorso-external, ventral and internal aspects. **12-13.** Patella and femur, dorsal and ventral aspects. **14.** Patella external aspect.

*C. borneensis* to *C. celebensis* as possible synonyms. Naturally, both species are distinct and valid (Lourenço & Ythier, 2008; Lourenço *et al.*, 2010).

**MATERIAL USED FOR THE DIAGNOSIS.** Indonesia, Borneo, North, 1 male holotype, MNHN-RS-O599 (ES 3379). 1 male, IX/2007 (E. Ythier), MNHN-RS-8761 Borneo, 1 female, MNHN-RS-0610.

### Conclusions

This study is only one more step in the clarification of the status and patterns of distribution of the species of *Chaerilus*. Some insights, however, have been gained concerning the species of *Chaerilus* found in the Indonesian islands and nearby regions of Malaysia, Singapore and Philippines.

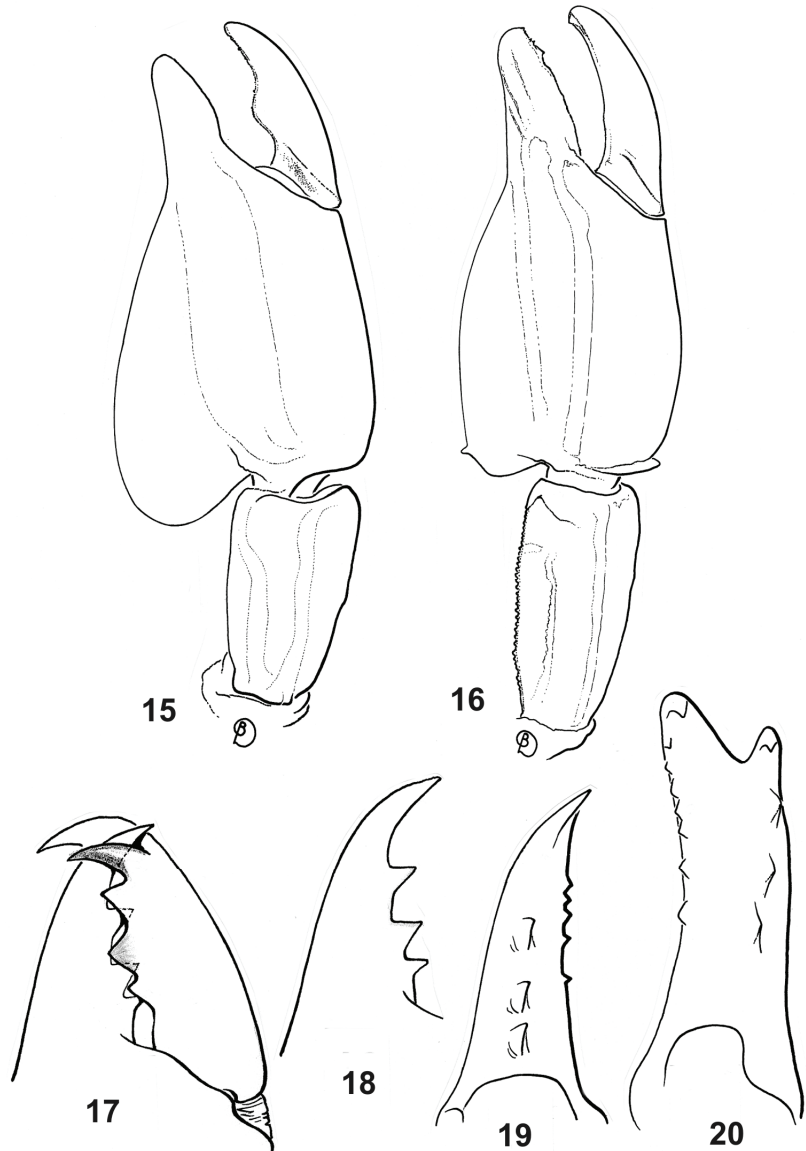
With the description of new species (Lourenço, 2009; Lourenço & Ythier, 2008), new available evidence suggests that many if not most species constitute endemic elements

to given islands or regions. Old records of species described by the earlier authors in many Indonesian islands, but also in the nearby geographic regions (Kraepelin, 1894; Pocock, 1894, 1899; Fage, 1933, 1936, 1944), can only be attributed to misidentifications. More recently, Kovařík (2000) also suggested large ranges of distribution for several species, which most certainly correspond to misidentifications. This situation should be better clarified with the possible help of molecular DNA analysis of some populations (Lourenço, in preparation).

In conclusion, in the present state of our knowledge, the following species can be retained as valid for the Indonesian Islands and nearby regions:

- Chaerilus agilis* Pocock, 1899
- Chaerilus borneensis* Simon, 1880
- Chaerilus cavernicola* Pocock, 1894
- Chaerilus celebensis* Pocock, 1894
- Chaerilus chapmani* Vachon & Lourenço, 1985
- Chaerilus laevimanus* Pocock, 1899

**Fig. 15-16.** Chela, external aspect. **15.** *Chaerilus variegatus* (strongly deep). **16.** *Chaerilus borneensis* (moderately deep). **Fig. 17-20.** *Chaerilus variegatus*, female holotype. **17.** Chelicera, dorsal aspect. **18-19.** Fixed finger, dorsal and internal aspects. **20.** Internal aspect of movable finger.



\**Chaerilus ojangureni* Kovařík, 2005  
*Chaerilus philippinus* Lourenço & Ythier, 2008  
*Chaerilus petrzelkai* Kovařík, 2000  
*Chaerilus rectimanus* Pocock, 1899  
*Chaerilus robinsoni* Hirst, 1911  
*Chaerilus sabinae* Lourenço, 1995  
 \**Chaerilus sejnai* Kovařík, 2005  
*Chaerilus telnovi* Lourenço, 2009  
 \**Chaerilus tichyi* Kovařík, 2000  
*Chaerilus variegatus* Simon, 1877

Note: the species indicated with an (\*) have not been examined by us. These are probably valid species, however, more precise redescriptions with illustrations properly done are urgently required.

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