

**MORPHOLOGICAL DIFFERENCES IN METATHORACIC  
GLANDS OF DIFFERENT POPULATIONS OF SUNN  
PEST, *EURYGASTER INTEGRICEPS* PUT.  
(HETEROPTERA: SCUTELLERIDAE)**

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**ABSTRACT:** Metathoracic scent glands could only be observed in adults of Heteroptera. These glands are located between metathoracic legs which pour open near leg's coxa. Reservoirs are the main part of glands. Metathoracic scent glands of *E. integriceps* have an orange median reservoir and two colorless secretory tubules that their secretions directly release to median reservoir. Wave shaped accessory glands can be observed on the median reservoir. Dimension of glands directly relates with rate of secretion. Morphological characters of active and hibernating populations of sunn pest scent glands were studied in collected populations from Hamedan and Tabriz. After dissection scent gland dimension was measured by micrometer. Width and length of glands in widest and longest region were measured. Mean dimension of scent glands in active populations of Hamedan and Tabriz were  $2.58 \pm 0.049$  and  $2.6 \pm 0.083$  mm in males and  $2.47 \pm 0.083$  and  $2.45 \pm 0.102$  mm in females respectively. Also these dimensions in males of Hamedan and Tabriz overwriting Populations were  $2.75 \pm 0.088$  and  $2.79 \pm 0.082$  mm and in females were  $2.7 \pm 0.07$  and  $2.69 \pm 0.076$  mm. Statistical analysis showed no significant differences in male and female glands dimension of each population. Glands dimension in active and Hibernating populations differed significantly ( $p < 0.05$ ).

**KEY WORDS:** Metathoracic gland, Sunn Pest, *Eurygaster integriceps*

The scent glands in true bugs consist of integument similar in basic structure to that forming the body wall (Staddon, 1972). The scent glands are named depending on their position in the body, for example dorso-abdominal and metathoracic glands (Aldrich, 1988). The scent glands can be found in nymphs and also in adults of some families of true bugs. In nymphs these glands located in abdominal segments with opening to dorsal and named dorso-abdominal glands but metathoracic scent glands could be only observed in adults of heteroptera (Durak and Kalendar, (b and c) 2007). These glands are located between the metathoracic legs which pour open near the leg's coxa. Reservoirs are the main part of glands. The adult scent gland complex of both males and females consists of a median ventral metathoracic scent reservoir, which is orange-yellow in color, and paired colorless lateral glands sometimes called accessory glands. The lateral glands discharge through ducts into the reservoir, which also receives secretions from the gland cells which form its epithelium. The glands open to the exterior on the ventral surface (Zarbin et al., 2000). Scent gland function in bugs in different literatures has been investigated and defence against predators and microorganisms, specific patterns of behavior including alarm, aggregation and mating or sexual behaviour are examples of these functions (Staddon, 1979).

Dimension of glands directly relates with the rate of secretion activity. In this study size of metathoracic scent glands of male and female insects in active and hibernating populations from two different places in Iran were studied.

## MATERIAL AND METHODS

Adult insects were collected from Hibernating and activation places from Hamedan and Tabriz. Insects reared on wheat until dissection. An adult *E. integriceps* was pinned in a Petri dish with the dorsal side up. Anesthetized insects were used for dissection. The dissection process consisted of cutting the dorsal abdominal edges of the insect cuticle up to the metathoracic region and under the scutellum. The dorsal abdominal cuticle was pulled back and the viscera were removed. The scent gland complex, located at the ventral abdominal metathoracic region, could be reached. Calibrated micrometer located on a stereomicroscope was used and the width and length of scent glands were recorded. Male and female insects in both active and hibernating populations were studied separately. Data analysis was carried out with MSTAT-C software and the means compared using Duncan's multiple tests.

