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A second new species for the genus *Cretaceoushormiops* Lourenço, 2018 from Cretaceous Burmite (Scorpiones: Protoischnuridae)

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Keywords:

Scorpiones;
Protoischnuridae;
fossil;
new species;
Cretaceoushormiops;
staxi;
Burmite;
variability;
description.

Abstract. – The study of two new scorpion specimens from Cretaceous Burmite leads to the descriptions of a new species of *Cretaceoushormiops* Lourenço, 2018, confirming therefore the validity of this genus, previously known by a single species. The new species shows quite distinct characters, particularly a possible majorante trichobothriotaxy. The validity of *Betaburmesebuthus joergi* Lourenço & Rossi, 2017 (Family Palaeoburmesebuthidae) is also confirmed and the male is characterized for the first time.

Lourenço W. R. & Velten J., 2022. – A second new species for the genus *Cretaceoushormiops* Lourenço, 2018 from Cretaceous Burmite (Scorpiones: Protoischnuridae). *Faunitaxys*, 10(43): 1 – 5.

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Introduction

The remarkable pace in the studies of scorpions included in Burmite was already outlined in several recent publications (Lourenço, 2021; Lourenço & Velten, 2021a,b, 2022a,b). If these studies started only 20 years ago, with the first one based only on a very incomplete specimen (Lourenço, 2002), quite many other followed since. A remarkable number of new descriptions took place particularly in the last 10 years, and the pace of new discoveries seems to increase every year. This new situation is mainly due to the important availability of new pieces containing scorpions in Burmite, which is largely due to an intense commercial business which took place in recent years. A part of these pieces are, when possible, correctly study and classified, but it can be suggested that many if not most of it are never examined by any scorpion expert.

The majority of the scorpions found in Burmite belong to the families Chaerilobuthidae Lourenço & Beigel, 2011 and Palaeoburmesebuthidae Lourenço, 2015, and these remain the dominant groups among the scorpion fauna of the Cretaceous Burmite. Nevertheless, several other groups or lineages have also been described (e. g. Lourenço, 2015, 2016, 2021; Lourenço & Velten, 2021a,b, 2022a,b). For more details refer to the cited literature.

Naturally, as already noticed before (Lourenço, 2021; Lourenço & Velten, 2021a,b, 2022a,b), the increased pace of descriptions brings equally problems for future identifications, since many species found in Burmese amber show similar morphologies. Consequently,

as more and more taxa will be known for a given group, the quality of the pieces required to justify new description is necessarily raised (Lourenço, 2018, 2021; Lourenço & Velten, 2021a,b, 2022a,b). Precise new descriptions also imply a rather good knowledge of all the fossils previously described. Only this form of procedure can authorise new descriptions without the risk of misidentifications.

In the present contribution two new scorpions are studied; one belongs to a known species of the family Palaeoburmesebuthidae, and the new specimen brings further confirmation to its status. The second scorpion is represented by a specimen which belongs to the remarkable genus *Cretaceoushormiops* Lourenço, 2018 but presenting quite unique characters that leads to the description of a new species. For precise details refer to Lourenço (2018). Once again, the considerable degree of scorpion diversity in the Burmese amber-producing forests is confirmed.

Material and methods

The specimen related to the new species of *Cretaceoushormiops* is originally preserved in a very clear block of pale yellow amber. The block measured 25 x 13 x 2 mm. Many characters, and in particular trichobothria, are largely visible, allowing detailed investigation. Nevertheless, some characters can be more difficult to be interpreted because the specimen suffered a certain degree of dissection (mummification) process within the resin, a situation commonly observed with Burmite specimens. The presence of many bubbles and several inclusions, mostly dirty, equally

Reviewer:

Eric Ythier (France) - ZooBank: <http://zoobank.org/06FD0852-A88E-49E5-B8E6-E1494B86C4E1>



