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**Seasonal variations in the histology of the stink gland
of *Aelia rostrata* Boh. (Hemiptera: Pentatomidae)**

by

N. ŞİŞLİ

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Seasonal variations in the histology of the stink gland of *Aelia rostrata* Boh. (Hemiptera : Pentatomidae)

NIHAT ŞİŞLİ

Department of Systematic Zoology Faculty of Science University of Ankara

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Aelia rostrata has a metathoracic stink gland which lies on the metasternum of the thorax and the second, third and the fourth abdominal segments.

Two kinds of secretory cells are observed in histological sections: the cells which constitute the wall of the gland and a smaller type scattered in groups among the wall cells. These cell groups may be considered accessory glands.

There is a seasonal oscillation in the size of the gland's main wall cells. Both the cells of the accessory gland and the main wall cells are stained paler during hibernation period of the insect.

INTRODUCTION

Aelia rostrata possesses a metathoracic stink gland, as seen in other geocorizae. In this species, however, there is no information about its morphology and functional histology. The author aims to give a short description of its morphology and point out variations in its histology depending on the season of the year.

MATERIAL AND METHODS

The material used in the present work was collected from hibernation sites and grain fields around Ankara in 1965. Vivisectioned or alcohol-preserved specimens were used to examine the morphology of the gland. Specimens fixed in aqueous Bouin's solution were used for histological purposes. Cuticle presented some difficulties in sectioning, but 10 % hot KOH proved satisfactory for softening it. For some specimens whose heads, terga, and legs had been removed another method, butyl alcohol treat-

ment [1], was used. After infiltration in tissuemat with a 60° c. melting point, sections were cut at 10 microns. Heidenhein's and Groat's hematoxilin and eosin were used as histological stains.

RESULTS

The stink gland of *Aelia rostrata* is a large spheroid sac lying on the metathoracic sternum and the second third and fourth abdominal sterna (Fig. 1). The reservoir is divided into two lobes in some hemipteran species and in others, there may be two separate glands each with a reservoir [4].

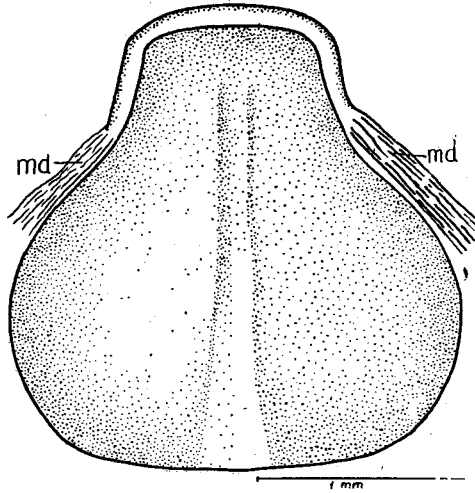


Fig. 1. Dorsal aspect of the stink gland. md: musculus dorsoventralis

The stink gland of *A. rostrata* is yellow in newly emerged adults. Later in adult life, when the insect is still in the grain field, its color turns bright orange.

The stink gland possesses two separate external openings on the anterior edge of the metapleura near each metathoracic coxa. The external opening continues as a groove through which the secretion flows (Fig. 2). This liquid then spreads on the rough surface posterior the groove and immediately evaporates to pro-

duce repugnant odor. A long dorso-ventral muscle, *musculus dorsoventralis glandula*, which originates nearby each evacuation canal of the reservoir, may control the release of the secretion. Malouf [2] has demonstrated two separate bundle of muscles in *Nezera viridula* with this function.

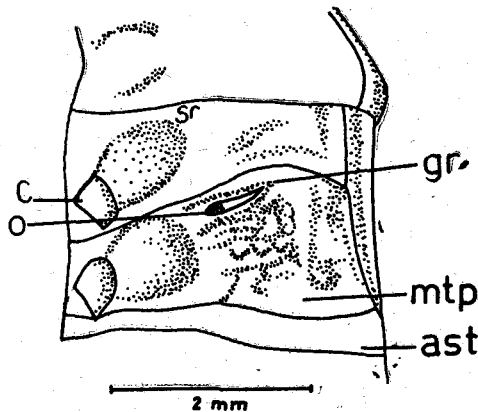


Fig. 2. Ventral aspect of the metasternum, ast: 2 nd abdominal sternite, c: coxa, gr: groove, o = external orifice of stink gland, mtp: metapleura, sc: subcoxa' flange.

