DESCRIPTION OF THE STRIDULATORY APPARATUS IN SOME SPECIES OF THE GENUS *RHOPALURUS* THORELL (SCORPIONES: BUTHIDAE)

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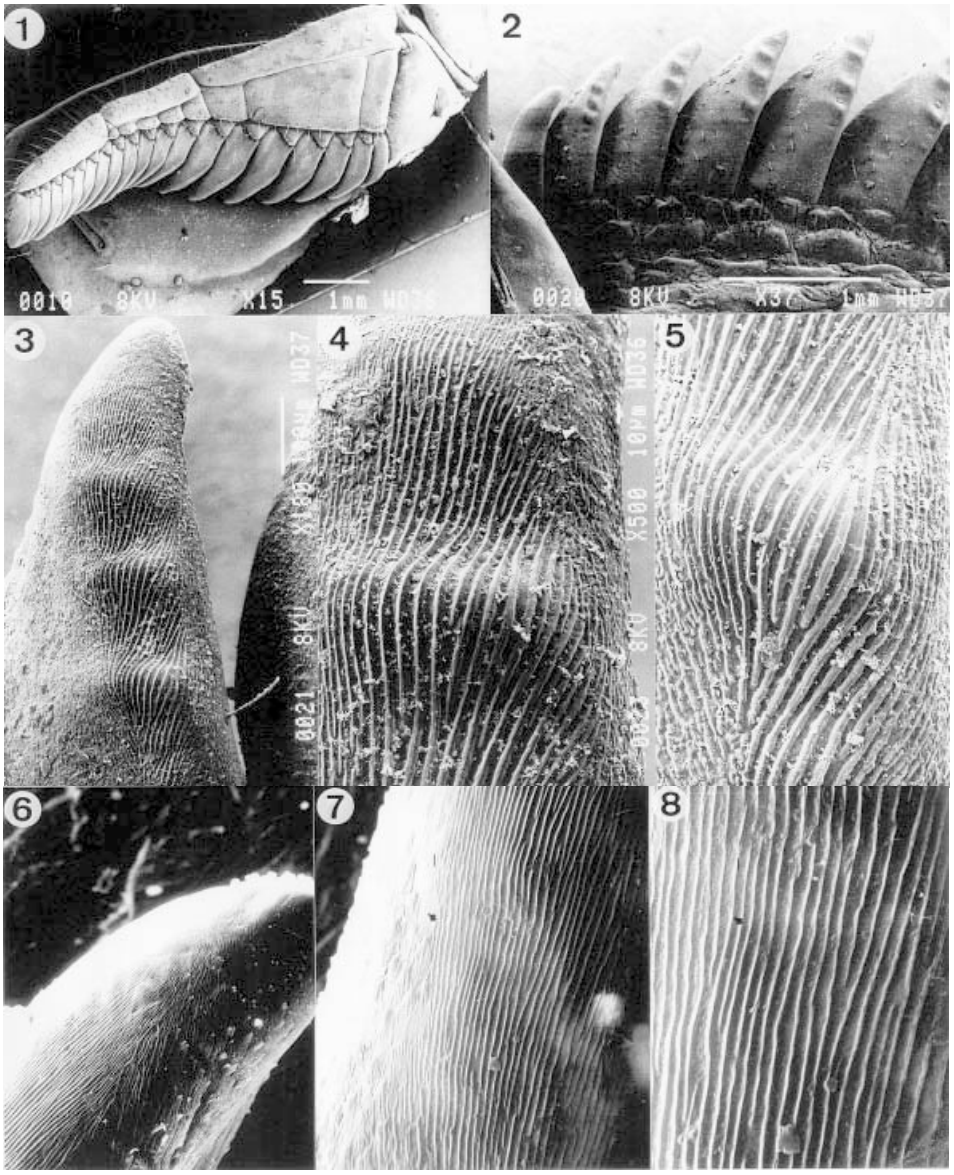
The genus *Rhopalurus,* established by Thorell (1876), was based on a single species from Colombia, *Rhopalurus laticauda* Lourenço (1982) proposed a full revision of the genus *Rhopalurus* and reduced the number of species from 19 to 9. After this revision four new species have been described. In every case a stridulatory apparatus was found to be present.

