Mem. Inst. Oswaldo Cruz, Rio de Janeiro, Vol. 83(2): 253-257, abr./jun. 1988

SCANNING ELECTRON MICROSCOPY OF THE EGG AND THE FIRST INSTAR LARVA OF *DERMATOBIA HOMINIS* (DIPTERA, CUTEREBRIDAE)

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The egg and the first instar larva of Dermatobia hominis *were described based on observation with a scanning electron microscope.*

Key words: egg – first instar larva – *Dermatobia hominis* – Diptera-Cuterebridae – scanning electron microscope

Dermatobia hominis is a most important fly from the economic and public health standpoints in the American tropics. Maggots of *D. hominis* are cutaneous parasites of domestic and wild mammals, and of humans, causing a characteristic furuncular lesion (cutaneous myiasis). In Latin America, livestock losses are estimated at about 260 million dollars annualy (Mateus Valles, 1975).

The optical morphology of the egg (Townsend, 1935; Moya Borja, 1979) and of the first instar larva (Sorcouf, 1913; Newstead & Poots, 1925; Jobsen & Mourier, 1972) has been poorly described.

As to scanning electron microscopy (SEM) of *D. hominis*, there are only a few illustrations of the second and third instar larvae, and of the adult (Moriena et al., 1981/82). The present paper is part of a series on the SEM of Cuterebridae.

MATERIALS AND METHODS

D. hominis maggots were obtained by squeezing nodules of naturally infected cattle from Igarapé, State of Minas Gerais, Brazil. The life cycle of *D. hominis* was mantained in laboratory by the methods of Chaia et al. (1975). Albino rats, *Rattus norvegicus*, and houseflies, *Musca domestica* were used as host and phoretic, respectively.

Egg-carrying houseflies, eggs and the first larva of *D. hominis* were killed in 80°C water, fixed in 80% ethanol, dehydrated in ethanol, critical-point dried in CO_2, sputter-coated with gold, and photographed with a Novascan – 30 Zeiss scanning electron microscope, as described by Leite & Lopes (1987).

RESULTS

The Egg (Figs. 1 to 6)

The egg is navicular with flat anterior end, recurved posterior end, round dorsal and lateral faces and flatter in the ventral face. The exochorion is high, with a sculptured network formed by discontinuous narrow ridges and high-relief continuous ridges that form four- and five- sided irregular polygons. The operculum is dorso-anteriorly situated, with well-evident hatching lines surrounding the micropylar plate. It opens from the anterior to the posterior end, and frequently stays open after hatching a first instar larva. The micropylar plate is round on its anterior end, and presents a central micropylar orifice that has prominent walls.

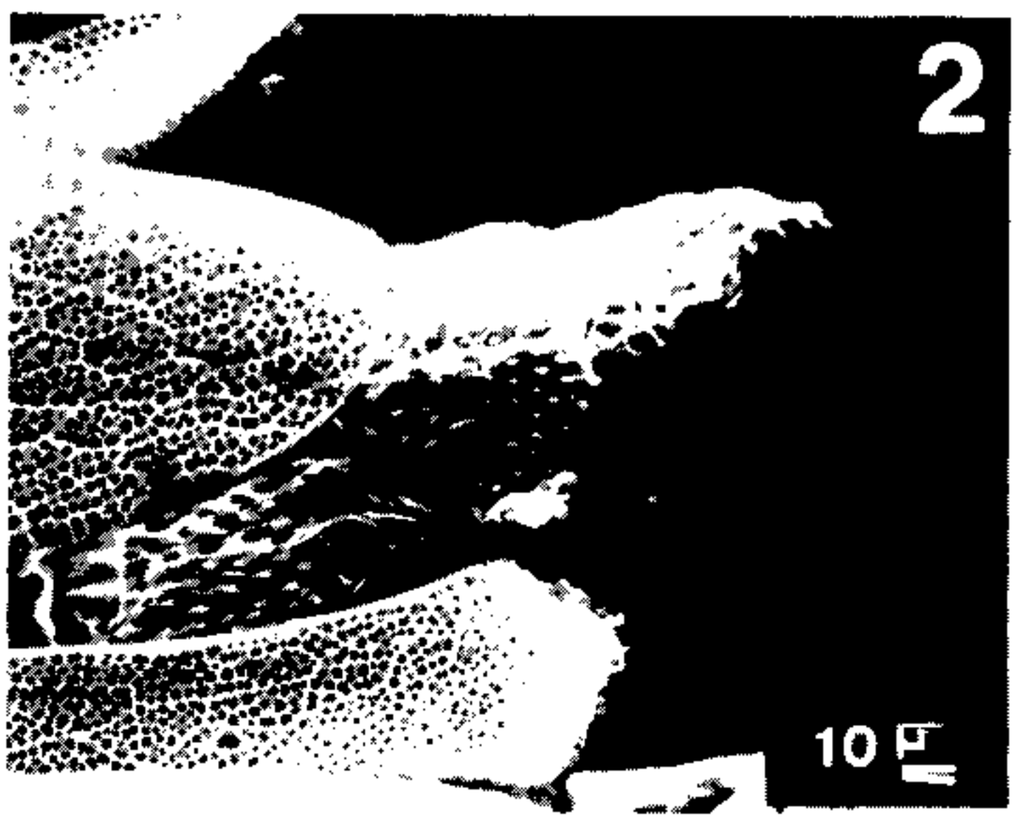
The First Instar Larva (Figs. 7 to 13)

