

Digestive system of *Bovicola caprae* Gurlt, 1843 (Insecta : Mallophaga)

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Summary

In this study an histological and anatomical research is carried out concerning the digestive system of Bovicola caprae Gurlt, 1843. Photographs of the sections, taken with the optic microscope, are presented. Different organs, such as salivary glands, oesophagus, crop, gut, Malpighian tubes of the mentioned digestive system, are clearly visible.

Key words : *Bovicola caprae* — Mallophaga — Digestive system — Histology — Anatomy.

Résumé

APPAREIL DIGESTIF DE *BOVICOLA CAPRAE* GURLT, 1843 (INSECTA : MALLOPHAGA). *Dans ce travail nous avons réalisé une étude histologique et anatomique de l'appareil digestif de Bovicola caprae Gurlt, 1843. Des photographies des coupes histologiques prises au microscope sont présentées. Différents organes de l'appareil digestif, tels que les glandes salivaires, l'oesophage, le jabot, l'intestin, les tubes de Malpighi, sont clairement visibles.*

Mots-clés : *Bovicola caprae* — Mallophaga — Appareil digestif — Histologie — Anatomie.

Introduction

The histology of Mallophaga has been studied by various authors e.g. Snodgrass (1899) who studied several genera of Mallophaga, showing their different organs and systems.

Cummings (1913) studied the Mallophaga crop, its development and systematic value of its teeth.

Risler (1951) published a research concerning the head of *Bovicola caprae* Gurlt, 1843, presenting schemes of the anterior part of the digestive system.

One year later, Waterhouse studied the food digestion of Ischnocera and Amblycera, starting with an histological anatomy of the digestive system and tracheal system of the alimentary canal. Symmons (1952) carried out a complete research concerning comparative head anatomy of some species of Mallophaga in order to construct a general scheme of the head of these insects in such a manner that he could obtain a homology between suborders.

The authors carry out an anatomical research concerning the digestive system of *Bovicola caprae*, up

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PHOTO 1. — Salivarium (S). SL = Lingual Sclerite



PHOTO 3. — L.S. crop (CR)

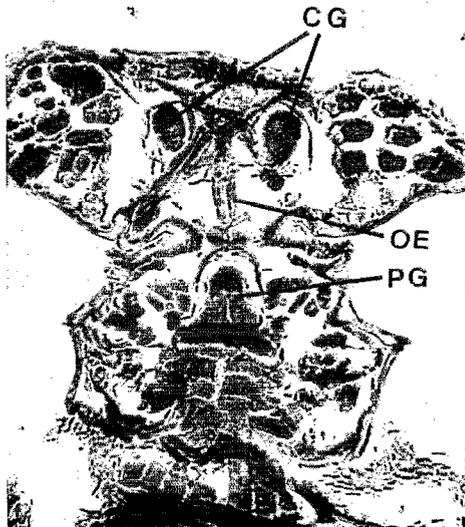


PHOTO 2. — L.S. oesophagus (O). CG = Cerebral ganglion ;
PG = Prothoracic ganglion

to now never completed, using paraffin sections of these Mallophaga.

Material and methods

Females of *Bovicola caprae* Gurlt, 1843 were prepared (fixing and bedding) according to the methods of Soler *et al.* (in press).

The Mallophaga were collected from goats, destined for human consuming in Granada (Southern Spain).

The sections were cut lengthwise, starting with the ventral part of the lice.

Results and discussion

The alimentary canal of this species is similar to those of other Mallophaga if we compare it to Waterhouse's compendium.

Starting with the head and following the next sections, we see in photo 1 the salivarium, where the salivary glands secrete their contents.

Next to the salivarium we see a relatively narrow canal, the oesophagus (photo 2) which is situated



PHOTO 4. — Salivary gland (SG). Observe the Salivary canal (SC)

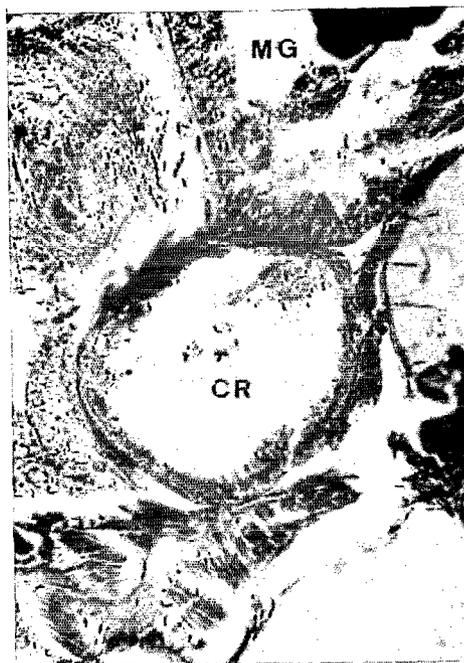


PHOTO 6. — T.S. crop (CR) together with a section of the mid gut (MG)