The stink gland reservoir of *Aelia rostrata* is not provided with an externally distinguished glandular structure. As pointed out by Malouf [2] and Dufour [6], the wall of the reservoir has a secretory function. In fact, two kinds of cells are distinguished in sections of the stink gland reservoir in *Ae. rostrata*. One of them is cuboid in shape and contains a large nucleus and an intima entad. These cuboid cells form the wall of the reservoir and also show secretory activity (Fig. 3).

Among the cuboid cells of the reservoir wall are groups of smaller cells which may be considered accessory glands (Fig. 3). Each accessory gland possesses a ductule opening into the lumen of the reservoir. The accessory glands are more frequent on the ventral wall than on the dorsal wall of the reservoir. According to Malouf [2], only the cells of the ventral wall show secretory

activity. He found no structure which may function as an accessory gland, as observed in *Ae. rostrata*.

TABLE: 1

Analysis of variations in the size of the reservoir wall. For each measurement the average, the standard error and the extremes are given (for each case 25 measurements are made).

Date	The length of the cells (micron)	
	Mean	Range
July 19.	16.7 \pm 0.4	14.8 — 22.2
October 5	10.8 \pm 0.4	7.4 — 12.9
March 12	7.2 \pm 0.05	7.4 — 12.9
April 2 (in hibernation)	7.7 \pm 0.05	5.5 — 9.2
April 2 (feeding)	15.3 \pm 0.5	11.1 — 22.2

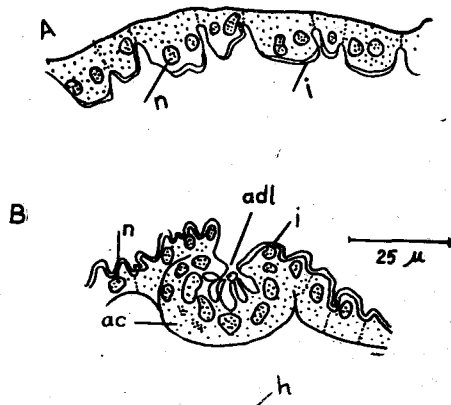


Fig. 3. Longitudinal section through the stink gland.

A- dorsal wall cells, B- ventral wall cells,
ac: accessory gland, adl: ductule of the accessory gland,
i: intima, n: nucleus.

As seen in table: 1, seasonal oscillations are observed in the size of the reservoir cells. Their length decrease towards the

prehibernation period. The difference in length between cells from adults of the new generation and specimens collected from hibernation quarters in the first week of October is significant ($P < 0.01$).

The length of the cell is greatly reduced in the wintering insects. The difference between the newly emerged adult and the specimen collected in mid March is also significant ($p < 0.01$).

If overwintering specimens are brought into the laboratory and supplied with food and water, the cells of the reservoir wall recover their length, and no difference is observed between them and newly emerged adults ($p > 0.01$).

The similarity of oscillations observed in the size and the function of cells of digestive system [7], and reproductive organs of *Ae. rostrata* [2], suggests that a common center may be responsible for them.

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Ö Z E T

Aelia rostrata erginlerinde, metasternumdan başlayarak 4. abdominal sternite kadar uzanan bir koku bezi bulunmaktadır. Bez üçüncü çift bacakların koksası yanından dışarıya açılır. Bezin rengi, genç erginlerde sarı olduğu halde, daha sonraları parlak tıruncu renge dönüşür. Lumende, ergin hayat süresince salgı maddesi bulunur.

Bez, ana hücreler ve yardımcı bez hücreleri olmak üzere iki tip hücre ihtiva eder. Ana bez hücrelerinin büyüklük ve faaliyetlerinde, kışlamaya doğru bir gerileme meydana gelir.

Kışlamakta olan kımlar laboratuara getirilip yetiştirilecek olursa, hücrelerin faaliyeti artar, büyüklükleri yeni erginlerin sahip oldukları değere erişir.

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