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prevents a fully observation of some characters. One Millipede specimen is observed in front of the scorpion, but probably does not correspond to a prey. According to Dr Thomas Wesener (in litt), this millipede is a member of the order Polydesmida; probably a female (4.94 x 0.94 mm). This group does not appear to be dominant during the Cretaceous (Wesener & Moritz, 2018). Among present species only one case of a scorpion preying on Millipedes was observed (Lourenço, 1983) for *Opisthacanthus rugulosus* Pocock from Africa, family Hormuridae, associated to the Protoischnuridae. The schematic drawings provided here are interpretations of what was observable. Illustrations and measurements were produced with the aid of a Wild M5 stereomicroscope equipped with a drawing tube and an ocular micrometer. Morphological terminology mostly follows Hjelle (1990). Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974). Trichobothria were definitely recorded only when their bothria (areoles) could be observed. Other trichobothria may be suggested by the presence of transverse hairs.

Systematic description

Family **Protoischnuridae** Carvalho & Lourenço, 2001

Genus ***Cretaceoushormiops*** Lourenço, 2018

Cretaceoushormiops staxi Lourenço sp. n.

(Fig. 1-6, 9-13, 14-18)

ZooBank: <http://zoobank.org/A03C30A5-47EC-4C48-948A-87B13BA404A9>

Type material. – Holotype, a possible juvenile or pre-adult. According to the morphology of pectines and genital operculum, with a single plate, it can be defined as a female.

Type locality and horizon. – Myanmar (Burma), Kachin; precise locality unknown; Lower Cretaceous.

Name. – Honors Dr Dietmar Stax (Pfungen, Switzerland) who arranged facilities for the study of the specimen.

Depository. – The type specimen is deposited in the Collection of Dr Dietmar Stax (Pfungen, Switzerland).

Diagnosis for the new species

Total length 11.30 mm (to notice that the mesosoma is strongly contracted). General coloration yellow to bright yellow. Carapace with a moderately to weakly marked median concavity; median ocular tubercle anterior to the centre of the carapace and with large median eyes; two lateral eyes can be observed; a possible third pair of vestigial eyes may exist. Sternum pentagonal in shape; slightly larger than long. Pectines moderate to large in size with 16-17 teeth; fulcra inconspicuous. Spiracles slightly oval. Metasomal segment I to V rounded and weakly flattened laterally with only dorsal and latero-dorsal carinae. Telson with a long pear-shaped vesicle weakly flattened laterally; no annular ring on the telson is observed. Fixed and movable fingers with one row of small rounded granules, without clear accessory granules; presence of 3-4 spinoid granules on the distal third of fingers; each finger terminating by a moderately to weakly marked spinoid process. Chelicerae only partially observed but showing a dentition similar to that defined for the Scorpionidae sensu Vachon (1963). Tibial spurs absent; tarsi with two rows of spines. Trichobothrial pattern similar to type C defined by Vachon (1974) and also illustrated by Lourenço & Monod (1999) for the genus *Hormiops*. On the chela hand, trichobothria **Db**, **Dt**, **Est**, **Et₁₋₅**, **Esb**, **Eb₁** to **Eb₃** and four **V** can be observed. On the chela fixed finger, trichobothria **eb**, **db**, **dsb**, **esb**, **dst**, **dt**, **est**, **et**, **ib** and **it**

can be observed. Patella shows **d₁** and **d₂** on dorsal face; **i** on internal face; on the ventral face 3 **V** trichobothria are clearly observed and a diminutive **V₄** is suspected. Accessory ventral trichobothria have being previously observed for extant Hormuridae species; e. g. *Liocheles penta* Francke & Lourenço, 1991 (Francke & Lourenço, 1991). 7-8 external trichobothria can be directly observed on the patella, but the presence of several transverse hairs suggests a higher number reaching a total of 12-13, which belong to territories **et**, **est**, **esb**, **em**, **esb** and **eb**. Femur shows one **d**, one **i** and one **e**.

