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Further taxonomic considerations about the genus *Charmus* Karsch, 1879 (Scorpiones, Buthidae), with the description of a new species from Sri Lanka

WILSON R. LOURENÇO

(With 15 figures)

Abstract

Considerations regarding the taxonomy and distribution of the species belonging to the genus *Charmus* Karsch, 1879 are proposed, and a new species, *Charmus minor* sp. n., is described from north-western region of Sri Lanka (Wilpattu National Park). Even with the description of this new species, *Charmus* remains a discrete genus with a limited range of distribution in India and Sri Lanka. With the description of the new species, the total number of known species in this genus is raised to five; three in India and two in Sri Lanka.

Introduction

As emphasised in a recent paper (Lourenço 2000), the history of *Charmus* is not simple. This genus was created by Karsch (1879), based on a new species, *Charmus laneus* Karsch, 1879, from Sri Lanka. On account of certain morphological features, such as the pentagonal shape of the sternum, Karsch originally placed *Charmus* in the family Vaejovidae.

Pocock (1892) proposed a new buthid genus *Heterocharmus* and described a new species, *Heterocharmus cinctipes* Pocock, 1892, based on a single female specimen also from Sri Lanka. In "Das Tierreich" Kraepelin (1899) transferred the genus *Charmus* to the family Buthidae and regarded Pocock's *Heterocharmus cinctipes* as a synonym of *Charmus laneus*. Birula (1917) proposed a new familial and generic classification of scorpions and again placed *Charmus* in the family Vaejovidae with the subsequent creation of a new sub-family Charminae for this genus. It is quite possible that Birula was ignorant of the publications of both Pocock and Kraepelin. Moreover, since the Birula's work was originally published in Russian, it remained poorly known until 1965, when an English version was prepared by the Israel Program for Scientific Translations.

Just after the translation of Birula's work, Sreenivasa-Reddy (1966), provided a redescription of *Charmus indicus* Hirst, 1915 followed by a further discussion (Screnivasa-Reddy 1970) regarding the position of the genus *Charmus*. This was based on the study of new characters and confirmed the status of the genus as a buthid taxon.

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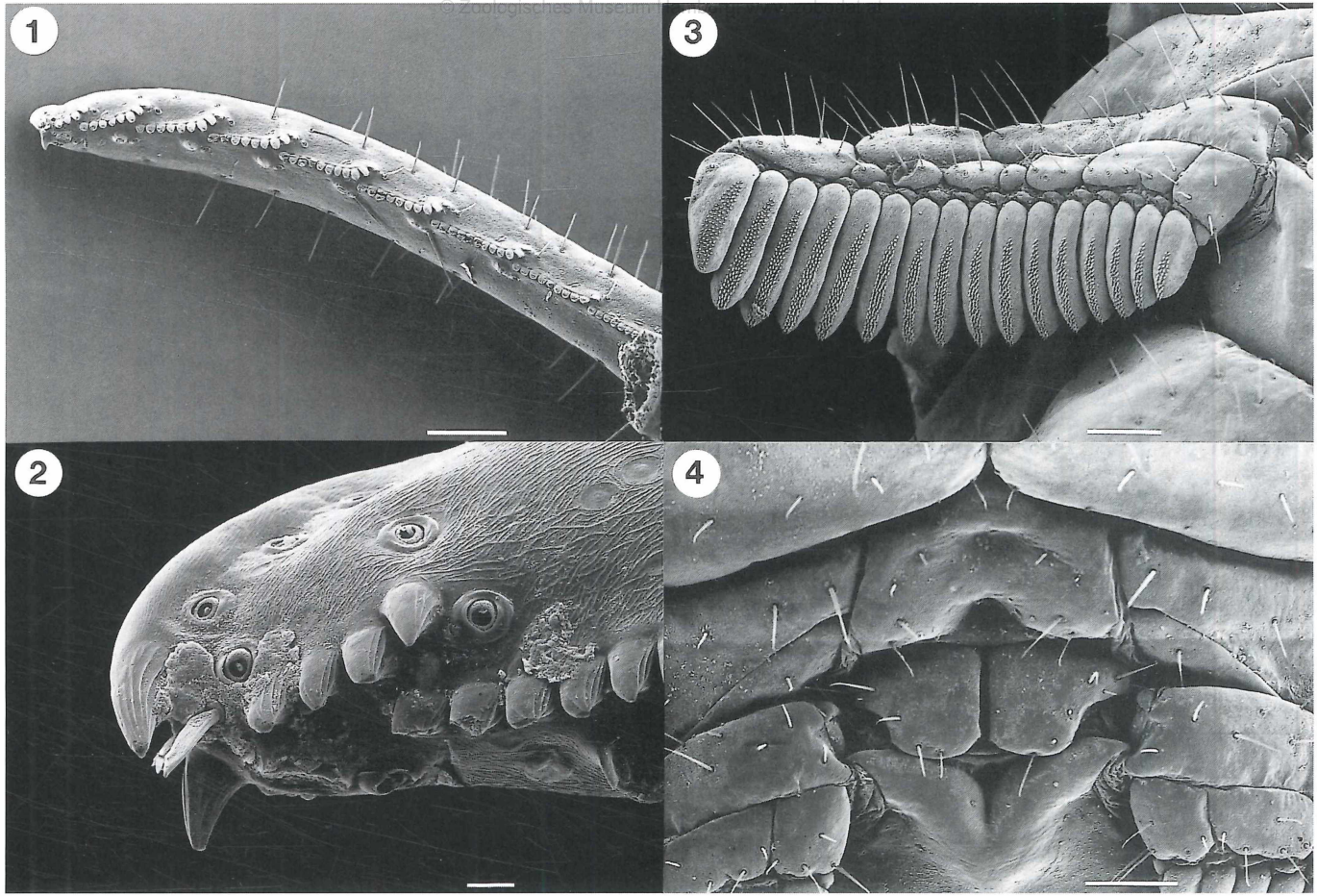

