

SOME OBSERVATIONS ON THE EARLY LARVAL STAGES OF
HIPPOLYSMATA VITTATA (STIMPSON)

By S. VENUGOPALA PILLAI*

Central Marine Fisheries Research Institute, Mandapam Camp

MENON (1940) has described the first two stages of the *Hippolysmata* sp. from Madras waters, whereas Kurien (1951) recorded the eggs and the first stage larva of *Hippolysmata vittata* (Stimpson) from Krusadi. Bensam and Kartha (1965) have described the eggs and early larval stages of *Hippolysmata ensirostris* (Kemp). Studies on the larval stages of other species belonging to the *Hippolytidae* have also been made by Lebour (1931), Gurney (1937 and 1939), Al-kholy (1961), and Sankoli and Kewalramani (1962). In the present paper the life history of *Hippolysmata vittata* (Stimpson), upto the third larval stage has been described. Several variations in the first stage larval characters of the *Hippolysmata vittata*, noticed from the descriptions of Kurien (1951) are also brought out in this account.

Berried females of the species were obtained in large numbers from the 'Kamba vala' (Shore-siene) catches during the monsoon season from Cannanore waters, and were reared in the laboratory. The sea water was renewed every day. The larvae and adults were fed on crushed eggs of other crustaceans. The sketches and measurements were taken from the fresh specimens.

OBSERVATIONS

1. Eggs

During the last stage of embryonic development the eggs measured about 0.65×0.43 mm. to 0.77×0.53 mm. (Fig. 1). The eggs hatched out in 15-16 days.

2. Larval development

(a) Stage I (Fig. 2A): The size of the first stage larva of *H. vittata* is 2.17 mm. with a carapace measurement of 0.86 mm. Pigmentation shows the following distribution. Dark brownish pigments on the joints of the appendages and on the third abdominal segment. Pinkish-violet pigments on the cephalic region, first abdominal segment, tip of the antennular peduncle, and at the base of the telson. Rostrum is slender and reaches upto the tip of the antennular peduncle, and a small dorsal tubercle is seen at the base of the rostrum. Slight elevation in the anterior margin of the carapace on either side of the rostrum is also noticed. Pterygostomial spines and lateral denticulations are present in the carapace (Fig. 2 A₁).

* Present address : Central Sericultural Research and Training Institute, Mysore-4.

Antennule and antenna are similar to those of Kurien's (1951) descriptions. Mandible is well developed and slightly asymmetrical. The left one is with a short

