STUDIES ON ULTRASTRUCTURE AND FUNCTION OF THE JAWS OF LAND-LEECH, HAEMADIPSA ZEYLANICA (MOQUIN—TANDON)

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ALTHOUGH considerable work has been reported on the detailed structure of the jaws and biting mechanism of the European leech, *Hirudo medicinalis*¹-³ and Indian cattle-leech, *Poecilobdella granulosa*⁴,⁵, only a scanty account is available for the land-leech, *Haemadipsa zeylanica*, a highly evolved, terrestrial, ectoparasitic sanguivorous Annelid⁶-¹⁰. This has prompted the present investigation.

Animals were collected from Pithoragarh, a hill district in the Western Himalayas, and the tissues were fixed in a solution containing 2.5% glutaraldehyde, 1% paraformaldehyde in 0.1 M cacodylate buffer for 4-6 hr at 4°C. Following post-fixation in OsO₄, tissue samples were dehydrated through graded series of acetone and finally critical point-dried in liquid CO₂. The dried samples were mounted on aluminium studs using conductive silver paint and then coated with a thin layer of gold-palladium alloy in a high vacuum evaporator. Samples were examined and photographed under stereoscan (Cambridge 180).

Tri-radiate mouth, lying at the base of the cup-shaped pre-oral chamber, leads into a very short buccal cavity, containing three radially arranged crescentic jaws, embedded in crypts. Two jaws are ventro-lateral in position and are smaller than the third jaw, which is medio-dorsal in position. Each jaw bears an attenuated, sharp and hard dentigerous ridge having a row of minute denticles or "teeth". Such a monostichodont saw-like jaw bears 70 to 99 denticles. A typical denticle is curved outwards. Denticles situated towards the central buccal lumen are larger in size than those situated peripherally. Another interesting feature, clearly revealed by scanning electron microscopy, is the presence of intra-denticular and peri-denticular apertures for salivary discharge (figures 1–4). The surface of the jaw is without salivary papillae, but shows aperture-like structures, possibly for pouring out saliva. It is known that for feeding, the leech applies its anterior sucker to the body-surface of the host, pre-oral chamber is flattened, three radially arranged jaws are protruded and moved like a saw to make a tri-radiate "L"-shaped incision, and the blood is sucked in. Scanning electron microscopy of the jaw gives a detailed insight into mechanism of such a bite by these laterally compressed, semi-circular, monostichodont jaws.

Figures 1–4. 1. Electron photomicrograph of a jaw showing salivary discharge oozing out of the denticular edge (Arrows—salivary discharge). 2. Electron photomicrograph of a jaw showing row of denticles diminishing in size from luminal end (LE) to peripheral end (PE). Note the curved denticles. 3. Electron photomicrograph of a portion of the jaw showing row of denticular apertures (DA). 4. End-on view of a portion of the jaw showing DA.
This study has helped in understanding how the efficiency of biting and feeding is increased in the land-leeches. Firstly, the distribution of denticles is such that the smallest denticles are situated on the outer peripheral end of a jaw, where microincision on the host-surface is initiated (figure 2). When a jaw is moved in a centrifugal manner, this small wound is slowly deepened with the help of larger denticles, found towards the central oral aperture; and widened with the help of the wedge-shaped jaws bearing a broad base and attenuated edge. Secondly, a typical denticle in the land-leech is considerably curved outwards, a fact seen neither in the Indian cattle-leech, *P. granulosa*, nor in the European leech, *H. medicinalis*. Lastly, the denticles are distinctly sharper and more acute-tipped than those of *P. granulosa*. The presence of such a denticular curvature and acute tip obviously adds to the sawing efficiency of the jaws of the land-leeches during microincision.

The present study, supported by light microscopic work, has shown that a large number of salivary ductules pass through a denticle and open at its tip. In addition to such an intra-denticular salivary discharge, a few openings can also be seen around the denticles. In short, a denticle not only pours saliva but is bathed by it also during microincision. A similar intra-denticular salivary discharge has been reported by Damas in *H. medicinalis*.

The author is grateful to Dr V. K. Bajpai for help in electron microscopic work, to U.G.C. for a Fellowship, and to Prof. Bhoomitra Dev for guidance.

9 December 1985; Revised 9 January 1986


**CHARACTERIZATION OF PURPLE AND GREEN PHOTOSYNTHETIC BACTERIA ISOLATED FROM THE LAGOON OF AGATTI ATOLL (LAKSHADWEEP SEA)**

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Photosynthetic bacteria comprise green and purple bacteria which are different physiologically but with common anoxygenic photosynthesis using only one photosystem. They are different from cyanobacteria in that the latter group will carry out oxygenic photosynthesis using two photosystems. The contribution of photosynthetic bacteria to primary production in some environments can be very high and it varies from 20 to 85% of the total daily production in some lakes. These bacteria are important not only as food for secondary production but also in the removal of toxic sulphide through anaerobic photooxidation in the process of CO₂ assimilation. Not much information is available on these bacteria in tropical waters except one report on the photosynthetic non-sulphur bacteria of Rhodospirillaceae in India. The present communication is the first of its kind to report the occurrence and characterization of photosynthetic sulphur bacteria in the tropical waters.

During the 147th cruise of R.V. Gaveshani (5-25 January, 1985) routine microbiological parameters were studied in some of the Lakshadweep islands. While working in Agatti Island (Lat. 11°50'N and Long. 72°11'E) extensive areas of pink coloured sediments were noticed in the lagoon. These were found with decaying beds of sea grass. Since red water phenomena in marine environment due to bacteria has been studied, and described in many coastal lagoons and lakes, an attempt was made to isolate photosynthetic bacteria from the pink sediments and characterize them. Sediment samples were collected aseptically and about one gram of sample was added to screw capped culture tubes (25 ml cap) containing Pfennig's medium. The tubes were incubated at room temperature (28 ± 2°C) for 7 days under natural