Figs 1-4. *Charmus minor* sp. n. (paratype ♂): **1** - dentate margin of chela movable finger with rows of granules; **2** - extremity of the movable finger with two strong accessory granules; **3** - pecten, showing the papillae and the presence of fulcra; **4** - sternum and genital operculum (scale bar in Figs 1, 3, 4 = 100 µm, in Fig. 2 = 10 µm).

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In his redescription of *Ch. indicus*, Sreenivasa-Reddy (1966) made reference to several specimens deposited in the Muséum National d'Histoire Naturelle, Paris. Among others, he cited a male from Pondicherry, previously examined by the French arachnologist Eugène Simon around 1899/1900 and labelled by him as a new species which he named *Charmus annulipes*. Since E. Simon never published any description or diagnosis for this species, the name was not subsequently considered to be valid. The opinion of Sreenivasa-Reddy (1966) regarding this specimen was that it belonged to the species *Ch. indicus*. The specimens deposited in the Museum in Paris, and in particular the specimen labelled *Ch. annulipes*, have recently been revised (Lourenço 2000). The conclusion in this revision was that E. Simon's opinion had been correct. The specimen from Pondicherry was therefore described as a new species, *Charmus brignolii* Lourenço, 2000.

The present study of two other specimens of *Charmus* collected in the north-western region of Sri Lanka (Wilpattu National Park) led to the description of yet another new species. With the description of this taxon, the genus *Charmus* now contains five species: *Ch. indicus*, *Ch. sinhagadensis* Tikader & Bastawade, 1983 and *Ch. brignolii* from India, *Ch. laneus* and *Ch. minor* sp. n. from. Sri Lanka. During both my previous study (Lourenço 2000) and the present one, I have been enable to examine *Ch. sinhagadensis* which was described by Tikader & Bastawade (1983) from Sinhagad, SW of Poona.

Charmus minor sp. n.
(Figs 1-14)

TYPE MATERIAL: H o l o t y p e male. Sri Lanka, Mannar District, Wilpattu National Park, 0.5 miles NE Cockmuttai (20 m), 6-7 October, 1977, coll. K.V. Krombein, P.B. Karunaratne, T. Wijesinhe, M. Jayaweera. Collected in yellow pan trap – Moericke type. Deposited in the Zoologisches Museum Hamburg (ZMH Acc. No A 12/02).

P a r a t y p e (juvenile: 2th instar, female) Sri Lanka, Puttalam District, Kalivillu, 12 June, 1975, coll. W. Messersmith, P.B. Karunaratne. Deposited in the Zoologisches Museum Hamburg (ZMH Acc. No A 11/02).

ETYMOLOGY. The specific name makes reference to the small size of the new species.

D i a g n o s i s. Scorpions of very small size, 14 mm in total length. Coloration dark, ranging from blackish to blackish brown. Metasomal segments II-IV with granulation strong throughout (Figs 5-7). Movable finger with 9 rows of granules (Fig. 1). Sternites III-IV with punctations. Juveniles with fulcra (Fig. 3). Sternum pentagonal; moderately flattened in the female (Fig. 4); strongly flattened in the male.

