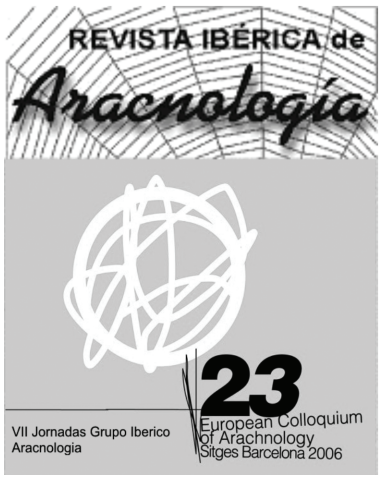

ARTÍCULO:

An Organ of Stridulation in East Asian Hexathelid Spiders (Araneae, Mygalomorphae).

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An Organ of Stridulation in East Asian Hexathelid Spiders (Araneae, Mygalomorphae).

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Abstract:

An organ of stridulation is described from *Macrothele gigas* Shimojana et Haupt, 1998 (Araneae, Hexathelidae). One part is located on the retrolateral side of the pedipalpal trochanter and its counterpart is a specialized structure on the anterolateral side of the first leg's trochanter. Stridulation facilities occur in both sexes. This descripton emphazises differences between large and smaller *Macrothele* species and the taxonomic situation is discussed on the basis of further characters.

Keywords: Araneae, Hexathelidae, *Macrothele gigas*, stridulation organ, taxonomy.

Un órgano estridulador en arañas hexatélidas del Asia oriental (Araneae, Mygalomorphae).

Resumen:

Se describe el órgano estridulador de *Macrothele gigas* Shimojana & Haupt, 1998 (Araneae, Hexathelidae). Una parte del órgano esta situada sobre la cara retrolateral del trocánter del pedipalpo, mientras que su contraparte es una estructura especializada sobre la cara anterolateral del trocánter de la primera pata locomotora. Dichas estructuras estriduladoras aparecen en ambos sexos. En la descripción se enfatizan las diferencias entre especies de *Macrothele* grandes y pequeñas, y se discute la situación taxonómica en base a caracteres adicionales.

Palabras clave: Araneae, Hexathelidae, *Macrothele gigas*, órgano estridulador, taxonomía.

Introduction

In recent years several new species of the genus *Macrothele* Ausserer were described from East Asia (Hu & Li (1986), Shimojana & Haupt (1998), Zhu et al. (2000), Zhu & Song (2000)). In this paper the emphasis is put on the large species of *Macrothele*, as *M. gigas* Shimojana & Haupt, 1998 and *M. raveni* Zhu, Li et Song, 2000.

In large *Macrothele* species four characters of taxonomic importance are recognized: the presence of a stridulation organ, morphology of female receptacula and male palpal organ and the distribution of sense organs on the male pedipalpal tibia (Shimojana & Haupt, 1998).

Material and Methods

Specimens of *M. gigas* were collected on the islands of Ishigaki and Iriomote (Japan) and in 2001 specimens of *M. gigas* were also found in Kenting NP, Taiwan (partly in the collections of the Zoological Museum Berlin 34974, 47160) (Haupt, 2003). In the Kenting NP it occurs together with M. holsti (Pocock, 1901) (Hsieh et al., 2003). Thus, material from Japan, Taiwan and China (paratypes of *M. raveni*, deposited in the College of Life Sciences, Hebei University) was studied. Specimens of *M. guizhouensis* were not available.

Results

A re-examination of the male holotype and females of *Macrothele gigas* from Iriomote and Ishigaki (Japan) reveals additional information not mentioned in the original description. A stridulation organ between the retrolateral surface of the palpal trochanter and the anterolateral side of the first leg is present in *M. gigas*, as well (Fig. 1, 2).

Its hairs situated on the palpal trochanter have the characteristic shape of paddles or narrow dragonfly-wings with one side much thicker and the other side extending to a thin blade. Their length is increasing in ventral direction. Two rows of about six such hairs are present, one more proximal at the base of the pedipalpal trochanter, one slightly more distal but parallel to the first one. The number of the specialized hairs is slightly varying, even in the same specimen (Table I).

