Muraenidae, Ophichthyidae, Congridae, etc., the head and body are completely devoid of pigment cells. On the other hand, in the type specimen, the alimentary canal is pigmented with five pairs of pigment spots placed equi-distant from one another. The first and second pigment spots extend over two myotomes each (28-29, 42-43). The first spot is elongate and diffuse while the second is linear and constituted by a few irregularly scattered pigment cells. The third pigment spot, situated in the 58th myotome, is punctate and the fourth and the fifth spots, placed in the 70th and 82nd myotomes, are slightly branched *i.e.*, puncto-stellate. In the second specimen there are only four pairs of pigment spots. Apparently this shows that the number of pigment spots on the alimentary canal is not constant while the pattern of pigmentation remains the same.

The larva described here shows a remarkable similarity to that of *G. taeniola* described by Castle[4] not only in general appearance but also in total and pre-anal myotome numbers. It is seen that the size of the larva, especially the full-grown, is smaller in the Gulf of Mannar specimens while Castle records a maximum size of 196 mm prior to metamorphosis. The most important similarity is in the pattern of pigmentation which according to him is in the form of "paired series of about seven, relatively large, ocellate, somatic melanophores, along the length of the gut". He has found the number varying from 6 to 7 while in the present specimens the variation is 4 to 5. It may be mentioned here that Castle's collection comprising of 21 specimens, was obtained by Research Vessels *Dana, Galathea, Albatross* and *Diamantina* from widely separated places in the Indo-West Pacific region. It is seen that the leptocephalus of *G. taeniola* has a wide distribution even though the adults are known to have a restricted distribution only.

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6 *August* 1981

1. Alcock, A. W., *Ann. Mag. Nat Hist.*, 1889, **6**, 450.
2. Alcock, A. W., A descriptive catalogue of the Indian deep-sea fishes in the Indian Museum, *collected by the Royal Indian Marine Survey* Ship "Investigator". Calcutta, 1899.
3. Norman, J. R., *Sci. Rep. Murray Exped.*, 1939, **7**, 1.
4. Castle , P. H. J., *Copeia*, 1977, 488.
5. D' Ancona, U., *R. Com. Talasogr. Ital.*, 1928, **146**, 1.
6. Nair, R. V., *Proc. Indian Acad. Sci.*, 1947, **B25**, 1.
7. Blache, J., *Bull. I. F. A. N.*, 1968, **30**, 690.
8. Fahay, M. P., *Copeia*, 1976, 210.
9. Castle, P. H. J., *"Meteor" Forschungs-Ergebn.*, 1975, **21**, 19.

