Scanning electron microscopic detection of a specialized cuticular structure on the abdominal surface of the maggot of *Blepharia zebina* (Walk) (Diptera: Tachinidae), parasitizing the larvae of the muga silk moth, *Antheraea assamensis*

*Blepharia zebina* (Walk) is a member of the dipteran family Tachinidae, whose larval stage (maggot) is a parasite on the larvae of the muga silk moth, *Antheraea assamensis*. It is well acknowledged that parasitic mode of life involves cuticular adaptations in terms of structural and histochemical features in insect and other arthropod parasites. However, little information is available on the specialization of the cuticle in endo-parasitic insect larvae, where it is concerned with absorption of food and resistance against secretion of an insect host. The resistance would necessitate structural modification of the cuticle surface, which is expected to be involved not only in protection against host enzymes but also in chemical sensing. Early as well as recent literature on insect cuticle reveals the importance of scanning electron microscopy in studying the cuticular surface and its associated structures. Scanning electron microscopy, because of its large depth of field and high resolving power, has been used extensively for detailed study of surface ultrastructure of cuticle involved in specialized functions. Here we report using scanning electron microscopy, the occurrence of some specialized cuticular projections on the anterior abdominal segments of the parasitic maggot of *Blepharia zebina*. The structural features of the projections are unusual in the sense that some of its characters are similar to those of cuticular spines, some to sensilla trichodea and some to sensilla basiconica, but with no complete similarity with any one of them.

The specimens collected from the fifth instar larva of the silk moth, *Antheraea assamensis* were fixed in 2.5% glutaraldehyde in 0.1M sodium cacodylate buffer, pH 7.2–7.4, for 4 h at 4°C, washed in the same buffer overnight and post fixed in 1% osmium tetroxide for 1 h. The fixed samples were dehydrated through increasing concentrations of acetone and were dried with tetramethylsilane following the method of Dey et al. The dry samples were secured horizontally to brass stub (10 mm dia; 10 mm height) and were coated with gold in a JFC 1100 (Jeol) ion sputter coater. Observations were made with a JEOL JSM 35 CF scanning electron microscope operated at 15 kV.

It was interesting to note that the parasitic maggot of *Blepharia zebina* (Walk) did not show any special structure or sensilla on their body surface, except the spine-like structures localized on a few anterior segments. The distinct sensory structures like sensilla trichodea, sensilla coeloconica and sensilla campaniformia, reported in other parasitic dipteran larvae, e.g. the mousebot, the cattle grubs, etc., were lacking in *Blepharia*. The cuticular oral ridges on the cephalic segments found in the free-living dipteran maggots were absent. These structures, however, were not found in other parasitic dipteran maggots also.

The spine-like structures present in the maggot of *Blepharia* differ in their distribution pattern from cuticular spines of other parasitic dipteran larva. In *Cutirebra fontinella* the spines are localized on the anterior margin of each thoracic and abdominal segment, except the last two segments of the abdomen. In *Hypoderma lineatum* and *Hypoderma bovis*, the spines are distributed throughout the entire body with a slightly higher concentration at the anterior margin of the thoracic and abdominal segments. In *Blepharia* on the other hand, the spine-like cuticular structures were localized only on the anterior abdominal surface, arranged in only 2–3 vertical rows (Figure 1). The structures were found to be stout and were tapering toward the tip. The length varies from 13 to 20 μm, the breadth at the base from 5.8 to 9.4 μm and that at the tip from 1.7 to 2.3 μm. The surface feature of the cuticular structure was unique in that, it was found to be striated unlike the cuticular spines reported in other insects (Figure 2). As far as the striations are concerned, the structure showed similarity with sensilla trichodea. The shape on the other hand, with a broad base and tapering tip was unlike the sensilla trichodea. The length of the structure was also shorter compared to...
Green algae (Oedogonium sp.) and Lemna sp.: The new alternate hosts for Spodoptera litura Fabricius

In India, tobacco caterpillar S. litura Fab. appears every year as a severe pest in rabi crops, viz. gram, wheat, linseed, sunflower, etc., particularly at certain locations of Jabalpur, MP. The pest is particularly serious in haveli fields. ‘Haveli’ system of cultivation is a predominant practice in heavy soils of Jabalpur district. Under this system, rain water is impounded in bunded fields during kharif season and direct sowing of rabi crops is done with no tillage after letting out impounded water about 10–12 days before sowing of the rabi crops. On the impounded water, algae and Lemna sp. grow naturally.

The second-third instar caterpillars, which are already present in the field at the time of sowing of rabi crops, start devouring the germinating seeds. At times, its severity necessitates resowing. Hence,