

A new *Hahnia* from Ivory Coast with a note on stridulating organs in the Hahniidae (Araneida)

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Summary

Hahnia eburneensis n. sp. from Ivory Coast is described. The male is provided with a strong stridulatory file on the chelicerae. Fifteen other *Hahnia* species all proved to have stridulatory ridges on the chelicerae. In some species the file consists of scales, arranged roughly in rows; in others it is composed of simple ridges. Most species examined have a stridulating file that is something in between the two extreme types.

Hahnia eburneensis n. sp. (Figs. 1-5)

Male

Total length 2.20 mm (without spinnerets), carapace 1.06 mm long, 0.80 mm wide.

Colour: Carapace yellowish brown with dark striae and margin; sternum and chelicerae yellowish brown; legs yellow, in some specimens with dark annulations, in others without. Abdomen with two white spots in front followed by three chevrons. In some specimens the abdomen is entirely grey.

Carapace: Cephalic area parallel-sided, 0.51 mm wide. Fovea an obvious dark line.

Eyes: AME the smallest, less than half their diameter apart and even closer to ALE. PME separated by about their radius and half that distance from PLE. Laterals touching. Clypeus as wide as ALE.

Chelicerae: 0.52 mm long; anterior margin with three teeth, posterior margin with 5 or 6 teeth. With a stridulating file of about 25 ridges.

Labium: 0.24 mm long, 1.18 wide, with two pairs

of forwardly pointing hairs on anterior margin. **Sternum:** 0.75 mm long, and almost as wide, pointed behind.

Legs:

	Fe	Pa	Ti	Mt	Ta	Total
I	1.18	0.45	1.00	0.90	0.59	4.12
II	1.08	0.39	0.90	0.85	0.59	3.81
III	0.82	0.39	0.73	0.77	0.55	3.26
IV	1.09	0.39	0.84	0.97	0.62	3.91

Spinination as in most other species. Metatarsi IV with one dorsal and one ventral spine.

Abdomen: Stigma closer to spinnerets than to epigastric furrow (± 0.4). Spinnerets in a slightly recurved row. Outer spinnerets 1.5 times the length of inner spinnerets; basal segment darkened and twice the length of apical segment.

Male palp (Figs. 1-3): Patella with a spur, bifid at its extremity (Fig. 1). The terminal ridge of the tibia does not protrude but bears a row of fine hairs and a low short ridge at its proximal end (Fig. 2). Apophysis evenly curved from the base to its end.

Female

Total length: 2.04 mm (without spinnerets), carapace 0.82 mm long, 0.58 mm broad. Similar to the male except for the following characters.

Chelicerae: 0.36 mm long; stridulating file less well developed, hardly visible.

Labium: 0.19 mm wide, 0.14 mm long.

Sternum: 0.61 mm long and about as wide.

Legs:

	Fe	Pa	Ti	Mt	Ta	Total
I	0.77	0.30	0.60	0.58	0.41	2.66
II	0.71	0.32	0.52	0.53	0.37	2.45
III	0.68	0.30	0.46	0.54	0.42	2.40
IV	0.86	0.35	0.87	0.72	0.36	3.16

All metatarsi without spines, and fewer spines on tibiae than in the male.

Abdomen: Stigma closer to spinnerets than to epigastric furrow (0.48).

Epigyne (Fig. 4): Posterior part with a large depression, about twice as broad as long; receptacula and some ducts show through.

Vulva (Fig. 5): Of the same type as in *Hahnia*

inflata Benoit (Bosmans & Thijs, 1980). Longest axis of the secondary receptacula transverse instead of longitudinal as in most *Hahnia* species.