A NEW SPECIES OF *HELIOCOCCUS* SULC (COCCOIDEA : PSEUDOCOCCIDAE) FROM SOUTH INDIA

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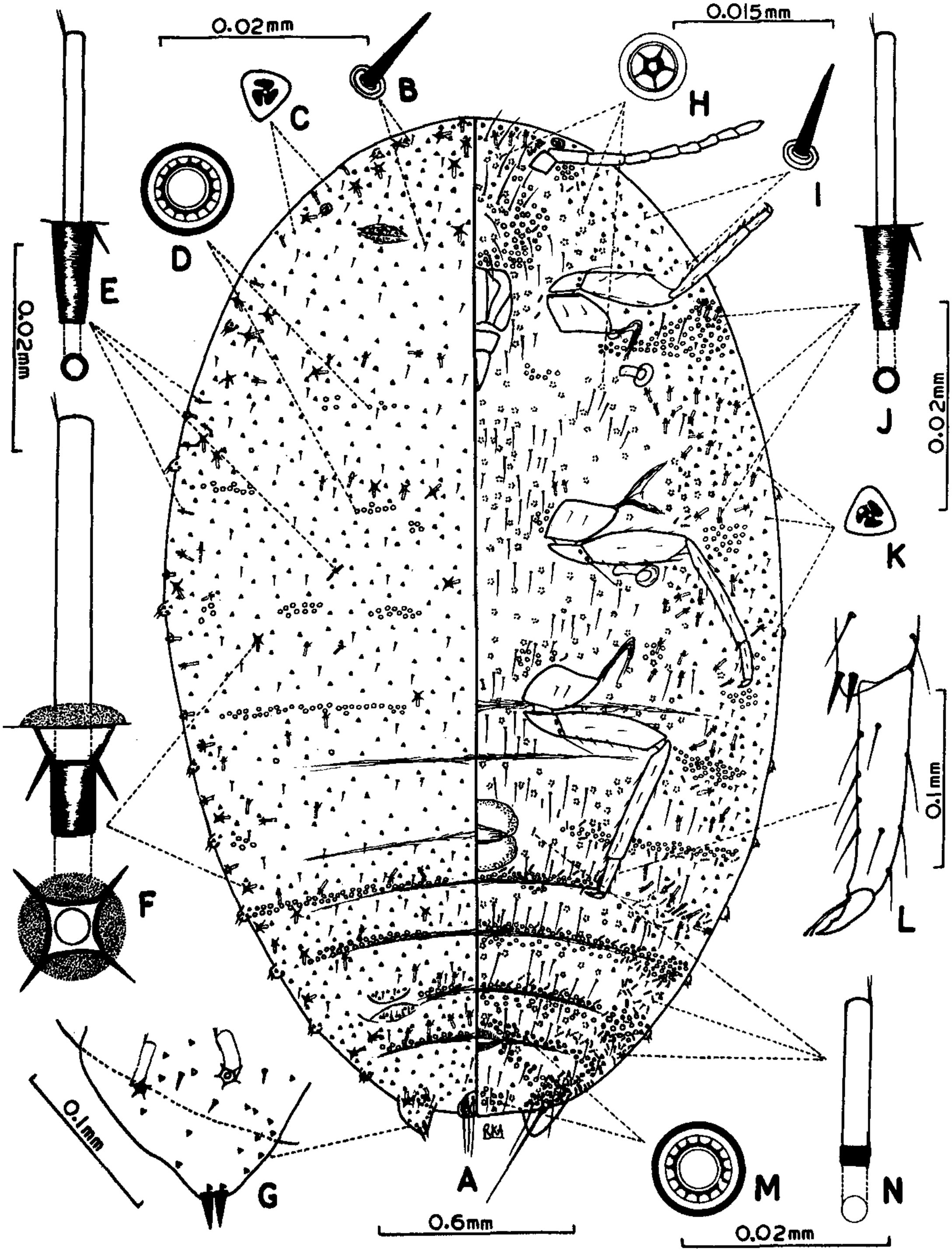
THE genus *Heliococcus* Sulc is reported for the first time from India. *H. singularis* sp. n. is described in the present paper. It runs close to *H. caucasicus* Borchsenius in the key to species of *Heliococcus*[1], but can be separated by its having small marginal protuberances and numerous multilocular pores irregularly distributed on dorsum.

Heliococcus singularis sp. n. (Figs. A-N)

Adult female (A) : Mounted specimen oval in shape, more than one and a half times longer than wide (3·05 : 1·83 mm), anal lobes well developed. Dorsum with small spinose setae (B). Trilocular pores (C) numerous and evenly distributed. Quinquelocular pores absent. Multilocular pores (D) in groups on thoracic and segmentally arranged on abdominal regions. Crateriform ducts sparsely distributed and are of two sizes, large size (F) with 4–5, small size (E) with 1–3 minute setae attached to the base of the ducts prominence. Ostioles well developed. Body with 12 pairs of cerarii which are devoid of auxiliary setate; anal lobe cerarii (G) without area of sclerotization, each with a pair of stout conical spines, a pair of large tubular ducts and few trilocular pores; cerarii anterior to anal lobe placed on the marginal protuberances, each cerarii with 2 conical spines and 2–3 trilocular pores. Anal ring with 6 setae which are longer than the greatest diameter of ring.