Description

Coloration. – The scorpion is yellow to pale bright-yellow; carapace and tergites yellow; metasomal segments I to V yellow; telson slightly reddish-yellow; pedipalps and legs yellow to reddish-yellow. The ventral aspect of the specimen is yellow to pale yellow.

Morphology. – Carapace without granulations, almost smooth; anterior margin with a moderately to weakly marked median concavity. Carinae absent; furrows weakly marked. Median ocular tubercle anterior to the centre of carapace; median eyes moderate to large in size and separated by about one ocular diameter. Two pairs of lateral eyes; a possible third pair of vestigial eyes may exist. Sternum pentagonal, slightly larger than long. Mesosomal tergites without granulations, smooth, with one median vestigial carina; VII with five inconspicuous carinae. Pectines moderate to large in size with 16-17 teeth; fulcra inconspicuous. Sternites smooth with small slightly oval spiracles. Metasomal segment I to V rounded and weakly flattened laterally with only dorsal and latero-dorsal carinae; dorsal carinae of segments I to IV without any spinoid granules; dorsal aspect of segments I to V weakly depressed; setation on all segments strongly marked. Telson with a long pear-shaped vesicle weakly flattened laterally; not granular, smooth; aculeus short and moderately curved; absence of any annular ring on the telson; setation conspicuous. Cheliceral dentition only partially visible, similar to that defined for the Scorpionidae sensu Vachon (1963). Pedipalp femur pentacarinata with some internal spinoid granules; patella with dorso-internal, ventro-internal, and dorso-external carinae; internal face with some minute spinoid granules and one moderate apophysis. Chela with moderately marked carinae; all faces smooth. Fixed and movable fingers each with one row of small rounded granules; no accessory granules are observable but 3-4 spinoid granules on the distal third of fingers can be observed; each finger terminating by a weakly marked spinoid process; setation of pedipalps weak to moderate. Tibial spurs absent; tarsi with two rows of small spines. Trichobothriatax similar to type C (Vachon, 1974) of extant Hormuridae scorpions (Lourenço & Monod, 1999). For details refer to the diagnosis.

Relationships

Most characters observed for this new species allow its inclusion in the genus *Cretaceoushormiops*. Nevertheless, a few characters such as the presence of spines on the tarsi, instead of setae or the possible presence of a fourth ventral trichobothrium in the patella, could suggest a generic difference. The possibility of a new genus is however, rejected at present, mainly because these variations have also been observed in extant species, and mostly because some require yet further and more clear observations.

The new species of *Cretaceoushormiops* can however be distinguished from *C. knodeli* by a number of features:

- (i) both species have similar global sizes, but the morphometric values are distinct; pedipalp fingers, in particular, are more bulk in the new species and the spinoid process in their tip is much less marked,
- (ii) the anterior median concavity on carapace is less marked in the new species,
- (iii) median eyes are bigger in the new species,
- (iv) in *Cretaceoushormiops staxi* Lourenço, sp. n. the sternum is larger than long,
- (v) in the new species pectines are larger and have a bigger number of teeth 16-17 vs 13-14 for *C. knodeli*,
- (vi) spiracles slightly oval in *Cretaceoushormiops staxi* Lourenço, sp. n.,
- (vii) the possible presence of a fourth ventral trichobothrium on patella.

