

The clypeal gland of *Argyrodes fissifrontella*
Saaristo, 1978 (Araneae, Theridiidae)

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Summary

The male of *Argyrodes fissifrontella* Saaristo, a theridiid endemic to the Seychelles, is provided, like other spiders of the same genus, with an exocrine clypeal gland. The large bi-cellular units of this organ open on both lips of the cephalic notch. The secretion is probably used during mating.

Introduction

Argyrodes fissifrontella is a new species of theridiid, described recently by Saaristo (1978) and known only from the Seychelles Archipelago.

Like other *Argyrodes*, it shows a conspicuous sexual dimorphism of the prosoma, since the male, in contrast to the female, is provided with two cephalic knobs separated by a deep notch. Hence it follows that *A. fissifrontella* may be related to the nosed morphological type (Lopez, 1978; Lopez & Emerit, 1979) which also includes *Argyrodes argyroides* (Walck.), *A. zonatus* (Walck.) and *A. elevatus* Taczanowski.

We have previously demonstrated the presence of a secretory organ in these species, responsible for the peculiarity of the male prosoma and given the name clypeal gland (Legendre & Lopez, 1974, 1975). Moreover, a homonymous organ was described by Blest & Taylor (1977) in the linyphiid *Mynoglenes*; it differs strikingly from the clypeal gland of *Argyrodes* by its presence in both sexes.

The present note aims to demonstrate, not only that *A. fissifrontella* is similarly provided with such an organ but also to emphasise differences and details of the ducts by means of a histological study associated with a scanning microscope examination.

Material and Methods

The specimens of both sexes originated from Mahé (intermediate forest, alongside the Montagne Posée and Sans Souci roads) and Praslin (*Lodoicea maldivica* sanctuary forest, in the Vallée de Mai). The species was found only on these two granitic islands where it inhabits the webs of *Nephila inaurata* (Walck.), as a kleptoparasite, sometimes in company with *Argyrodes nephilae rostratus* Blackwall (Lopez, pers. obs., August 1979). It seems that *A. fissifrontella* is absent from Bird Island, a northern coral islet of the Seychelles Archipelago. However *A. nephilae rostratus* abounds here in the webs of *Nephila inaurata* (Lopez, pers. obs., August 1979).

Material was fixed in the field, in 70° alcohol for scanning electron microscopy and in Duboscq-Brasil fluid for histological purposes. Prosomas of the alcohol-preserved specimens were studied in the scanning microscope JEOL SM 35 after appropriate preparation. The histology specimens were embedded in cytoparaffin, sectioned serially 6 µm thick and stained with the usual trichromes (Masson, Hematoxylin-eosin-orange G).

Results

In accordance with the earlier description of the *Argyrodes* prosoma (Legendre & Lopez, 1974), the cephalic part of *A. fissifrontella* exhibits an upper knob bearing the eyes, given the name ocular protuberance, a lower knob given the name frontal bump and an interposed clypeal notch (Fig. 1).

Scanning microscopy

Scanning examination reveals the presence of pores on both surfaces of the notch (Figs. 5, 6). Small orifices are spread over the whole lower face of the ocular protuberance where they appear between the sockets of smooth hairs, either as irregular holes or, more often, as narrow slits (Fig. 5). A similar grouping of scratch- or buttonhole-like fissures opens transversely on the upper face of the frontal bump, where they are also associated with hairs (Fig. 6). At the bottom of the slits, minute round pores may be seen when they are not buried under secretion (Figs. 5, 6).

Histology

The sagittal and parasagittal sections of the anterior prosoma show the presence in the male only of a gland which fills practically the whole frontal bump, but occupies only the lower third of the ocular protuberance. It appears pushed back by the notch cuticle and is, therefore, conspicuously curved, concave side forward, in the form of an irregular crescent (Fig. 1). The transverse (Fig. 2) and horizontal sections do not show a symmetrical bilobate arrangement of the glandular mass on either side of a median plane.

Although originating from the hypodermis, as verified in immature males before their last moult,

the cells do not constitute a genuine epithelium. They crowd beneath the cuticle, forming glandular units, loosely arranged in lobules (Fig. 2) and which are, as a whole, shorter in the ocular protuberance than in the frontal bump (Fig. 1).

Each unit includes an adenocyte and a canal cell. The adenocytes are slender club-shaped elements, 60 to 100 μm long, with a basal nucleus and a foamy cytoplasm centred round an axial ductulus. The ductulus, which is clearly visible in transverse sections of adenocytes (Fig. 4), is surrounded by an acidophilic ring area, suggesting the presence here of an end apparatus, as in other *Argyrodes* (Juberthie & Lopez, 1980; Lopez, Emerit & Juberthie-Jupeau,