The counterpart of the specialized structure of the pedipalpal trochanter is situated on the anterolateral side of the first leg (Fig. 2). There is a sharp proximal ridge at the base of the trochanter as well as a dorso-lateral ridge topped by several straight bristles increasing in length in distal direction of the trochanter. These bristles are arranged in a straight line. Their number is equally variable from 1 to 7.

Meanwhile, *M. gigas* was also found in Kenting NP in Taiwan (Haupt, 2003, Hsieh et al., 2003). In this area this species lives between limestone rocks and it is not rare. The length of the female peltidium measures about 14-15 mm, thus adult specimens are considerably larger than those found in the Yaeyama islands, Ishigaki and Iriomote (Southern Japan). The size exceeds also species described from continental China (Fig. 3).

Discussion

Several questions arise according to the taxonomic situation of large *Macrothele* species, because some characters are rather similar:

1. A new, larger species of the genus *Macrothele* was described from China (Fig. 3): *M. guizhouensis* Hu & Li, 1986. As in M. gigas the receptacula are thin and lengthy, but according to the drawings their shape is slightly different (Fig. 4D). Unfortunately, so far only females are known of this species and the male still awaits discovery: it will offer further taxonomic characters.
1. A second species is *M. raveni* which has also slender receptacula, although slightly curled (Fig. 4C). Surprisingly, in the male pedipalps the same arrangement is shown as in *M. gigas*. In males of *M. gigas* and *M. raveni* there are no rows of specialized setae on the dorsal side of the male pedipalpal tibia as occur in smaller species (Hu & Li, 1986, Shimojana & Haupt, 1998, Zhu & Song, 2000). Just two rows of trichobothria are present and one or two spines on the anterolateral side of the pedipalpal tibia.
2. Paddle-like hairs occur in *M. guizhouensis* and in both sexes of *M. raveni*. This character is not present in all the smaller species (Zhu & Song, 2000, Zhu et al., 2000). Consequently, it was used as a reliable distinction of *M. raveni* to other, smaller Chinese species of the genus (Zhu et al., 2000) – without the knowledge that this character was also present in *M. gigas*, both in the South of Japan and in Taiwan.

Unfortunately, the variation of stridulating hairs is only known from specimens of *M. gigas* (Table I).

Without any published observations on the mating behaviour of *M. gigas* one can only speculate on the role of the specialized hairs on the pedipalpal trochanter and their counterparts on the trochanter of the first leg: certainly this organ is used for stridulation and communication between both sexes before copulation takes place.

A large *Macrothele* species also lives in Southern Spain, *M. calpeiana* (Walckenaer, 1805). Fortunately, this species was studied by Snazell & Allison (1989) concerning morphology and behaviour. The authors did not observe stridulation while the species was mating, therefore, a sound bioacoustic study should be carried out in both, East Asian and Spanish species.

According to the close similarity of genitalia in large *Macrothele* species, two possiblities can be suspected: 1. Genital organs of this group are not very reliable concerning the distinction of species. Females keep moulting and therefore change the morphology of receptacula, although only slightly. 2. Specimens in Southern Spain were accidentally introduced from South China. This second possibility can be ruled out, if we refer to molecular biological results of Arnedo & Ferrández (2007) on *Macrothele calpeiana*.