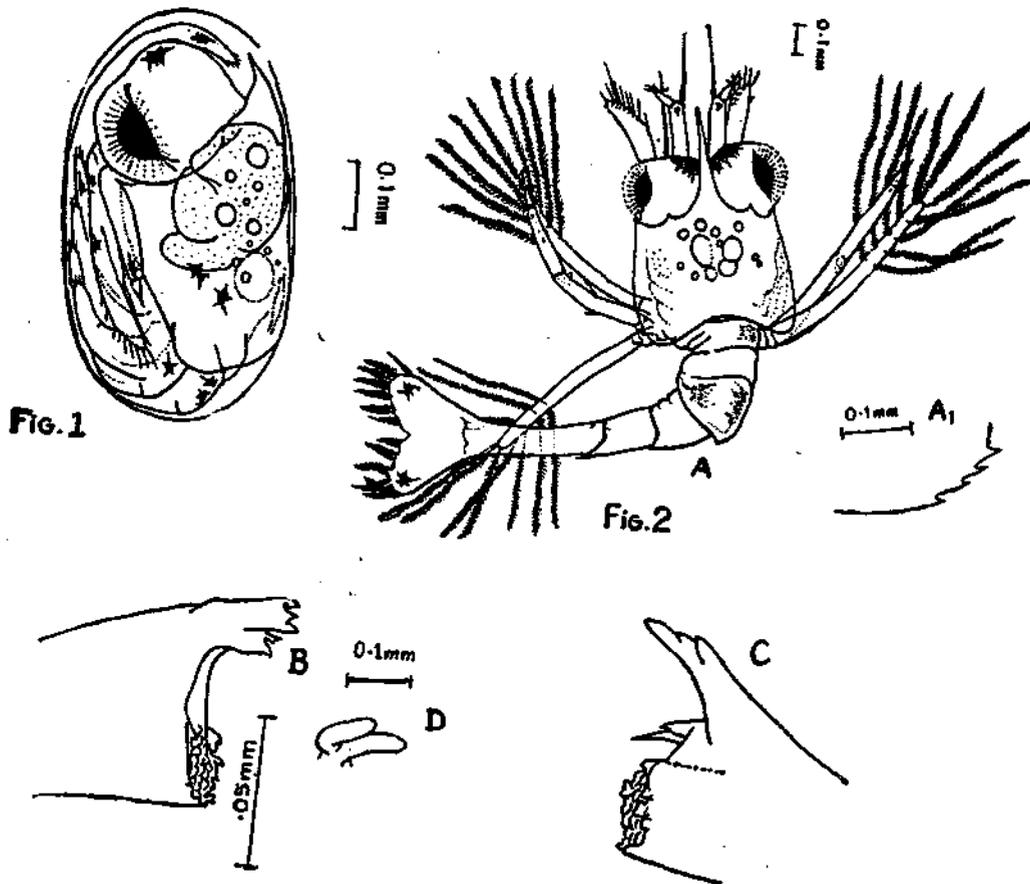


FIG. 1. Egg of the *Hippolysmata vittata* (Stimpson) with developing embryo. FIG. 2. A. First stage larva of *H. vittata* (Stimpson)—A₁. Anterolateral view of the carapace; B. Mandible (left side); C. Mandible (right side); D. Peraeopod I.

incisor portion with five teeth-like prominences (Fig. 2B). In the right side mandible the incisor portion has got only three teeth-like outgrowths (Fig. 2C) and in between the incisor and molar region two small teeth-like processes are present. The molar regions on either side are similar with numerous spinous elevations.

The number of setae in various segments of the endopodite of the 1st maxilliped is 4, 2, 1 and 2. The exopodite is with three terminal and one short lateral plumose setae. The endopodite of the maxilliped II is three segmented and the number of setae in the various segments is 4, 2 and 1. The exopodite bears three terminal and six lateral plumose setae. The exopodite of the maxilliped III is with eight lateral plumose setae.

Peraeopods I and II are rudimentary (Fig. 2D) biramous and are bent under the maxillipeds. Abdominal segments are devoid of appendages, and the fifth one carries a pair of spines on the dorsal side.

Telson is flat and bilobed with 7+7 plumose setae on either lobe, and with small spinous processes in between the setae.

(b) *Stage II* (Fig. 3A₁). The first day larva did not undergo moulting for 48 hours and the first moulting took place on the third day. The size of the freshly hatched out stage II larva is about 2.47 mm.

Pigmentation is more or less same as in the first stage except for the addition of greenish pigments on the eye-stalk. The eye-stalk is about half the size of the eye. Rostrum reaching only upto the base of the antennal scale. Supra-orbital and pterygostomial spines have become prominent (Fig. 3A₂).