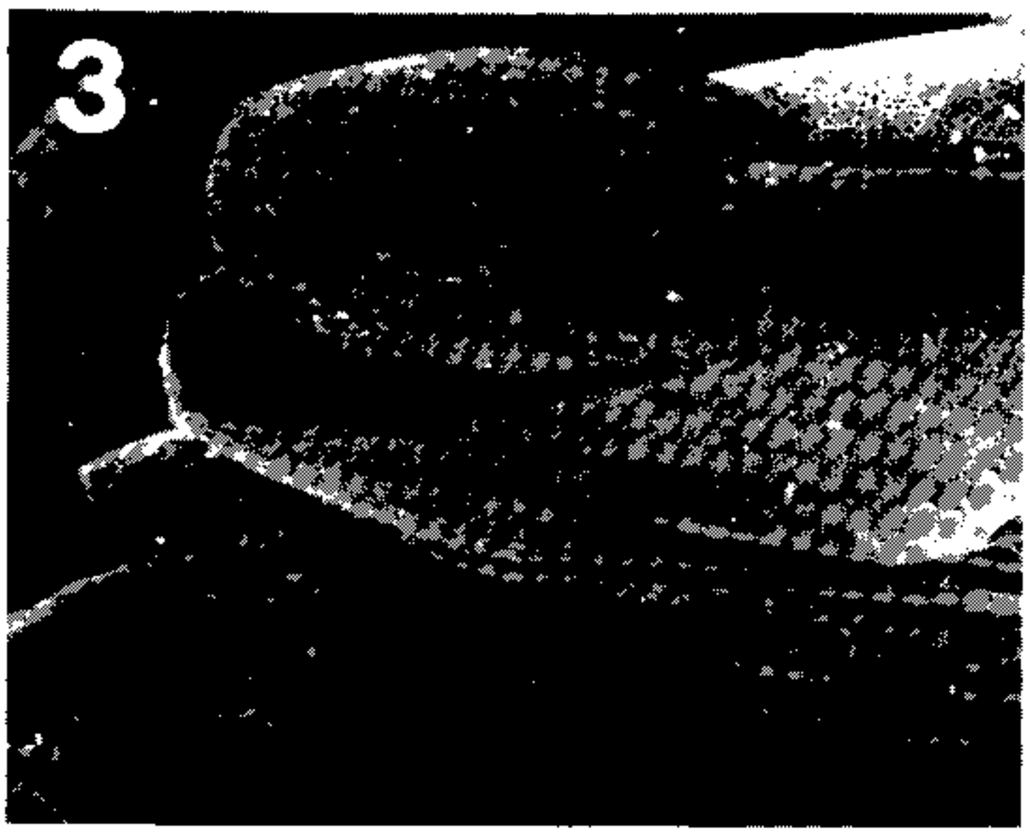
The first instar larva is subcylindrical, blunt, and rounded, anteriorly, gradually attenuating towards the posterior end and ventrally curved. Pseudoencephalon with a pair of conic antennae obliquely projected, each presenting two sensorial papillae in their base. The maxillae or mouth-hooks are smooth and ventrally curved. The first thoracic segment has small pointed spines, anteriorly and around the body, and pointing backwards. The second and third thoracic segments are like the first, but with a larger number and increased length of spines. No anterior spiracle was observed. The first abdominal segment has small pointed spines