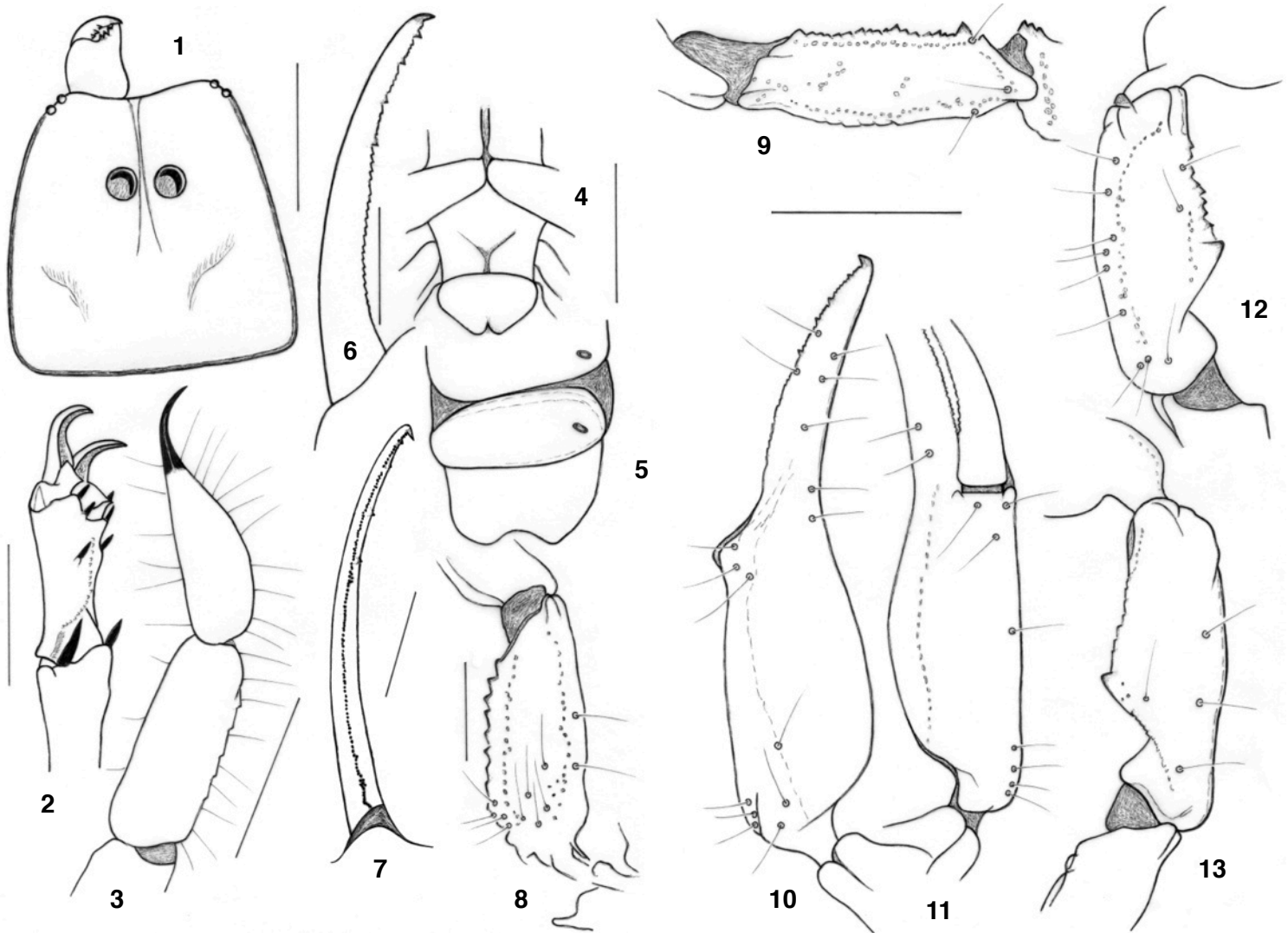


Fig. 1-6. *Cretaceoshormiops staxi* Lourenço sp. n.

1. Carapace and chelicera. 2. Tarsi of leg IV, showing spines. 3. Metasomal segment V and telson, lateral aspect. 4. Sternum and genital operculum. 5. Sternites V to VII, showing spiracles. 6. Chela movable finger.

Fig. 7. *C. knodeli*. Chela movable finger.

Fig. 8. *Betaburmesebuthus joergi*. Male femur, dorsal aspect (scales, 1, 3, 4, 5 = 1 mm; 2, 6, 7, 8 = 0.5 mm).