Diagnosis

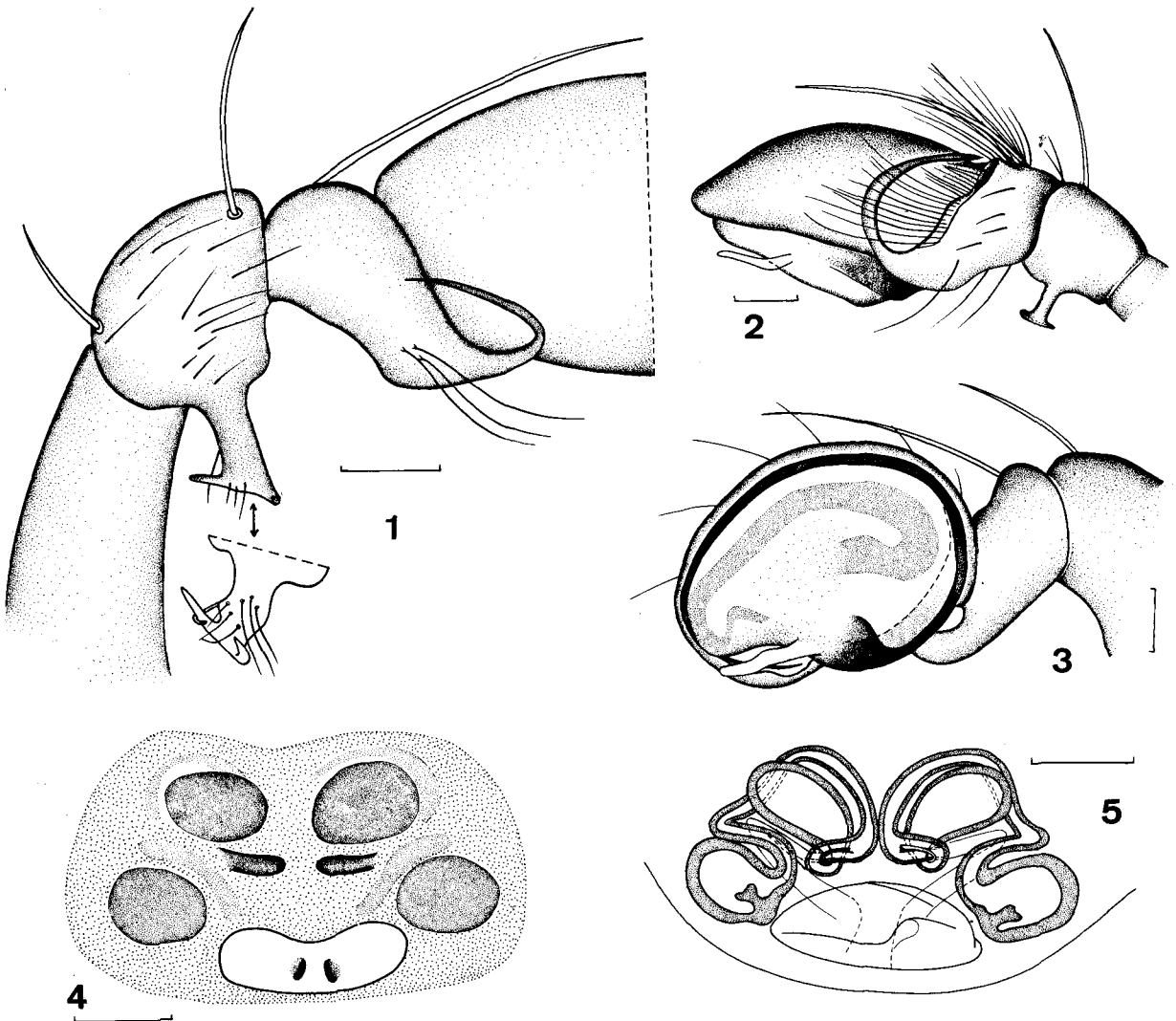
For reasons explained by one of us (R.B.) in a further paper, the species is placed in the genus *Hahnia*.

Hahnia eburneensis n. sp. is very variable in its

size (the males appear to be larger than the females), colour and spination of the legs. However, the male is easily recognised by the bifid spur on the patella, whereas the female is characterised by its vulva and the very large, single epigynal opening.

Material examined

Male holotype (MRAC 154 264): Ivory Coast, Kossou, 23 December 1974, pitfall trap, secondary



Figs. 1-5: *Hahnia eburneensis* n. sp. 1 Lateral view of male palpal tibia and patella with a detail of the patellar apophysis; 2 Lateral and 3 Ventral view of male palp; 4 Epigyne; 5 Vulva. Scale lines: 0.1 mm.

forest (R. Jocqué leg.); female paratype: 22 July 1977, same data as holotype; paratypes: 2 males, same data as holotype; 1 male, 4 February 1975, 1 female, 13 April 1975, both same data as holotype.

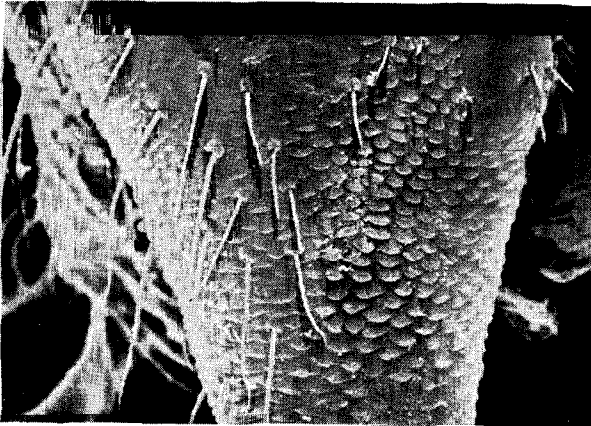
The material is deposited in the Koninklijk Museum voor Midden-Afrika, Tervuren.