D e s c r i p t i o n (based on holotype): measurements are given below.

C o l o r a t i o n. Basically blackish brown, symmetrically marbled with pale yellowish brown. Prosoma: carapace blackish brown with some yellowish spots on the posterior margin; eyes surrounded by black pigment. Mesosoma: brownish with confluent thin reddish spots and a reddish yellow longitudinal strip over tergites I-VI. Metasoma: all segments brownish. Vesicle reddish; aculeus yellowish. Venter reddish yellow except sternite VII which is reddish brown. Pectines, sternum and coxapophysis reddish yellow. Chelicerae reddish yellow with dense reticulated dark spots; fingers reddish yellow with yellowish teeth. Pedipalps: reddish brown; fingers yellowish. Legs yellowish with pale brown diffuse spots on the first four segments.

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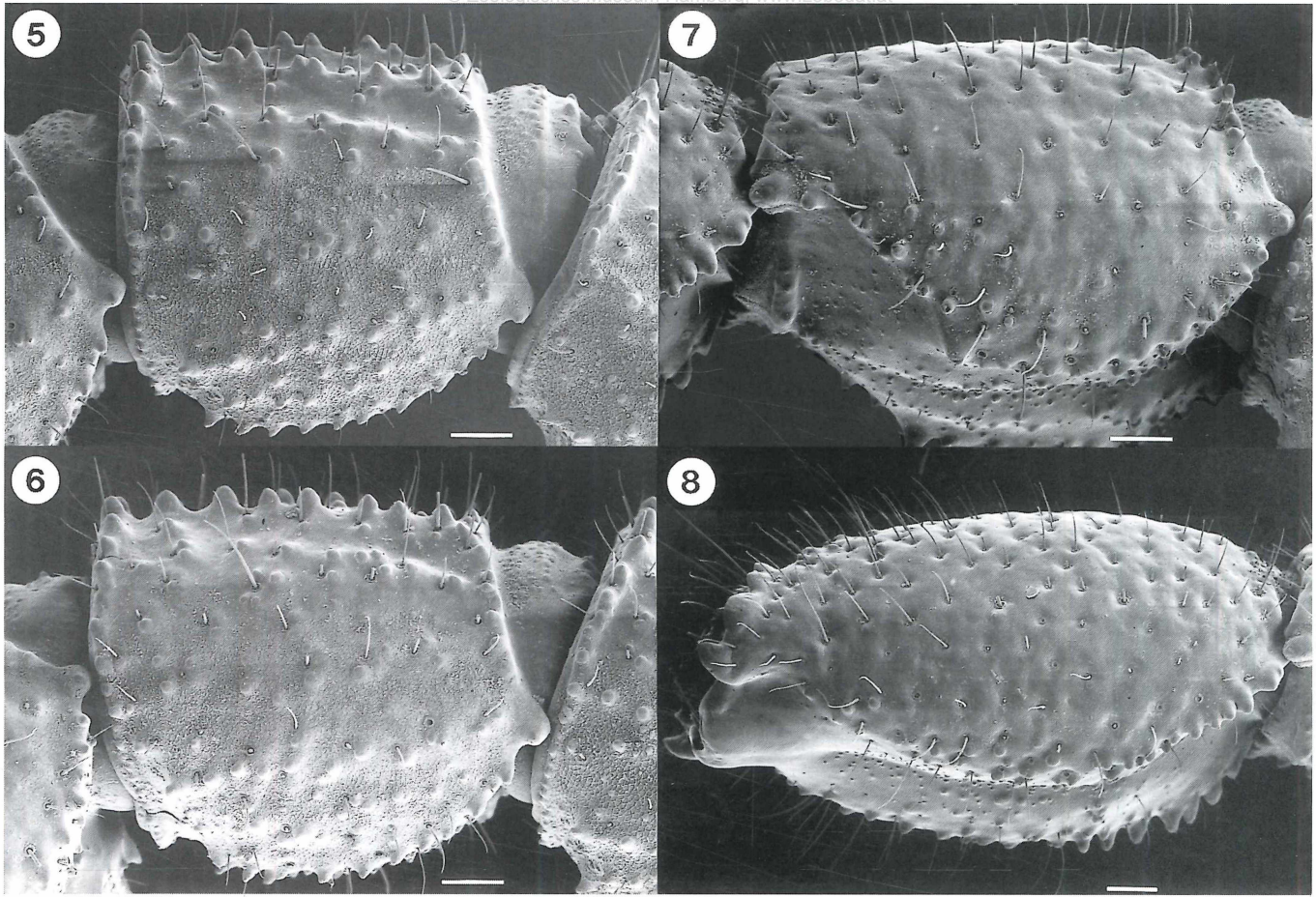

Figs 5-8. *Charmus minor* sp. n. (paratype ♂): metasomal segments II-V in lateral view, respectively, with granulations and setae (scale bar = 100 µm).