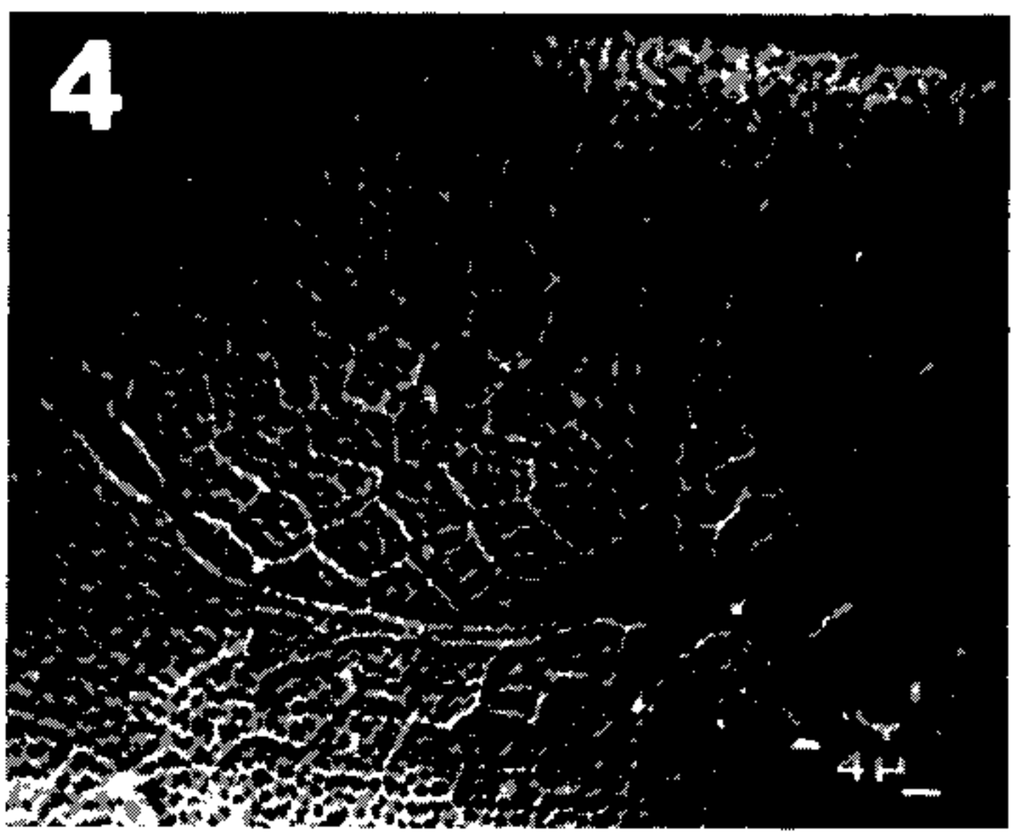
Research supported by "Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq".
Fellowship researcher of the CNPq.

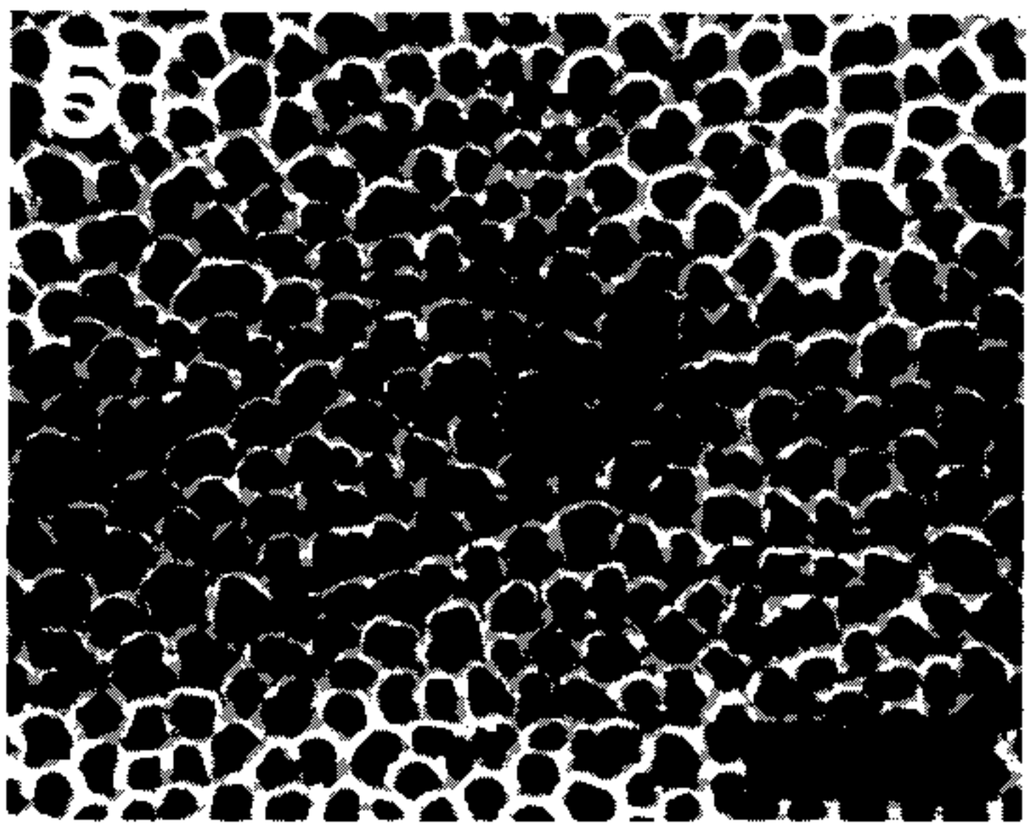
Received December 17, 1988.
Accepted March 24, 1988.