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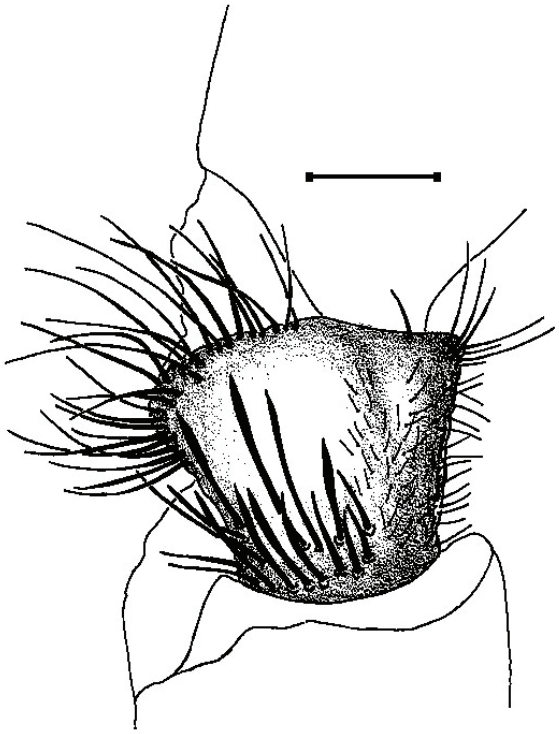

Fig. 1 Left retrolateral palpal trochanter of a female specimen of *Macrothele gigas* (bar: 1 mm).

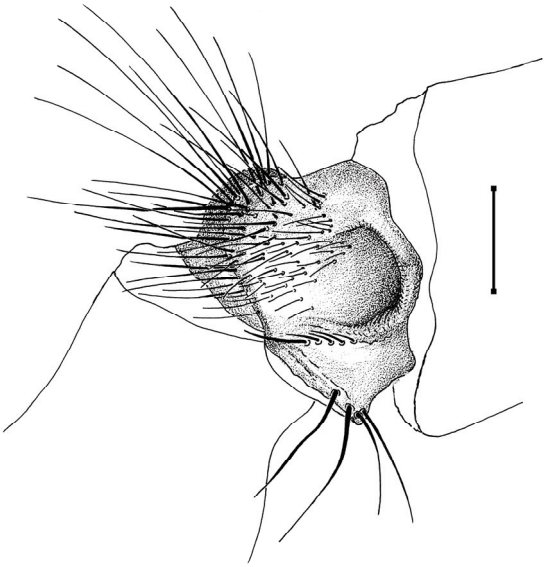

Fig. 2 Left anterolateral trochanter of the first leg (same specimen) (bar: 1 mm).

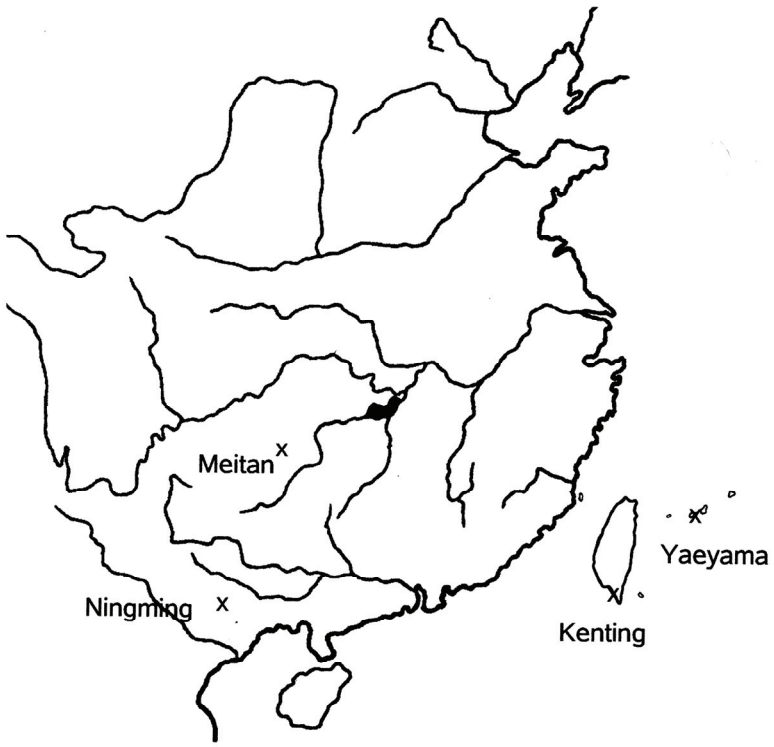

Fig. 3 Localities in East Asia in which large *Macrothele* species were found, Meitan: *M. guizhouensis*, Ningming: *M. raveni*, Kenting NP, Iriomote and Ishigaki (Yaeyama islands): *M. gigas*.