Fig. 9-13. *Cretaceoshormiops staxi* Lourenço sp. n. Trichobothrial pattern.

9. Femur, dorsal aspect. 10-11. Chela dorso-external and ventral aspects. 12-13. Patella, dorsal and ventral aspects (scale = 1 mm).

Comparative morphometric values (mm) between the holotypes of *Cretaceoshormiops knodeli* Lourenço and *Cretaceoshormiops staxi* Lourenço sp. n.

– Total length (including telson) 12.83/11.30.

– Carapace

length 1.80/1.87,
anterior width 0.94/1.20,
posterior width 1.60/1.74.

– Mesosoma length 5.07/3.65.

– Metasomal segments

I: length 0.67/0.74, width 0.34/0.47;
II: length 0.74/0.74, width 0.34/0.47;
III: length 0.80/0.81, depth/width 0.34/0.47;
IV: length 0.94/0.87, depth/width 0.34/0.47;
V: length 1.27/1.14, depth/width 0.47/0.41.

– Telson length 1.54/1.48.

– Vesicle: depth/width 0.44/0.41/0.34.

– Pedipalp

femur length 1.54/1.61, width 0.54/0.54;
patella length 1.60/1.68, width 0.60/0.68;
chela length 3.14/3.30, width 0.54/0.76, depth ?
movable finger length 1.87/1.78.

Second species also examined during this study

Betaburmesebuthus joergi Lourenço & Rossi, 2017
(Family **Palaeoburmesebuthidae**)

(Fig. 8 & 19)

A small male specimen, probably adult, with a total length of 12.8 mm, while the known female of measured 17.65 mm. Included in a clear yellow piece sizing 19 x 16 x 3-4 mm. The piece contains vegetal debris and some dirty and shows one major crack in the middle what prevents a better observation of many characters (Figs. 8, 16). The species is clearly characterised by morphological measures similar to that of the female holotype with pedipalps

short and bulk; the ratio between chela length/width is 4.19, while the one presented by the female is 4.86 (Lourenço, 2021). The beta disposition for the dorsal trichobothria of the femur is clearly observed (Fig. 8). Pectines are longer and have 20-19 teeth vs 18-18 for the female holotype. For more details on this species refer to Lourenço & Rossi (2017).

Acknowledgements

We are grateful to Dr. Thomas Wesener, Zoologisches Forschungsmuseum, Bonn, Germany for the information on the millipede, Polydesmida.

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Résumé

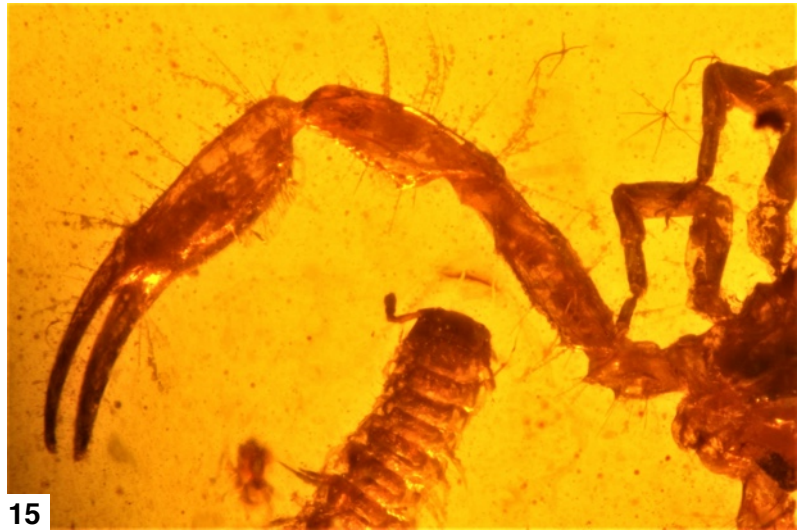
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L'étude de deux nouveaux spécimens de scorpions de l'ambre du Crétacé inférieur du Myanmar conduit à la description d'une nouvelle espèce de *Cretaceoushormiops* Lourenço, 2018 et confirme ainsi la validité de ce genre, connu auparavant par une seule espèce. La nouvelle espèce présente des caractères très distincts, notamment une trichobothriotaxie possiblement majorante. La validité de *Betaburmesebuthus joergi* Lourenço & Rossi, 2017 (Family Palaeoburmesebuthidae) est également confirmée et le mâle diagnostiqué pour la première fois.