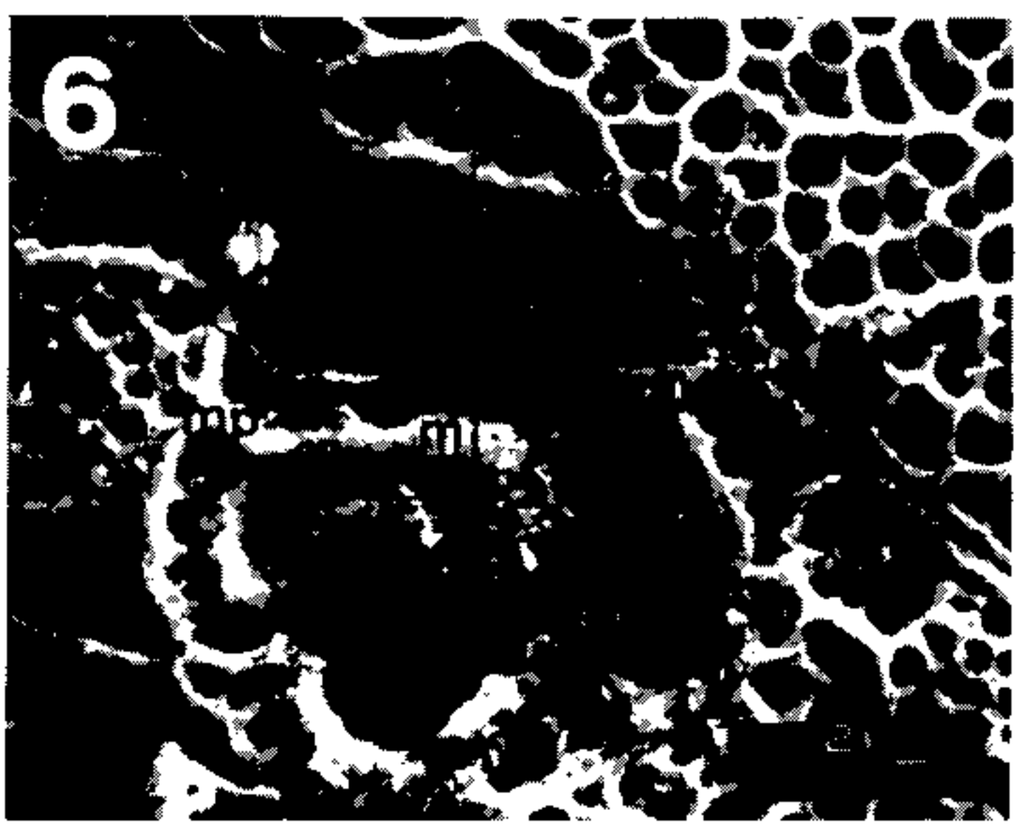
anteriorly, and long pointed spines pointing backwards. The second and third segments have spines like the first one. There are no spines from the fourth to the sixth abdominal segments. The seventh and eighth segments have small spines, posteriorly, pointing forwards. The eighth and last segment show round perianal pads and posterior spiracles with two openings on each side, and no spiracular plate.