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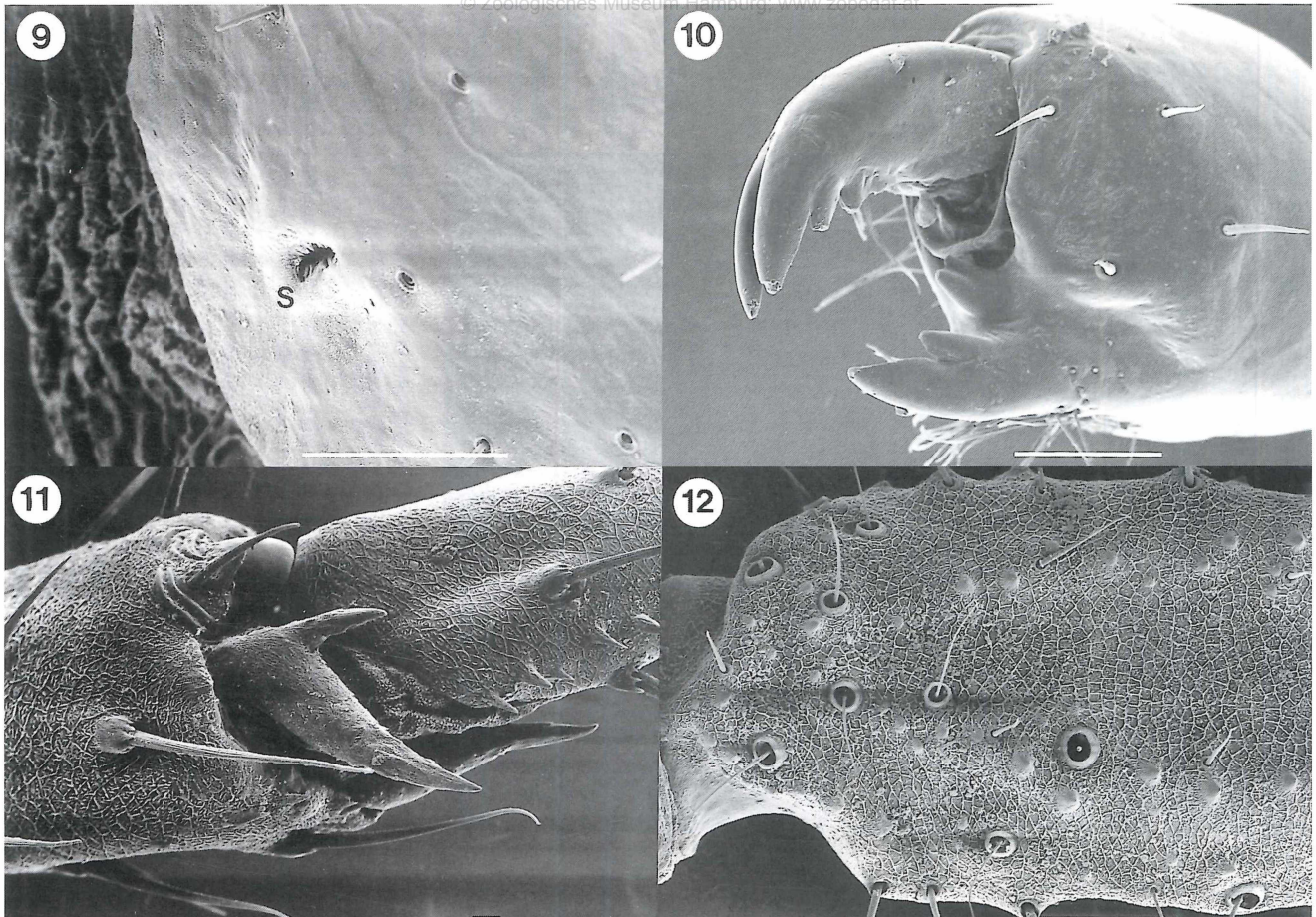

Figs 9-12. *Charmus minor* sp. n. (paratype ♂): **9** - sternite VI with spiracle (*S*); **10** - chelicera; **11** - leg IV, with pedal spur; **12** - femur with internal, dorsal and external trichobothria (scale bar in Figs 9, 10, 12 = 100 µm, in Fig. 11 = 10 µm).