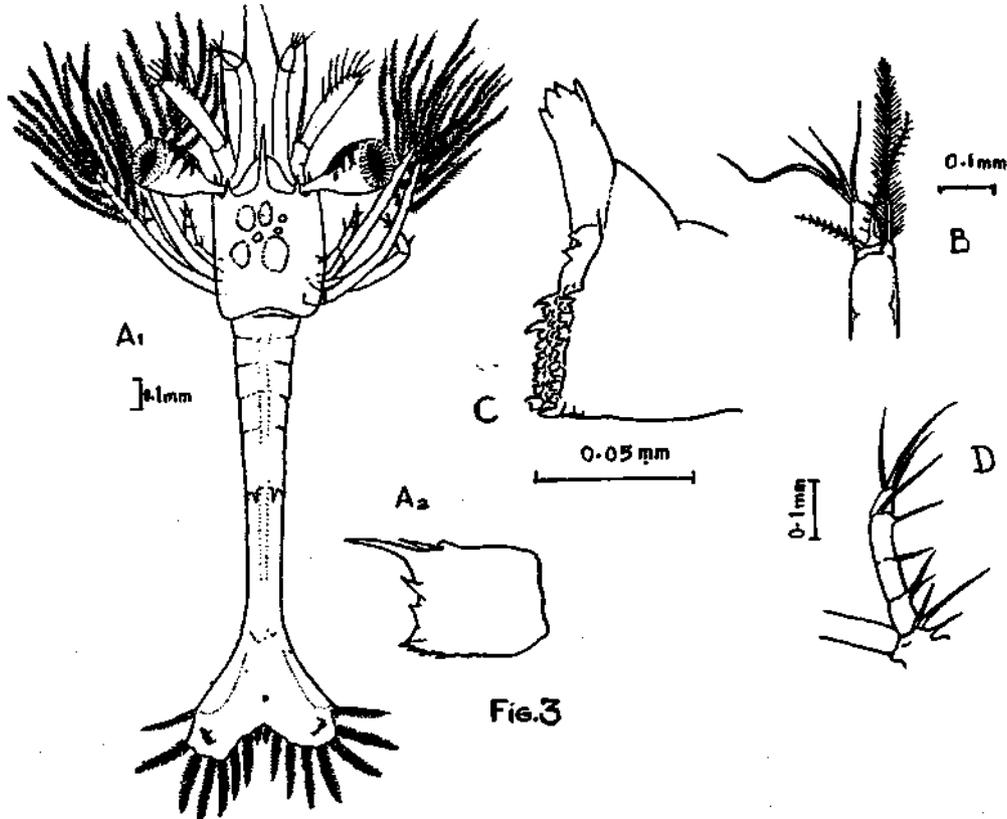


FIG. 3. A₁. Second stage larva of *H. vittata* (Stimpson). A₂. Lateral view of the carapace; B. Antennule; C. Mandible, right side; D. Maxilliped II (endopodite).

The antennule is with two hirsute setae (Fig. 3B) on the base of the apical cone, and the feathered seta on the apical cone, noticed in the previous stage is absent. Antenna remains same as in the first stage. Four teeth are noticed in the incisor portion of the right mandible (Fig. 3C). The number of the setae in the protopodite of the second maxilla is also increased. Maxilliped I is with an additional

seta in the second segment of the endopodite. The exopod remains same as in the previous stage. Endopodite of maxilliped II is four segmented (Fig. 3D) with 3, 2, 1 and 2 setae respectively. Basal region with three short setae and the exopodite remains as in the first stage. There is no change in the third maxilliped.

Peraeopods have become larger in size and the rudiments of the next two pairs are also noticed behind the former ones.

Telson is not differentiated from the last abdominal segment. 8+8 plumose setae on the free border, of which the innermost two are short and spine-like. Rudiments of the uropods are seen at the base of the telson.

(c) *Stage III* (Fig. 4A): Second moult took place the day after the first one i.e., on the fourth day after hatching. Size of the fresh third stage larva is 2.6 mm, and the general colouration remains the same as in the previous stage. At the base of the rostrum two short teeth are noticed (Fig. 4 A₁).

Antennule (Fig. 4B): Peduncle is bi-segmented. The basal segment is longer and the apical cone bears two flagella. The inner flagellum is short and bears a plumose seta on it. The outer flagellum is thicker and larger in size bearing four long aesthets. On the top of the 1st and 2nd segments there are 4 to 6 setae.

Antenna (Fig. 4C): Annulations on the scale have more or less disappeared. Eleven plumose setae on the inner border and a short spine on the outer border, sub-apically, are noticed. The inner flagellum is devoid of the plumose seta and a short stump-like prominence is noticed in its place.

Mandible (Fig. 4D): Both incisor and molar regions have become prominent. No other change is noticed from the previous stage.

An additional spine-like seta in the two lacinias are added in the first maxilla (Fig. 4E).

Maxilla II (Fig. 4F): Masticatory region with three setae in the first two processes and seven longer and slightly curved ones in the basal third one. The exopodite is comparatively bigger and has eight long plumose setae.

Maxilliped I (Fig. 4G): With ten setae on the basal part. Exopodite unsegmented and with an additional seta at the tip.

In maxilliped II the endopodite is four segmented, with four setae on each segment. Exopodite is with four plumose setae at the tip and six lateral ones. The endopodite of the 3rd maxilliped is five segmented with 3 to 4 short setae on each segment and the exopodite is with four apical and eight lateral plumose setae.

Peraeopods I and II (Fig. 4H) are well developed and functional. The endopodite is four segmented and the exopodite is as in the third maxilliped. Last pairs of the peraeopods are still rudimentary and bent under the former ones.

Abdominal segments are devoid of appendages.

Telson (Fig. 4I) is differentiated from the last abdominal segment. The exopod is long and narrow and bears nine plumose setae at its free end. Telson triangular

in shape and size with 8+8 spines, of which the inner and outer ones are shorter. Pinkish-violet pigments are seen at the base of the uropods and telson.