Stridulating organs in Hahniidae

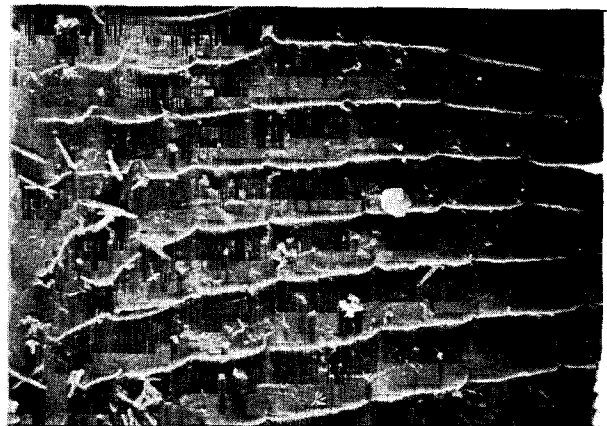
The male of *Hahnia eburneensis* n. sp. appears to be provided with a stridulatory organ composed of a series of ridges on the lateral side of the chelicera and, possibly, completed by the spur on the palpal patella. In the female the ridges are much weaker or

lacking and no corresponding excrescence is found on the palp.

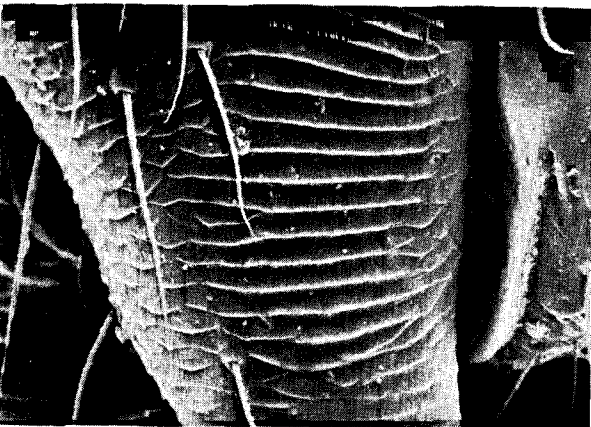
A totally different type of stridulatory organ was found in *Antistea elegans* by Simon (1896) and thoroughly described by Van Helsdingen (1963). In that species the organ is situated on the back of the carapace and the anterior part of the abdomen. Although the Hahniidae of several parts of the world, i.e. Europe (Brignoli, 1976, 1977a, 1978b; Harm, 1966), New Zealand (Forster, 1970), North America (Opell & Beatty, 1976) and Africa (Benoit, 1978; Bosmans & Thijs, 1980), have recently been the subject of detailed studies, none of the authors has stated the presence of a stridulatory organ in



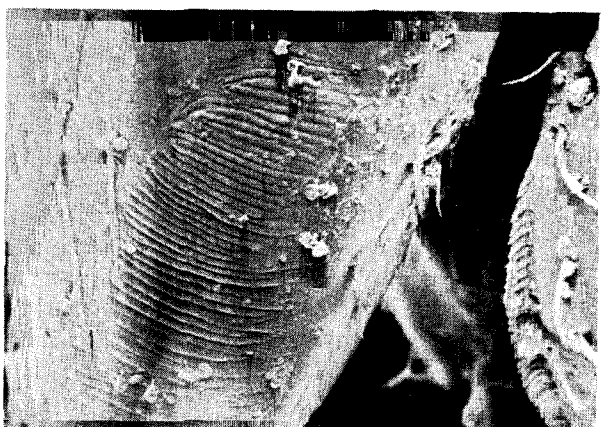
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Figs. 6-9: Outer lateral aspect of chelicera. 6 *Hahnia helveola* (x180); 7 *H. spinata* (x675); 8 *H. nava* (x400); 9 *H. montana* (x425.) Scanning electron micrographs.

Hahnia or any other hahniid genus. Only Brignoli (1978a) described several species of *Hahnia* from Bhutan and mentioned that in two of them, the chelicerae are provided with a stridulatory file.