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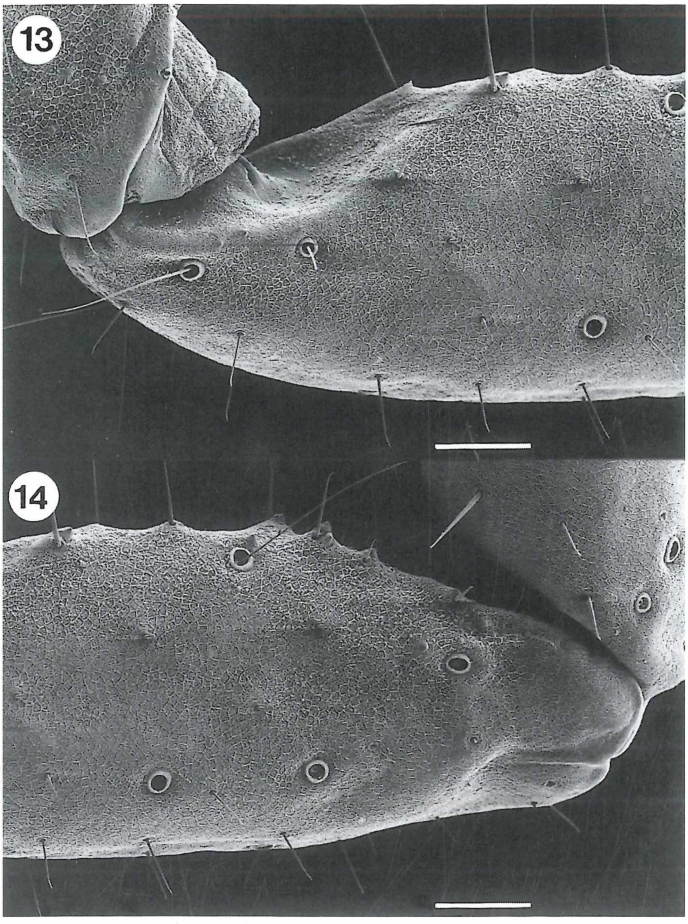

Figs 13-14. *Charmus minor* sp. n. (paratype ♂): **13** - tibia, with trichobothria d_1, d_2, d_3; **14** - tibia and part of chela, with trichobothria d_3, d_4, d_5, *i*, Eb_3, Eb_2 (scale bar = 100 µm).

M o r p h o l o g y. Carapace weakly granular, with a few stronger granules anteriorly; anterior margin almost without any median concavity, straight. Anterior median superciliary, and posterior median keels vestigial. All furrows weak to vestigial. Median ocular tubercle distinctly anterior to the centre of carapace; median eyes separated by one and half ocular diameters. Three pairs of lateral eyes. Sternum pentagonal but strongly flattened; three times wider than long (Fig. 4). Mesosoma: tergites weakly granular. Median keel vestigial but present in all tergites. Tergite VII pentacarinate and weakly crenulate. Venter: genital operculum divided longitudinally and longer than the sternum (Fig. 4). Pectines: pectinal tooth count 17-17 (paratype 16-16); basal middle lamellae of the pectines not dilated (Fig. 3). Sternites III-VI with thin granulation; granules on VII stronger; two lateral furrows present on sternites III-VI. Short semi-oval stigmata (Fig. 9). Metasoma: segments rounded with only dorsal and ventral keels

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moderately to strongly marked on segments I to III (Figs 5-7). Intercarinal spaces moderately to strongly granular. Telson without carinae, but with two lateral furrows; aculeus moderately long and strongly curved; subaculear tooth absent. All segments and telson covered with numerous thin white setae (Figs 5-8). Cheliceral dentition characteristic of the family Buthidae (Fig. 10): basal teeth on the movable finger almost fused (Vachon 1963; Screenivasa-Reddy 1966). Pedipalps: femur pentacarinate; tibia and chelae with some vestigial keels and weakly crenulate; internal face of tibia with 6 spinoid granules; all faces weekly granular. Movable fingers with 9 oblique rows of granules (Fig. 1); extremity of the fingers with 2 strong accessory granules (Fig. 2). Trichobothriotaxy; orthobothriotaxy *A-α* (Vachon 1974, 1975) (Figs 12-14). Legs: tarsus with very numerous median fine setae ventrally. Legs III-IV with one strong tibial spur and moderate pedal spurs (Fig. 11).