All known species of the genus *Rhopalurus* have been examined and a detailed study carried out on *R. abudi* Armas et Marcano Fondeur and *R. princeps* (Karsch) using Scanning Electron Microscopy (S.E.M.) photography. The stridulatory surfaces were exposed by removing the pectines from freshly fixed specimens. These were then coated with gold, according to standard procedure, and photographed with the S.E.M. of the Muséum National d'Histoire Naturelle, Paris.

Stridulation has long been known to occur in scorpions of the genus *Rhopalurus*. It was first noted by W.J. Burcherl during a field trip to Brazil in 1828. Several decades later, Pocock (1904) described the phenomenon using more scientific terminology, but the structure of the stridulatory apparatus has only recently been observed with the use of Scanning



Figs 1-8. Scanning electron micrographs of the pecten of *Rhopalurus* species from the Caribbean area. 1-5. *Rhopalurus abudi* from the Dominican Republic. 1. Pecten, external aspect (x 15). 2. Pecten, internal aspect (x 37). 3. Tooth, internal aspect (x 180) showing three expanded zones over the stridulatory lyriform files. 4 and 5. Expanded zone in two different teeth (x 500). 6-8. *Rhopalurus princeps* from Haiti. 6. Tooth, internal aspect (x 600) showing the absence of expanded zones. 7 and 8. Detail of the internal aspect showing stridulatory lyriform files (x 1200 and x 2500, respectively).

Electron Microscopy for two species, *R. princeps* and *R. abudi*. In the case of another two species, *Rhopalurus agamemnon* (KOCH) and *Rhopalurus rochae* BORELLI, sonograms (spectrograms) of the stridulations have also been registered (LOURENÇO, CLOUDSLEY-THOMPSON, 1995).

POCOCK (1904) noted peculiarities in the structure of the stridulatory apparatus of different species. His initial observations concerned the size and shape of pectines. *Rhopalurus* species possess pectines which are quite broad in their proximal half (Fig. 1). In fact, this aspect of pectine structure has been observed in all known species of the genus.

The previous S.E.M. studies carried out on *Rhopalurus princeps* from Haiti (LOURENÇO, CLOUDSLEY-THOMPSON, 1995) associated with new work now carried out on *Rhopalurus abudi,* confirm many of Pocock's observations concerning the structure of the internal surface of the teeth. They confirm, in particular, the presence of two different patterns in the structure of the striated areas of the internal surface of the teeth which form the stridulatory apparatus. What Pocock defined as "tubercular elevations", correspond, in fact, to the expanded zones observed at the inner edge of each tooth. This pattern was reported by POCOCK (1904) only in the case of *R. junceus* (HERBST). Our observations show that a similar structure is present in *R. abudi* (Figs 2-5), but absent from *R. princeps* (Figs 6-8), which likewise is distributed hroughout the island of Hispaniola. Pocock made reference only to the pattern in *R. borelli* (=*R. agamemnon*), from which expanded zones are absent. The study of the other species present in South America reveals that this pattern is the usual one.

One question now can be addressed: What is the significance of the expanded zones observed in the two species from the Caribbean area ? From a morphological point of view, these expanded zones increase the surface of the area in which teeth are in contact with the granulated, depressed region of the third sternite which acts as a rasp. This presumably results in the production of a more intense and louder sound. This can be detected in both Caribbean species when they produce sounds. Those produced by *R. abudi* are much louder than the ones produced by *R. princeps*.

Although the function of stridulation in scorpions remains unproven, it is most probably to the deterrence of predators (LOURENÇO, CLOUDSLEY-THOMPSON, 1995). Stridulation has not been recorded as taking place during courtship in any species of scorpion. Indeed, scorpions appear to be deaf to airborne sounds (CONSTANTINOU, CLOUDSLEY-THOMPSON, 1984), although the pectines may, among their other functions, detect ground vibrations (CLOUDSLEY-THOMPSON, 1955).

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