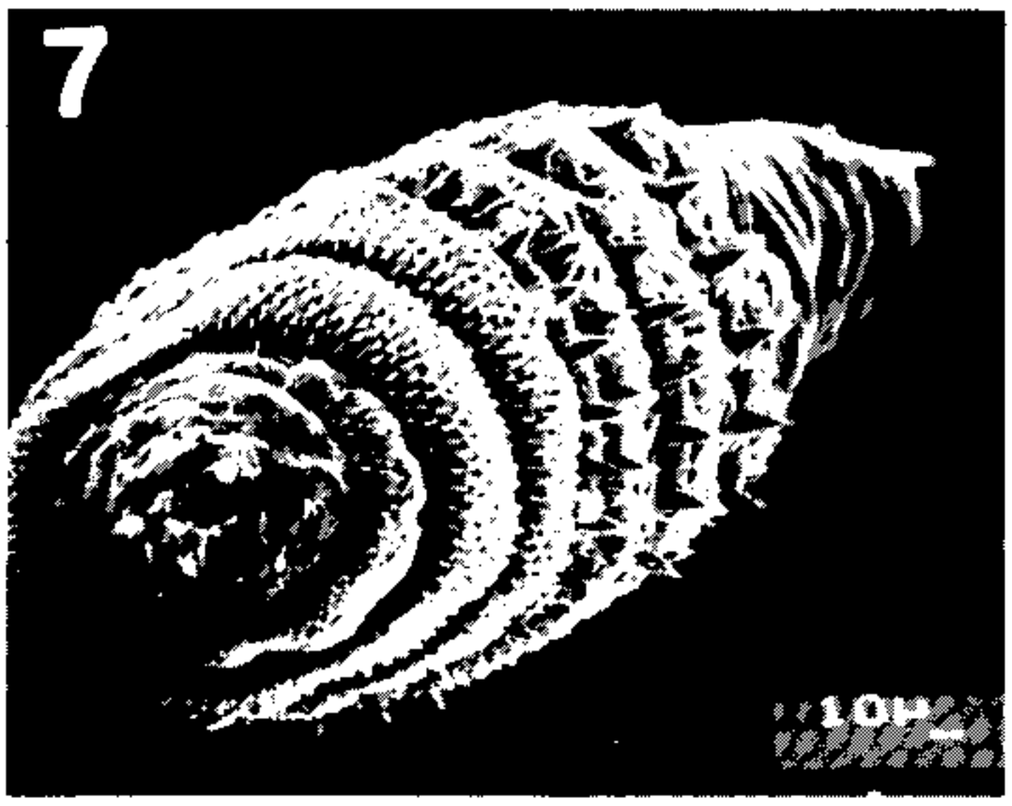


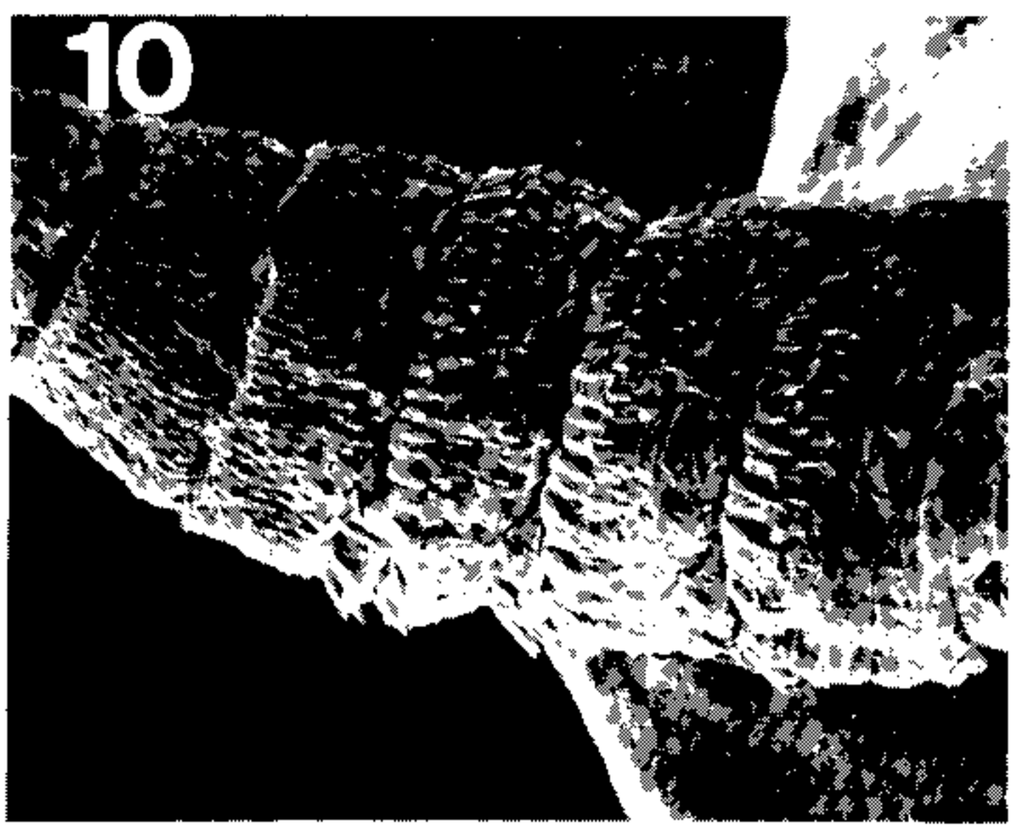


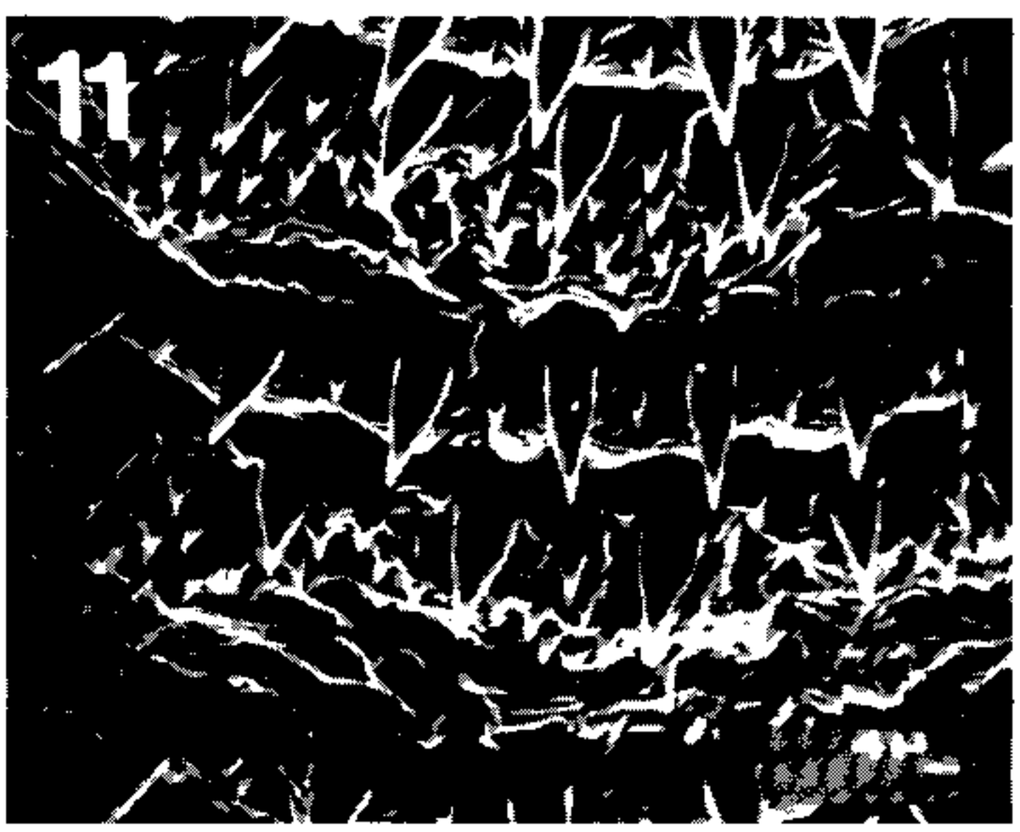




Scanning electron micrographs of *Dermatobia hominis*. Fig. 1: egglaying on phoretic host *(Musca domestica)*. Fig. 2: egg hatch, showing first instar larva exiting through operculum. Fig. 3: open operculum after larva hatching. 116 X. Fig. 4: anterior end, showing operculum and micropylar plate. Fig. 5: exochorionic ornamentation. Fig. 6: micropylar plate with central micropyle. mi – micropyle; mip – micropylar plate.