PHOTO 5. — Another section of salivary gland

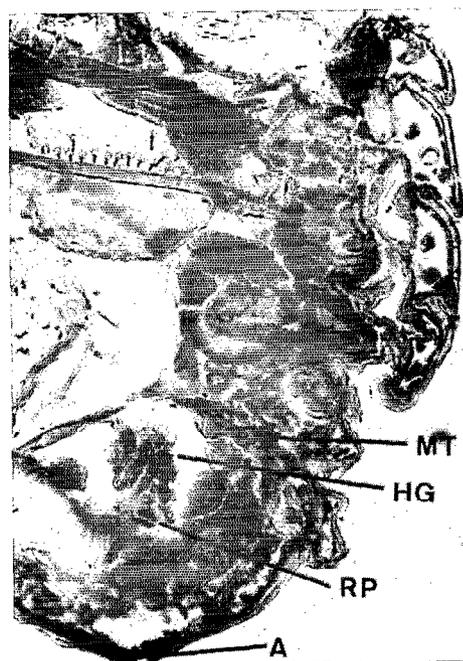


PHOTO 7. — L.S. hind gut (MG). T.S. Malpighian tubes (MT).
A = Anus ; RP = Rectal pad

behind the suboesophageal ganglion and therefore appears in the last sections.

The oesophagus has two canals, one entering into the crop and another entering into the mid gut (fig. 1).

The crop of *Bovicola caprae* (photo 3) is long and bag-shaped; it starts behind the oesophagus and continues until the dorsal part of the abdomen where it enlarges considerably. It is sidelong situated with regard to the mid gut but somewhat more towards the back. Observing photo 6, the crop walls are very thin in comparison with the walls of the mid gut.

The two couples of pear-shaped salivary glands are situated at each side of the canal that enters into the mid gut (photos 4 and 5), and we observe a high resemblance due to the hematoxylin colouring. Each gland has got a canal that enters in the salivarium where they secrete the saliva.

In the beginning of the mid gut we see two small enteric caeca (fig. 1). Its walls are bigger than those from the crop (photo 6) and we observe various layers of nucleated cells, surrounded by the basal membrane.

In its posterior part, the mid gut narrows and changes into the hind gut (photo 7), starting with the four Malpighian tubes (see transversal sections in photographs), then continueing by the rectal pads and finally the anus.

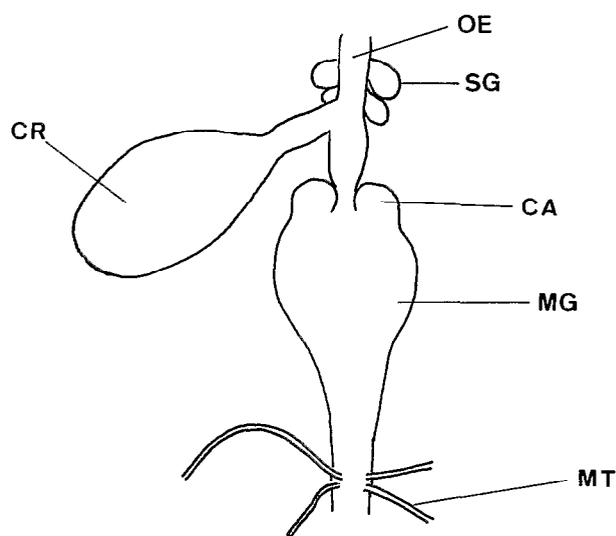


FIG. 1. — Scheme of the digestive system of *Bovicola caprae* Gurlt, 1843, after specimen dissection. CA = Caeca; CR = Crop; MG = Mid gut; MT = Malpighian tubes; OE = Oesophagus; SG = Salivary gland

ACKNOWLEDGEMENTS

We thank Dra. Illescas for her assistance in carrying out the photographs of this research.

This work has been supported by a grant from the Comisión Asesora de Investigación Científica y Técnica (C.A.I.C.Y.T. Project nr. 3224/83).

Manuscrit accepté par le Comité de Rédaction le 19 septembre 1986.

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