

## ULTRASTRUCTURE AND SCANNING MICROSCOPY OF THE STERNAL GLAND OF *Coptotermes gestroi* (ISOPTERA, RHINOTERMITIDAE).

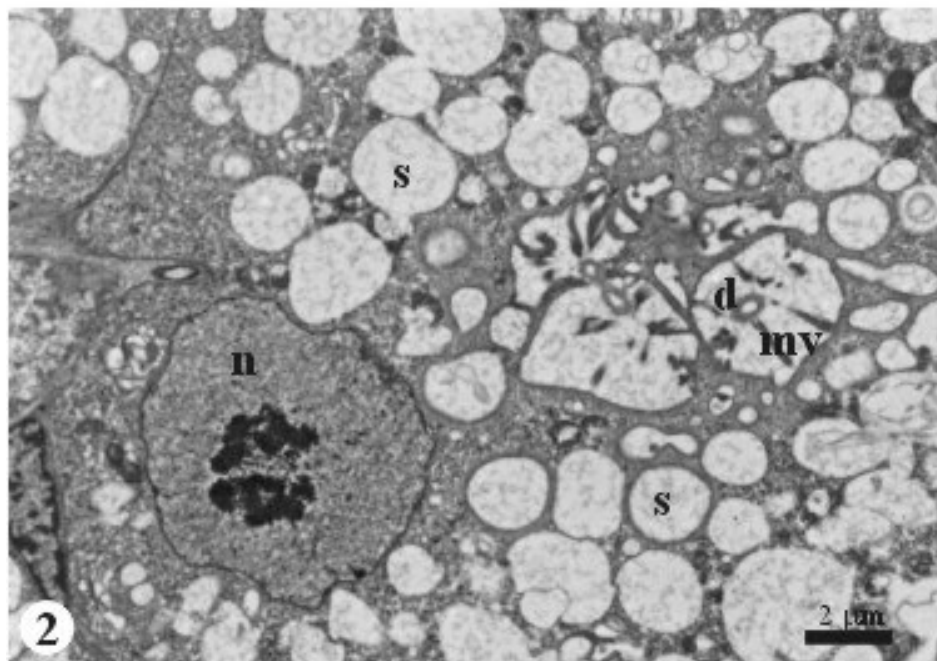
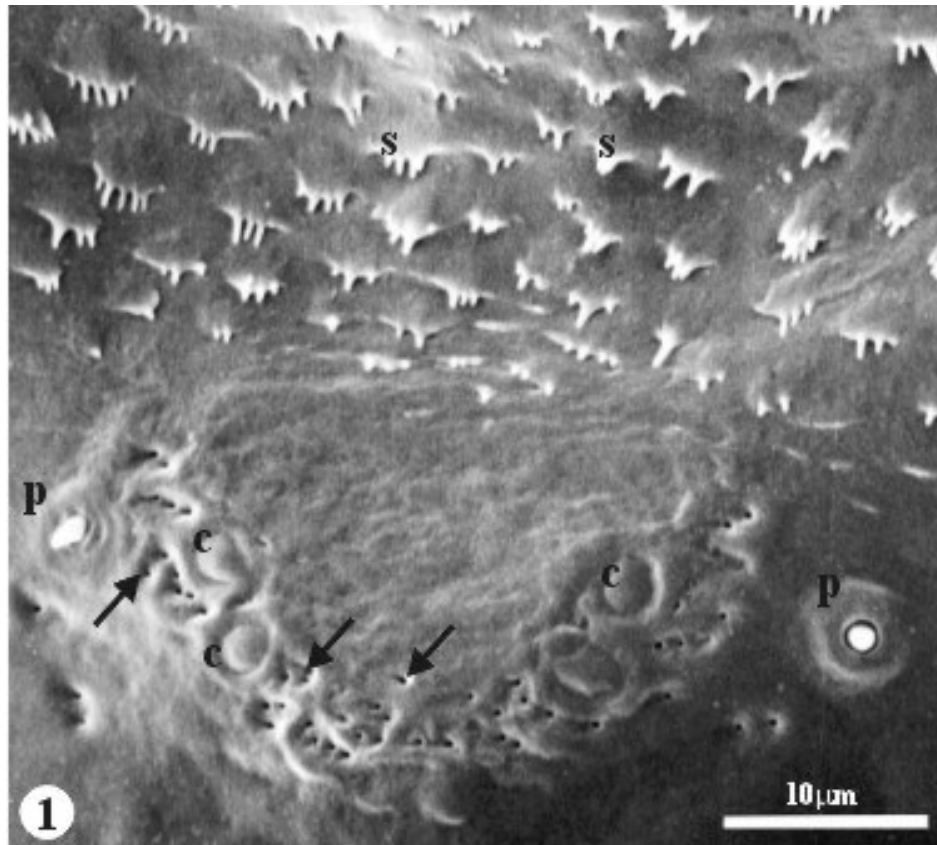
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Termites are social insects and the maintenance of this sociality is dependent on pheromones produced by exocrine glands. The sternal gland is the only source of trail pheromones in termite workers. To investigate the morphology of this gland, abdomens of *Coptotermes gestroi* workers were fixed in 2% glutaraldehyde and 4% paraformaldehyde in 0.2M sodium cacodilate buffer, and processed by routine methodology for transmission electron microscopy. The same material was fixed in FAA fluid and prepared through conventional technique for scanning electron microscopy. The workers of *C. gestroi* exhibited a small bilobed sternal gland with a highly modified cuticle. This gland appeared as a thickening of the epidermis, at the anterior part of the fifth abdominal sternite. Under the scanning electron microscope, the cuticular surface of the sternal gland showed a V-shaped structure with two peg sensilla in elevated socket and various campaniform sensilla (Fig. 1). Pores also occur in the glandular area and most of them are placed in depressions near the campaniform sensilla. Cuticular scale-like protuberances predominate in the anterior region of the gland, above the V. The ultrastructure showed a gland composed of class 1 and 3 cells, according to the terminology of Noirot & Quennedey (1974, 1991). Class 3 cells (type 1) are inserted among class 1 cells in the anterior lobe of the gland. These class 3 cells are small and contain electrondense vesicles with large modified mitochondria. Glycogen was observed around the secretory