Scanning electron micrographs of first instar larva of *Dermatobia hominis*. Fig. 7: top view of whole larva. Fig. 8: antenna and two sensory papilae on the base. Fig. 9: maxillae. Fig. 10: first to third thoracic and first to fourth abdominal segments (from left to right). Fig. 11: spines of first to third (from top down) abdominal segments. Fig. 12: fifth to eighth abdominal segments (from top down). Fig. 13: spines of seventh abdominal segment. a – antenna; m – maxilla; p – papilla; 1t to 3t – thoracic segments; 1a to 8a – abdominal segments.

DISCUSSION

Usually *Dermatobia hominis* lays its eggs on zoophilic insects, using them as phoretic hosts (Neiva & Gomes, 1917), an uncommon behavior that may distinguish it from other Diptera. Under the optic microscope, the eggs of *D. hominis* show shape, dorsal operculum and micropylar plate like those of other Cuterebridae: *C. fontinella* (Hadwen, 1915); *C. cuniculi* (Townsend, 1915), *Metacuterebra baui* (Fonseca, 1940), *C. peromysci* (Dalmat, 1943),

C. tenebrosa (Moilliet, 1950), *C. lepivora* (Ryckman & Lindt, 1954), *C. emasculator* (Bennett, 1955; Uberlaker & Keller, 1964), *C. horripilum* (Haas & Dicke, 1958), *C. polita* (Graham & Capelle, 1970), and *M. apicalis* (Leite, 1987). In its dimensions (1.5 mm in length and 0.6 mm in width) and white color, the *D. hominis* egg (Moya Borja, 1979) differs from the eggs of the other above-mentioned species of Cuterebridae, which have shorter eggs with an orange to brown color. Likeness in color to *C. tenebrosa* eggs was mentioned by Baird & Graham (1973).

In SEM, the egg differed from those of other Diptera *(Calliphora erytrocephala* and *Musca automalis, M. domestica, Fannia ornata, Haematobia irritans, Hebecnema affinis)* studied by Hinton (1981), which have a hatching line with exochorion. The exochorion of *D. hominis* is most similar to that of *H. affinis* by having a flange area near hatching line. The egg of *D. hominis* is like those *M. apicalis* (Leite et al., 1986) and *C. horripilum* (Baker, 1986), but differs by lacking a broad sculptured network of high-relief ridges in the exochorion.

Some authors studied the optical morphology of the first instar larva of *D. hominis* (Surcouf, 1913; Newstead & Potts, 1925; Moya Borja, 1966; Jobsen & Mourier, 1972), but it was considered poorly described (Guimarães et al., 1983). If compared with other species of Cuterebridae, *C. tenebrosa* (Parker & Wells, 1919; Baird & Graham, 1973), *C. americana* (Ferris, 1920); *C. lepivora* (Ryckman & Lindt, 1954), *C. emasculator* (Bennett, 1955), *M. apicalis,* there are differences, namely: all of them have spines from the fourth to the sixth abdominal segments and large spines with recurved apexes in the second and third thoracic segments and in the first abdominal segment. There are strong differences, under SEM, when compared with *C. horripilum* (Baker, 1986) and *M. apicalis* (Leite, 1987), especially in that *D. hominis* does not present a sharpened process in the dorsal region of the maxillae and a dorsal expansion in the posterior end of the larval body. A similar difference is observed with regard to *C. fontinella* (Colwell & Kokko, 1986).

RESUMO

Microscopia eletrônica de varredura do ovo e da larva de primeiro estágio de *Dermatobia hominis* (Diptera, Cuterebridae) – O ovo e a larva de primeiro estágio de *Dermatobia hominis* são descritos baseados em observações com um microscópio eletrônico de varredura. Comparações morfológicas são feitas com outras espécies de Diptera, particularmente com Cuterebridae.

Palavras-chave: ovo – larva de primeiro estágio – *Dermatobia hominis* – Diptera – Cuterebridae – microscopia eletrônica de varredura

ACKNOWLEDGEMENT

My gratefulness to the Department of Morphology, Institute of Biological Sciences, Federal University of Minas Gerais, Belo Horizonte, Brazil, for the use of the SEM.

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