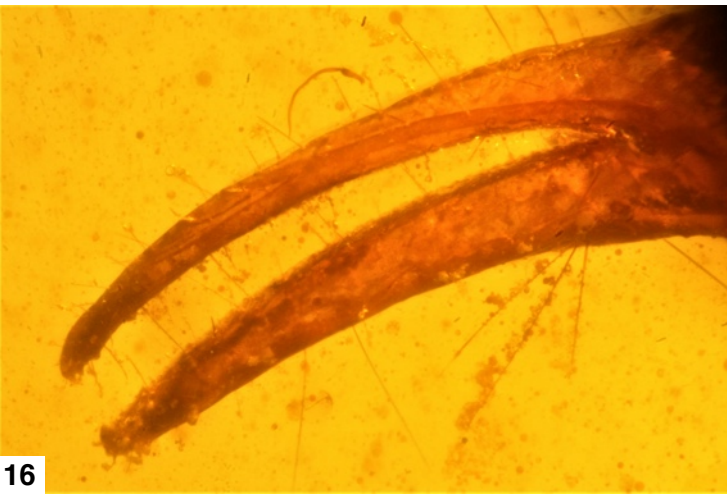
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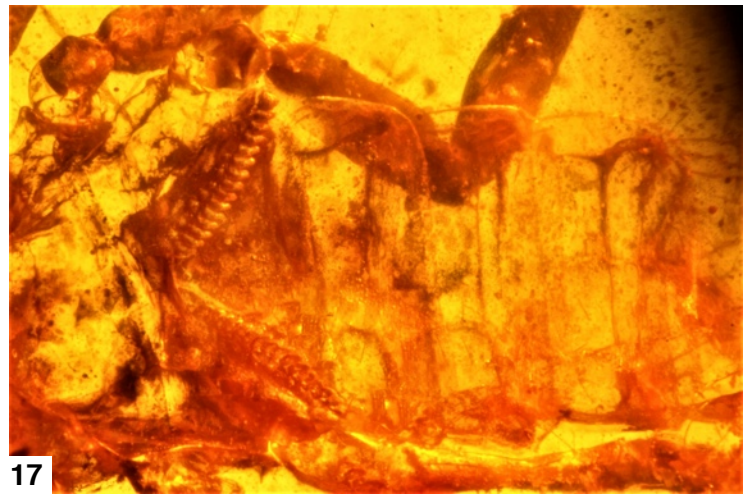
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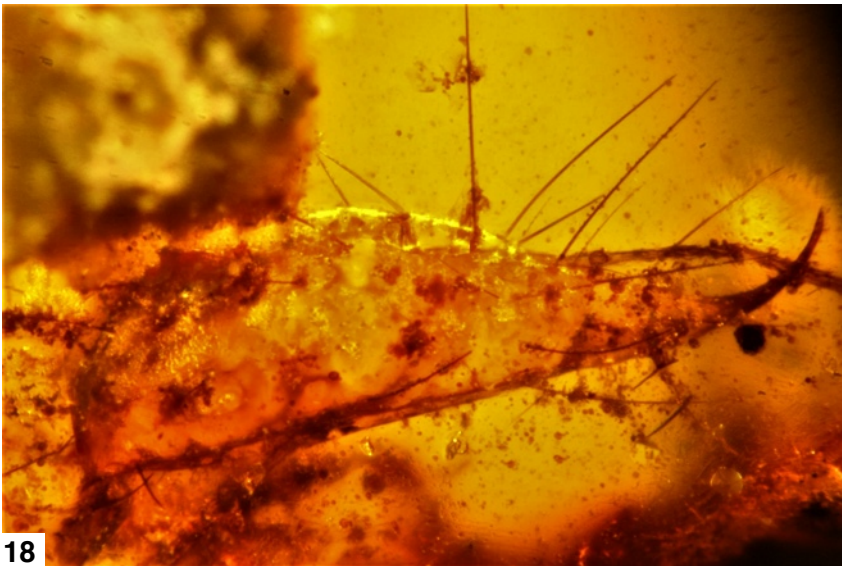
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Fig. 14-18. *Cretaceoushormiops staxi* Lourenço sp. n.