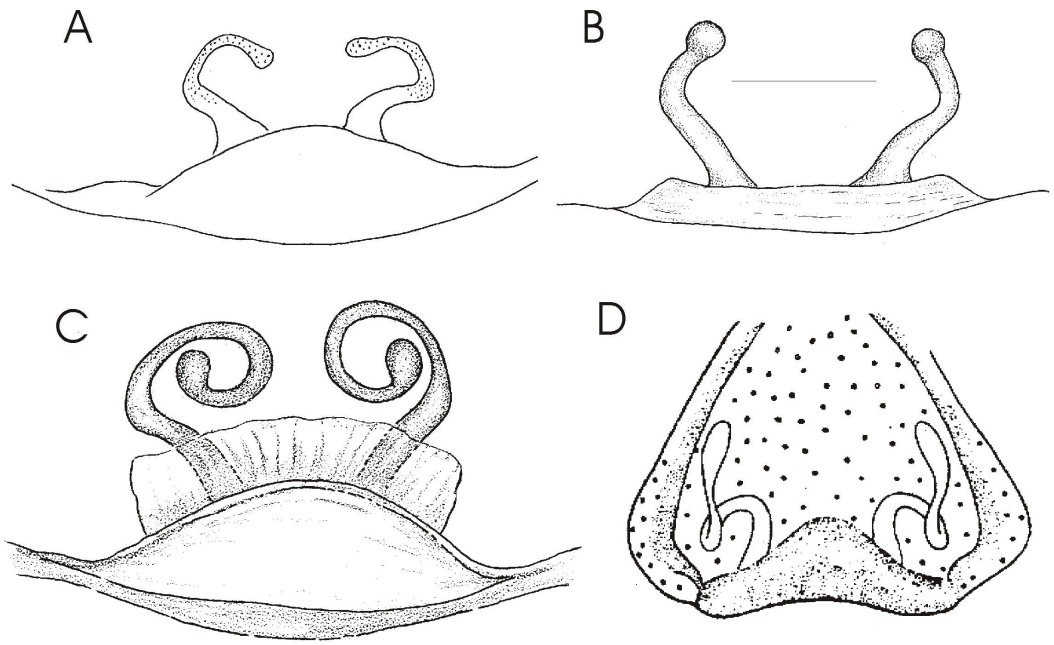

Fig. 4 Receptacula of large *Macrothele* species. A *M. gigas* from Iriomote (Japan). B *M. gigas* from Kenting NP. (Taiwan). C. *M. raveni*. D *M. guizhouensis*. A, B, C: bar 1 mm.

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Table I:
Survey on the occurrence of paddle-like hairs (p) on the retrolateral side of the palpal trochanter as compared to normal hairs (n) in different specimens of *Macrothele gigas*.

Macrothele gigas male type from Funaura (Iriomote, Japan): left side	proximal row	3 n	1 p	1 n	1 p	1 n
	distal	5 p				
Macrothele gigas male type from Funaura (Iriomote, Japan): right side	proximal row	4 p	1 n			
	distal row	5 p	1 n			
Macrothele gigas female from Funaura (Iriomote, Japan): left side	proximal	7 p				
	distal	5 p	1 n			
Macrothele gigas female from Funaura (Iriomote, Japan): right side	proximal	2 p	1 n	5 p		
	distal	1 n	5 p	1 n		
Macrothele gigas female from Kenting (Taiwan): left side	proximal	6 p				
	distal	5 p				
Macrothele gigas female from Kenting (Taiwan): right side	proximal	1 n	5 p			
	distal	6 p				
Macrothele gigas female (ZMB 34974) from Kenting (Taiwan): left side	proximal	7 p				
	distal	5 p	1 n			
Macrothele gigas female (ZMB 34974) from Kenting (Taiwan): right side	proximal	7 p				
	distal	5 p				