vesicles. The posterior lobe of the sternal gland is well-developed and was also constituted by class 3 cells (type 2). These glandular cells are different of those described in the anterior region and may be distinguished by the cytoplasmatic secretions. These cells presented a lot of round electronlucent vesicles of secretion (Fig. 2), abundant free ribosomes and a well-developed Golgi apparatus. The collector ductules of class 3 cells showed an endocuticular lining covered by a thin and discontinuous epicuticle. Each class 3 cell is connected to the cuticle by a duct which has two parts, one corresponding to the collector ductule and the other to the conducting one. Around the collector ductules were observed small reservoirs which were involved by the microvilli of the class 3 cells. After leaving the cell, the conducting ductules appeared surrounded by their secretory cells and showed an electrondense and continuous cuticular layer. The secretion of class 1 cells was stored in an inner subcuticular reservoir which was delimited by the microvilli of class 1 cells. This reservoir is large and crossed by the campaniform sensilla and ductules of two types of class 3 cells that open outside of the insect body. The complex structure of the sternal gland suggests multicomponents for the trail pheromone in the worker of *C. gestroi*.

### References

- Noirot, Ch & Quennedey, A., Annu. Rev. Entomol. 19:61-80 (1974).  
Noirot, Ch. & Quennedey, A., Ann. Soc. Ent. Fr. 27:123-128 (1991).



**Figure 1-** Scanning electron microscopy of the cuticular surface of the sternal gland. c=campaniform sensillum; p=peg sensillum; s=cuticular scale; arrows=pores.

**Figure 2-** Posterior class 3 cell of the sternal gland. d=collector ductule; mv=microvilli; n=nucleus; s=secretory vesicle.