M e a s u r e m e n t s (in mm: holotype ♂): Total length 14.1. Carapace: length 1.8, anterior width 1.3, posterior width 2.1; Metasomal segment I: length 0.9, width 1.3; Metasomal segment V: length 2.2, width 1.6, depth 1.3; Vesicle: width 1.0, depth 0.8; Pedipalp: femur length 1.4; femur width 0.4, tibia length 1.8, tibia width 0.6, chelae length 2.4, chelae width 0.4, chelae depth 0.3; Movable finger: length 1.6.

R e m a r k s

By its pattern of coloration, the new species shows affinities with *Ch. indicus* from India. The following comparison shows some features of the three considered species.

Charmus indicus	*Charmus laneus*	***Charmus minor* sp. n.**
Metasomal segments II-IV with granulation strong throughout	Metasomal segments II-IV with granulation weak throughout	Metasomal segments II-IV with granulation strong throughout
Movable finger with 9 rows of granules	Movable finger with 7-8 rows of granules	Movable finger with 9 rows of granules
Sternites III-IV with punctations	Sternites III-IV without	Sternites III-IV with punctations
Juveniles without fulcra	Juveniles without fulcra	Juveniles with fulcra
Sternum pentagonal	Sternum pentagonal	Sternum pentagonal: Moderately flattened in the female, strongly flattened in the male
Colour blackish-brown	Colour brownish-yellow	Colour blackish-brown

E c o l o g i c a l o b s e r v a t i o n s. According to Sreenivasa-Reddy (1966), *Ch. indicus* is a species which lives in open vegetation formations on the slopes of hills at an altitude of approximately 500 m. The specimens of *Ch. laneus* studied by Vachon (1982) were all collected in the central-south region of Sri Lanka which is characterised by high altitudes reaching to more than 1000 m and by wet forest formations. This area has a much higher level of precipitation than does the northwestern region of the country. The habitat of the new species, however, consists of dry forest formations almost at sea level, where precipitation is low.

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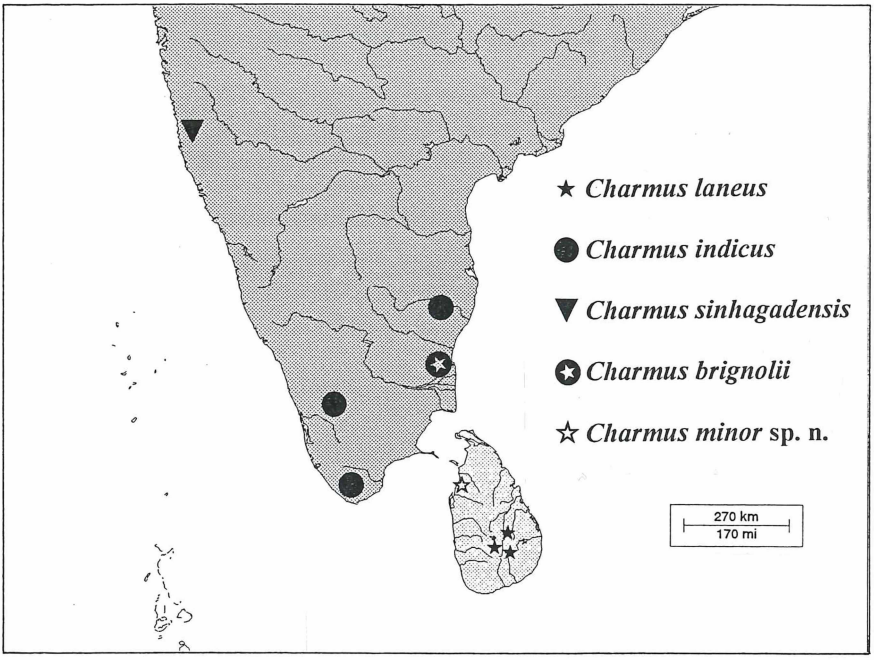

Fig. 15. Records of the genus *Charmus* in India and Sri Lanka.

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Author´s address:

Dr. W. R. LOURENÇO, Laboratoire de Zoologie (Arthropodes), Muséum National d'Histoire Naturelle, 61 rue de Buffon, 75005 Paris, France (e-mail: arachne@mnhn.fr).

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