14. Carapace, chelicera and pedipalps, dorsal aspect.

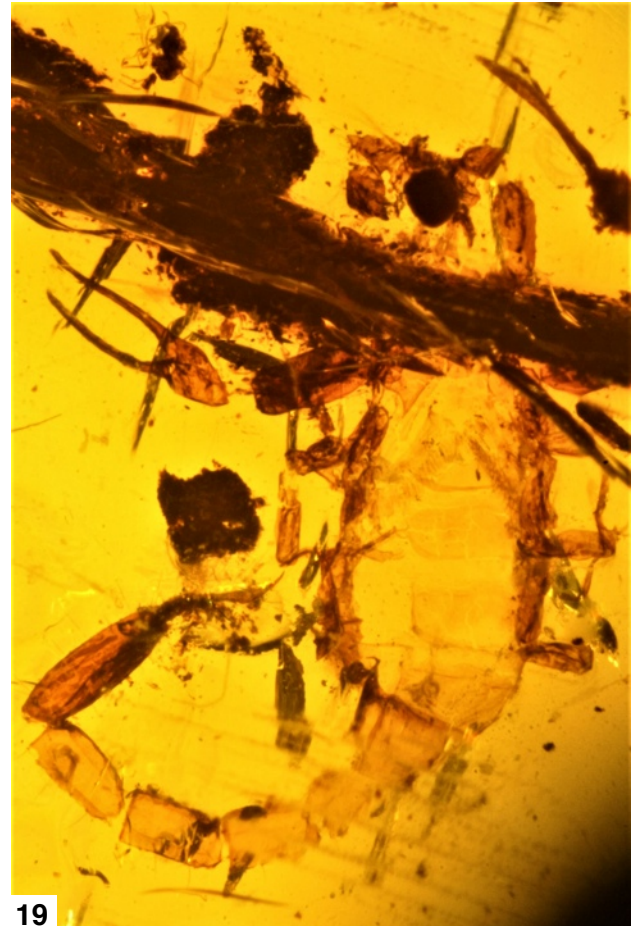
15. Left pedipalp, ventral aspect; with the millipede *Polydesmida*, in part.

16. In detail, movable finger of left pedipalp, ventral aspect.

17. Sternum, genital operculum, pectines and sternites.

18. Telson, lateral aspect.

Fig. 19. *Betaburmesebuthus joergi*, male, ventral aspect. The dark crack can be observed.



19

Faunitaxys

Volume 10, Numéro 43, Septembre 2022

SOMMAIRE

Une deuxième nouvelle espèce pour le genre *Cretaceoushormiops* Lourenço, 2018 de l'ambre du Crétacé inférieur de la Birmanie (Scorpiones: Protoischnuridae).

Wilson R. Lourenço & Jürgen Velten 1 – 5

CONTENTS

A second new species for the genus *Cretaceoushormiops* Lourenço, 2018 from Cretaceous Burmite (Scorpiones: Protoischnuridae).

Wilson R. Lourenço & Jürgen Velten 1 – 5



Illustration de la couverture :

Cretaceoushormiops staxi Lourenço sp. n.

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