Venter with numerous hair-like setae of variable lengths, few setae (I) as those on dorsum confined submarginally. Trilocular pores (K) confined submarginally. Quinque and locular pores (H) numerous, irregularly distributed except lateral areas. Multilocular pores (M) numerous arranged segmentally posterior to circulus and in groups throughout body anterior to circulus. Oral-collar tubular ducts (N) sparsely distributed, segmentally arranged on abdomen posterior to circulus and in 4–5 groups marginally anterior to anal lobe; few crateriform ducts of small size (J) irregularly distributed. Eyes well developed. Antennae 9-segmented, 0.76 mm in length, segment 2nd longest. Rostrum dimerous. Spiracles well developed. Circulus large, constructed medially. Legs elongate; claws (L) with distinct denticle, digitules slightly longer than claw and clubbed at apices; dimensions of fore, mid and hind legs : trochanter + femur (0.37 : 0.4 : 0.43 mm), tibia (0.3 : 0.33 : 0.39 mm) and tarsus (0.09 : 0.1: 0.11 mm) respectively



Figures A-N. *Heliococcus singularis* sp. n.,

Holotype ♀ India, Andhra Pradesh, Prakasam, Chirala, on *Cupressus* sp., 13. iv. 1979 (R. K. Avasthi). Type deposited in Zoological Museum, Aligarh Muslim University, Aligarh, India.

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1. Bazarov, B. B., *Entomol. Rev.*, 1974, 2, 78.

HOLOCRINE SECRETION IN THE HEPATOPANCREAS OF *ALPHEUS EDWARDSI* (AUDOUIN)

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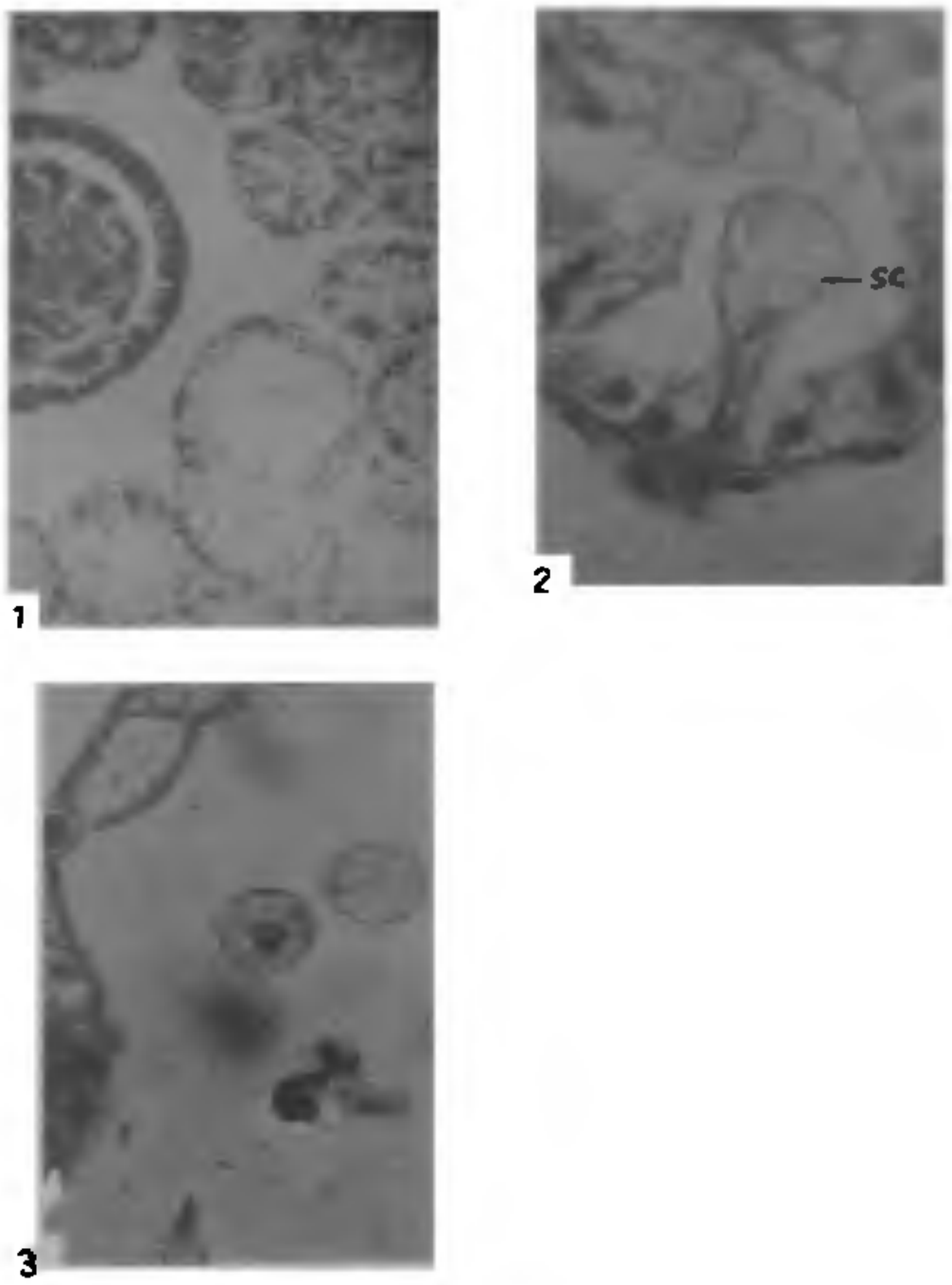
THE hepatopancreas, an important digestive gland associated with the alimentary canal of crustaceans has been studied. But comparatively little attention has been paid to study the histological and histochemical aspects in the shrimps. The study of the hepatopancreas of an intertidal shrimp *Alpheus edwardsi* can provide information on its histophysiology.