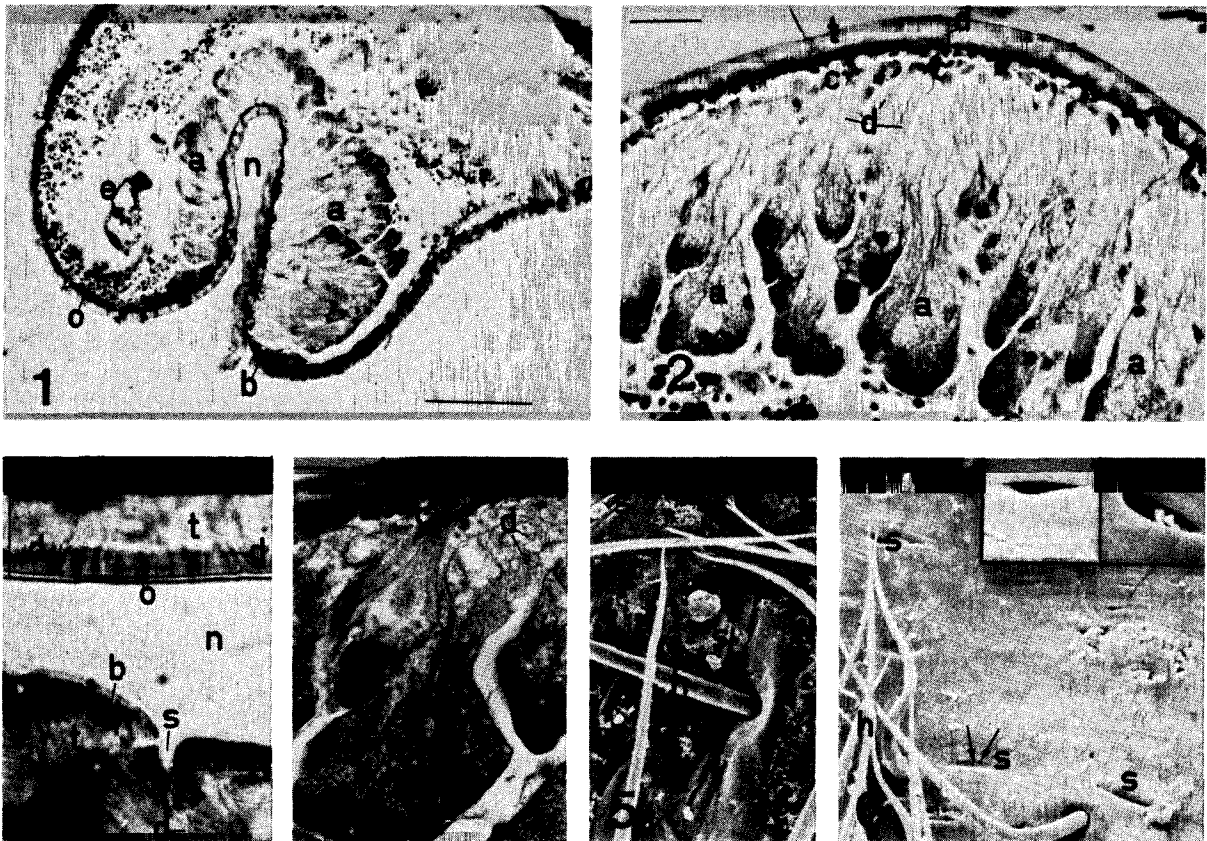


Fig. 1-6: *Argyrodes fissifrontella* (Saaristo). 1 Sagittal section of male prosoma; 2 Transverse section of frontal bump; 3 Detail of notch cuticle; 4 Detail of gland in frontal bump; 5,6 Ocular protuberance and frontal bump with orifices more or less concealed by secretion, and pores (arrows); 6 insets: two of the orifices. (a = adenocytes, b = frontal bump, c = canal cells, d = duct or ductulus, e = eye, h = hair, n = notch, o = ocular protuberance, s = slit, t = cuticle).

Scale lines: 50 μm (1), 20 μm (2), 10 μm (3,4), 20 μm (5,6).

1980). The end apparatus is an ultrastructural device of arthropod hypodermal gland cells. It includes an axial ductulus, the extracellular cavity between this ductulus and the adjoining part of the adenocyte being bordered with microvilli.

The canal cells mingle with the hypodermis and are only recognisable by their small dark nuclei, which have a tendency to cluster just beneath the cuticle (Figs. 2, 4). A short tiny duct, extending from the ductulus, emerges from their narrow cytoplasm, directly pierces the thick integument (14-20 μm) singly or in twos and threes (Figs. 3, 4), and opens usually at the bottom of the slits mentioned above (Fig. 3). The diameter is always small and there is no duct coalescence.

Discussion

From the histological point of view, the basic structure of the clypeal gland in *A. fissifrontella* is the same as the patterns in other species (Lopez, 1977; Lopez & Emerit, 1979; Lopez, Emerit & Juberthie-Jupeau, 1980). The organ appears as a dense grouping of independent glandular units composed of adenocytes, probably with an end apparatus, and canal cells and ducts traversing the adjoining cuticle.

However, it differs from the previously known glands of the nosed type *Argyroides* in four obvious details.

Firstly, the organ as a whole does not appear bilobate in the clearest sections (Fig. 2), unlike *A. argyroides* and *A. zonatus* for instance.

Secondly, the ducts do not merge into a branched draining system, the extent of which is especially prominent in the clypeal gland of *A. argyroides* (Legendre & Lopez, 1974; Juberthie & Lopez, 1980), *A. zonatus*, *A. elevatus* and of a second Seychelles species *A. nephilae rostratus* (Lopez, unpublished). Only a third Seychelles species, *A. cognatus* (Blackwall), possesses, in its cephalic turret, a clypeal gland, the secretory system of which appears closely related to *A. fissifrontella* on account of its tiny isolated non-branching ducts (Lopez, Emerit & Juberthie-Jupeau, 1980).

Thirdly, the ducts open, not only on the frontal bump, but also on the ocular protuberance, once again unlike *A. argyroides* and *A. elevatus* where the ocular protuberance is poreless. Given the presence of such a pored area extending up the clypeus and the

absence of any obvious gland division, it seems that *A. fissifrontella* constitutes an evolutionary step interposed between the bilobate organ with termination on the lower part of the clypeus of *A. argyroides* and the higher turret gland characterising *A. cognatus*.

Lastly, the pores do not open directly on the surface, as in other *Argyroides* but deep at the bottom of slits, as shown by scanning electron microscopy.

As regards the rôle of the gland, it is probably the same as in other species, namely to coat the cephalic knobs with a substance; this secretion, which perhaps contains a pheromone, would lubricate the male's prosoma for copulation as it is grasped by the female's chelicerae.

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