In all the 16 *Hahnia* species we examined, at least the males proved to have a stridulating file on the chelicerae though not always as strong as in *H. eburneensis* n. sp. In only two cases, i.e. *H. montana* (Blackwall) (Fig. 9) and *H. candida* Simon, the stridulating file is of the type found in most linyphiids, consisting of a row of simple more or less parallel ridges. In other species the file consists of groups of scales, arranged roughly in parallel rows on the lateral side of the chelicera. These scales appear to be pronounced reticulations of the chitinised wall. This type of file is found in *H. helveola* Simon (Fig. 6), *H. vangoethemi* Benoit, *H. rouleti* de Lessert and *H. tabulicola* Simon (paratype). In *H. spinata* Benoit (Fig. 7) the scales are arranged in neat, straight lines on the lateral side of the chelicera. In *H. annulata* de Lessert the ridges are almost as in the following type but here and there interrupted by short vertical lines.

In many species (*H. benoiti* Bosmans & Thijs, *H. breviducta* Bosmans & Thijs, *H. inflata* Benoit, *H. major* Benoit, *H. nava* (Blackwall) (Fig. 8), *H. ononidum* Simon and *H. pusilla* C. L. Koch) the stridulating ridges of the lateral side merge into scale-like reticulations in front and on the back of the chelicerae. This is reminiscent of the cheliceral ridges found in some *Mynoglenes* species (Blest & Pomeroy, 1978). It is therefore not unlikely that these different types of stridulating files represent successive stages in the evolution of cheliceral stridulating ridges. Pronounced reticulations of the chitinous wall, appearing as scales, probably are a primitive form of stridulating file, whereas the simple ridges as found in many linyphiids represent a more modern type. Stridulating ridges on the chelicerae are known to exist in some Sicariidae (Simon, 1893), Diguettidae and Scytodidae (Legendre, 1963), Ochyroceratidae, Pholcidae and Caponiidae (Brignoli, 1975, 1977b) and are common in Linyphiidae. In the latter family the organ seems to be more pronounced in the females (Locket & Millidge, 1951; Van Helsdingen, 1963) although Legendre (1963) mentions the reverse for *Lepthyphant* species.

As in Linyphiidae, the number and extent of the

ridges vary greatly with the species and might thus offer additional features to separate some closely related *Hahnia* species.

It is interesting to note that of all the species examined, only *H. candida* and *H. montana* possess a stridulatory organ without scales. Since this type of stridulating organ developed in many families independently, this feature can hardly be regarded as a synapomorphy. The fact that Lehtinen (1967) placed both of these species in another genus, i.e. *Iberina*, might however be more than just a coincidence.

Acknowledgements

The authors wish to thank Dr J. Rammeloo (Nationale Plantentuin van België, Meise) for his help with the scanning electron micrographs and Mrs N. Van Noppen who made the final drawings.

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Bull.Br.arachnol.Soc. (1982) 5 (7), 323-326

Lungbook microstructure in *Tegenaria* sp.

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Summary

The lungbooks of spiders of the genus *Tegenaria* Latreille were examined with particular reference to anatomical methods for the maintenance of shape and respiratory function. Light and scanning electron microscopy were used to examine the lungbooks. Pillar cells were found in the blood spaces and three types of chitinous "hairs" were found and described. Short simple "interlamellar hairs" were found on the upward facing sides of the lamellae keeping the air space open; more complex hairs form looping networks at the free ends of the lamellae ("terminal lamellar hairs"); larger complex hairs arise from the atrial wall ("atrial hairs"). The complex looping hairs may function as mechanical buffers as well as in keeping the air spaces open.

Introduction

The respiratory apparatus of arachnids consists of lungbooks and/or tracheae. *Tegenaria*, the spider genus used in this study, has two pairs of tracheal trunks and one pair of lungbooks. Each lungbook consists of ectodermal invaginations forming leaf-like lamellae, hence the term "lungbook". Air circulates between the lamellae and blood circulates inside them. Obviously for maximal gaseous exchange the air and blood spaces must be kept open by some means. This was therefore investigated.

Materials and Methods

Immature specimens were used and so not identified beyond the generic level. For examination under the light microscope, the opisthosoma was fixed for five hours in Carnoy fixative after the specimen had been anaesthetised with carbon dioxide and the dorsal cuticle removed under a physiological saline (Rathmeyer, 1965) to improve reagent penetration. The material was double-embedded in ester wax and agar (Wigglesworth, 1959) to minimise the problems of sectioning hard, brittle cuticle. Sections were cut at 8 μ m and stained with one-step Mallory triple stain.

For examination with the Cambridge Stereoscan S4, lungbooks were dissected out of freshly killed

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