## RESULTS AND DISCUSSION

Average scent glands dimension for active and Hibernating population of Hamedan were  $2.47 \pm 0.083$  and  $2.70 \pm 0.07$  mm for female and  $2.58 \pm 0.049$  and  $2.75 \pm 0.088$  mm for male insects. Also these measurements for active and Hibernating population of Tabriz were  $2.45 \pm 0.102$  and  $2.69 \pm 0.076$  mm for female and  $2.6 \pm 0.083$  and  $2.79 \pm 0.082$  mm for male insects respectively. Data analysis (Table 1) showed that, differences between metathoracic scent glands dimension in male and female insects were not significant. But in male insects in both populations the MSG dimension was more than females (Fig. 1). About populations, the results indicated that, there were significant differences in active and hibernating populations of both sampling places (Tabriz and Hamedan). In hibernating individuals dimension of metathoracic scent glands were more than the active ones (Fig. 1).

The same dimension of scent glands in male and female insects was observed by Aldrich et al. (1978). They showed that in *nezara viridula*, in both sexes scent glands are small an equal in size. But in other studies dimension of male and female scent glands were different. Farshbaf and Atalay (1993) studied the dimension of *Eurydema ornatum* sent glands. They showed that in male and female insects differences in width and length of scent glands was significant and male insects have larger scent glands. In another study these reserchers studied *Eurydema ventral* metathoracic scent glands and showed that differences in MSG dimension in male and female insects were significant (Farshbaf and Atalay 1994).

Differences in quality and quantity of MSG composition were investigated by researchers. Durak and Kalender (2007 a), showed that in *Eurygaster maura* some compounds only in male or female insects are detectable. About the same compounds in some cases quantity of them differs in male and female insects. Results of this study showed some differences in male and female MSG dimension, although the differences were not statistically significant. Male insects in both populations have larger MSG. Borges et al. (2001), studied diapause morph of *Euschistus servus* and showed that some compounds in active and diapause morph of this bug are different. There is a compound that presents only

in active morph. If we suggest that the dimension of MSG is related with its secretion activity there should be differences in active and hibernating also in male and female insects of sunn pest. This is because male and female insects and also active and non active populations have different ecological behaviours and their need for some responses to environmental conditions are different.

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Table 1. Data analysis of MSG dimension of *E. integriceps*.

<b>SOV</b>	<b>df</b>	<b>SS</b>	<b>MS</b>	<b>F</b>
Sex	1	0.338	0.338	2.606 <sup>ns</sup>
Population	3	1.459	0.486	3.754*
Sex×Population	3	0.075	0.025	0.192 <sup>ns</sup>
error	152	19.695	0.130	
Total	159	21.567		

NS: non significant, \*: significant in 0.5% level

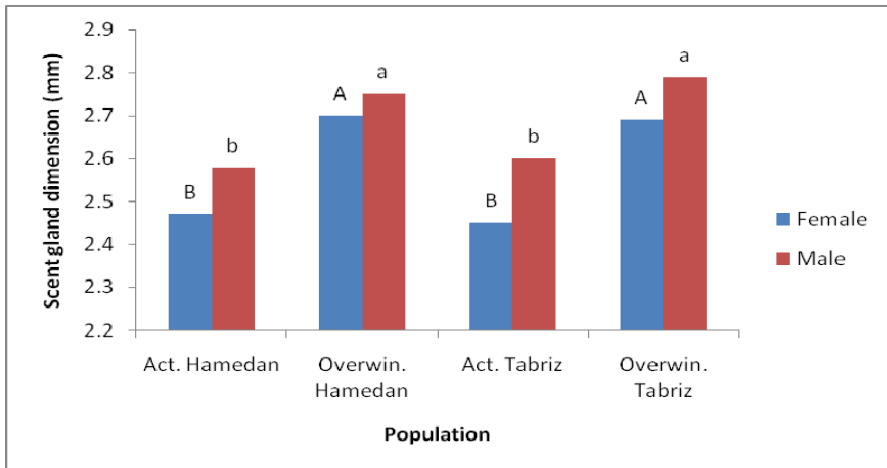


Figure 1. Metathoracic scent glands dimension in male and females of active and Hibernating populations of *E. integriceps*.