

## CHAPTER : 8

OVIPOSITION PREFERENCE OF THE NORMAL AND ANTENNECTOMIZED  
LASIODERMA SERRICORNE TO THE TOBACCO LEAF DISC-STACKS  
TREATED WITH HEXANE FEMALE BODY-WASH

Usually the female insects rely upon a variety of chemosensory stimuli to locate suitable oviposition sites. Though antennae are the primary organs of chemoreception in most of the insects, besides them some other organs such as tarsal bristles, maxillary and labial palpi, abdominal cirri, etc. are responsible. Chemoreception is also involved in the detection of an oviposition deterring pheromones in many insects. Recently, Levinson and Levinson (1987) have studied the morphology and sensillae of the antennae of L. serricorne by scanning electron and light microscopy. They found several types of sensillae along with sensilla basiconica and sensilla styloconica. The latter two were mainly found to be scattered among the bristles. While describing the mating habits of L. serricorne, they mentioned that following attraction to the main pheromone component, unmated males lower their heads and prothoracic regions, vibrate the antennae and rapidly walk around the female beetles. Prior to copulation, the male touches the female body with his antennae, palpi and extend the fore legs. This indicated that the

antennae and palpi were probably the principal organs for chemoreception of pheromone in L. serricorne. Removal of palpi in live tobacco beetle is very difficult as the insect usually holds the head bent downwards. The present work, therefore was, restricted to only antennectomy and the effect thereof on the role of perception of the oviposition deterring pheromone by the female Lasioderma serricorne.

#### MATERIAL AND METHODS

Thirty two tobacco leaf disc-stacks of the earlier mentioned size were taken, sixteen, each of which were treated with 15 FE dose of the hexane female body wash. The rest sixteen, each of which were treated with same amount (0.075 ml) of pure hexane only. Four of each of the leaf disc stacks were alternately arranged at eight equidistant sites in a "choice dish" and thus there were 4 choice dishes. Sixteen of the 5-6 days old unmated females were subjected to bilateral antennectomy. Antennectomized females were then allowed to mate with males of the same age. Rest of procedure concerned with assessing egg-laying, etc. remained practically similar to that described earlier. Results were compared with respect to the number of eggs laid by the intact females and those antennectomized on the leaf disc-stacks "treated"

with 15 FE dose of the hexane body wash and on the "control" stacks.

## RESULTS AND DISCUSSION

The oviposition preferences exhibited by the normal and antennectomized female tobacco beetles between the tobacco leaf disc-stacks treated with hexane female wash and respective "control" are shown in Table 8.1. Results obtained demonstrated very clearly that when the antennae were removed the females could not distinguish between the "treated" and "control" leaf disc-stacks for the purpose of ovipositing. Apparently then, there were no significant difference in the number of eggs laid by the antennectomized females in the "treated" as well as "control" leaf samples. On the other hand, highly significant ( $P < 0.001$ ) reduction of egg laying on the "treated" leaf disc stacks was obvious in the case of intact females (Table 8.1).

From this it can be easily concluded that the antennae of L. serricorne, are one of the principal organs of perceiving the oviposition deterring pheromone present in the hexane female body-wash. Similar antennal chemoperception of an oviposition attractant pheromone in Aedes triseriatus was described by Bentley et al. (1976). Pieris brassicae females can perceive oviposition deterring pheromone via three chemoreceptors located on the

antennae, tarsi and ovipositor, respectively (Behan and Schoonhoven, 1978; Klijnstra, 1982). Later, Klijnstra and Roessingh (1986) found, by tip recording technique, that female P. brassicae fore-tarsi possess some sensory hairs specifically sensitive to the oviposition deterring pheromone. Ma and Schoonhoven (1973) described that tarsal B - hairs are responsible for the oviposition selection behaviour of the P. brassicae butterflies. Klijnstra (1985) suggested that the olfactory hairs as well as gustatory hairs (at the fore tarsi) to be involved in the ODP perception in P. rapae. In Rhagoletis pomonella tarsal hairs were described to be the receptors of true oviposition deterring pheromone (Prokopy et al. 1982; Crajnar and Prokopy, 1982). According to Mitchell (1975) and Messina et al. (1987) the true factors promoting an even dispersion of eggs in Callosobruchus maculatus were perceived by the maxillary and labial palpi and the receptors on the antennae were responsible for avoidance of the seeds treated with oviposition marker. In various bruchids, the palpi are known to play a dominant role in legume host recognition (Szentesi, 1976; Pauzat, 1978). The abdominal sensory organs are also used for the perception of ODP in many insects e.g. Potato tuber moth, Phthorimaea operculella (Fenemore, 1978; Valencia and Rice, 1982); migratory locust, Locusta migratoria (Rice and Mcrae, 1976); Lucilia cuprina (Rice, 1976);

flea beetle, Attica lythri (Phillips, 1978); Chilo partellus, and Spodoptera littoralis (Chadha and Roome, 1980) and Eldana saccharina (Waladde, 1983). Though such varied chemoreceptors have been described in different insect species, at least for the female L. serricorne apparently antennae seemingly play a very important role in the detection of ODP activity of hexane female body-wash.

#### SUMMARY

Oviposition response of the normal and antennectomized female L. serricorne to the hexane female body-wash was tested. It was found that the antennectomized females were incapable of or insensitive to the ODP present in hexane body-wash. It can, therefore, be concluded that antennae are one of the principal sites of perception of oviposition deterring pheromone in the female L. serricorne.

Table 8.1. Oviposition preference of the normal and antennectomized females L. serricorne with respect to hexane female body-wash "treated" and "control" leaf disc-stacks.

	Percentage-wise egg distribution on leaf disc-stacks-		$\chi^2$ Values
	Treated	Control	
With antennae	11.47	88.53	59.37 ***
Without antennae	48.33	51.67	0.11 NS

\*\*\* Significant at 0.001 level

NS Non significant