The hepatopancreas in *A. edwardsi* is a large well demarcated structure, yellowish brown in colour. It occupies most of the posterior part of the cephalothorax and envelops the posterior portion of the stomach and anterior region of the midgut. Basic studies on the histology of the hepatopancreas of the decapods have already been made[1–3]. The hepatopancreas consists of two main lobes each of which is formed by three small lobes, which are formed of numerous tubules. Each tubule in turn possesses epithelial cells of different types (figure 1). On the basis of the cytoplasmic contents and the phase of secretory activity four types of cells, *viz.*, secretory, absorptive, storage and replacing cells could be recognized. In sections the secretory cells appear large, vacuolated and club shaped (figure 2). The basal portion of the secretory cells are narrow and the conspicuous nuclei are placed at this narrow stalk-like region. The distal portion is bulbous. The cytoplasm of the cell usually appears fully loaded with secretion. Adjacent to the secretory cells, nonvacuolated



Figures 1-3. 1. Section of hepato pancreatic tubule. **2.** Secretory cell (SC), **3.** Secretory cell after extrusion in the lumen showing the holocrine type of secretion.

absorptive cells are present, with prominent round nuclei situated centrally. The secretory cells, when fully grown, extrude from the base and get ruptured.

This characteristic activity of fully grown secretory cells, their extrusion from the base, rupture and emptying their secretions into the lumen of the tubule is to be reckoned as holocrine. This is further confirmed by the observation of few secretory cells with their nuclei in the lumen of the tubule (figure 3). We can therefore conclude that holocrine type of secretion is apparent in these shrimps. Although merocrine secretion cannot be precluded, evidence of intense holocrine secretion is presented here.

The mode of secretion in the hepatopancreas has been differently reported in crustaceans. Travis[4,5] described apocrine secretion in *Panulirus*. Van Weel[6] reported merocrine type in *Atya spinipes*. The phenomenon of secretion and restitution of gland cells of the hepatopancreas has been elucidated by Hirsch and Jacobs[7,8], who reported holocrine type of secretion in *Astacus leptodactylus*. Similar type of secretion was also reported in amphipod *Telorchestia martensii*[9], and *Homarus gammarus*[10].

30 *November* 1981

1. Frenzel, J., *Mitt. Zool. Stat. Neop.*, 1884, 5, 50.