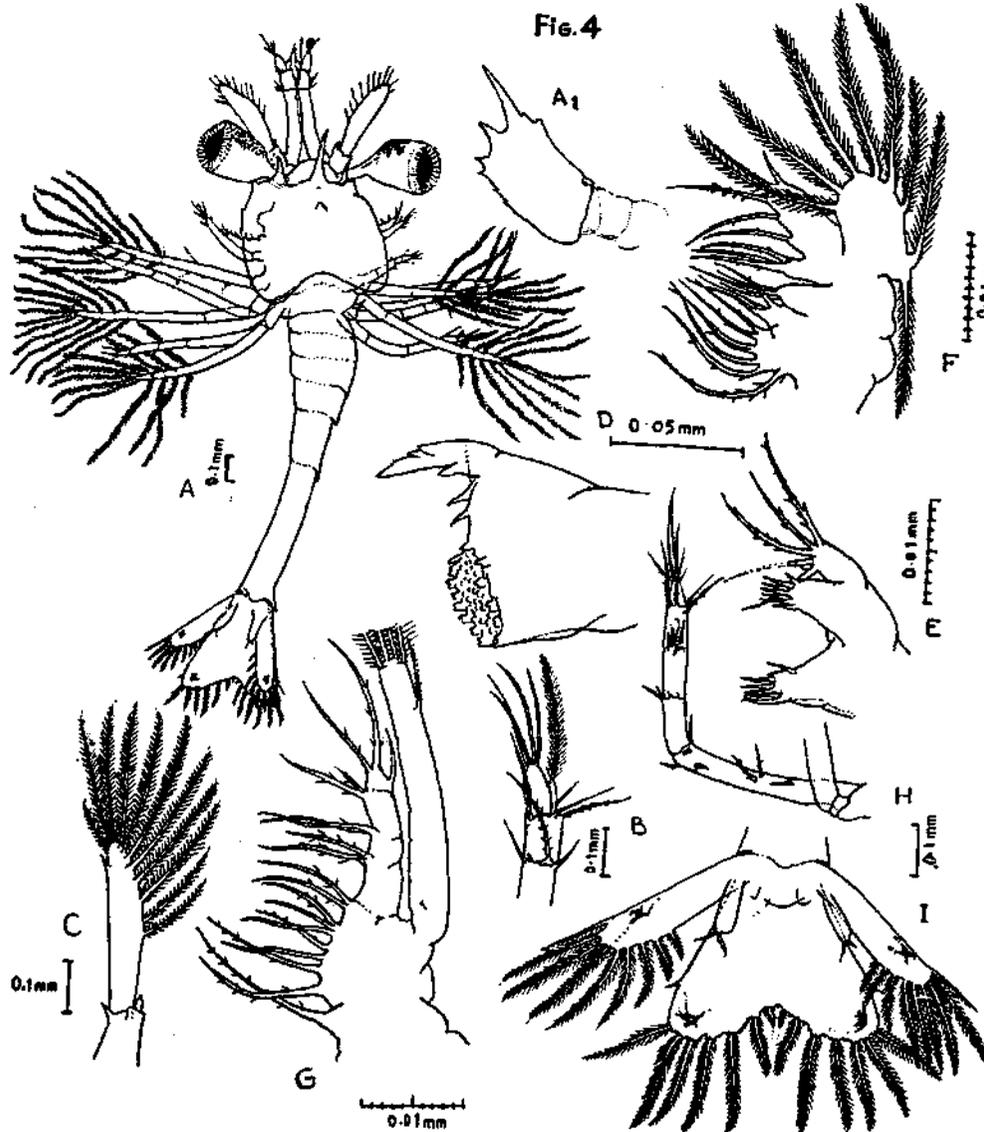


FIG. 4. A. Third stage larva of *H. vittata* (Stimpson). A₁. Carapace (lateral view); B. Antennule; C. Antenna; D. Mandible (right side); E. Maxilla-I; F. Maxilla-II; G. Maxilliped-I; H. Endopodite of pereopod I; I. Telson.

The third stage larva of *H. vittata* did not undergo further moulting, even though they survived for 10 to 15 days after the second moult.

DISCUSSION

From the observations the larva under study and those of *Hippolysmata* sp. described by Gurney (1937) from Red Sea and Menon (1940) from Madras waters, though agree in general characters showed the following variations. In the antenna of the first stage larva of *H. vittata* spoon-like outer margin is lacking in the smaller aesthet. Anterior elevations on either side of the rostrum is not shown in the descriptions of the first stage larva from Red Sea (Gurney 1937) and from Madras waters (Menon 1940). Larval characters of *Hippolysmata ensirostris* described by Bensam and Kartha (1965) also show some differences viz., larval length remaining constant upto the third stage, absence of dorsal tubercle and abdominal spines, and in the nature of uniramous uropods in the telson. The differences noticed in the characters of the first stage larva of *H. vittata* from those of Kurien's (1951) descriptions are striking and are given in Table 1.

TABLE 1

Characters	<i>H. vittata</i> (Kurien 1951)	<i>H. vittata</i> (Present observation)
Egg. Max. size	0.92 mm.	0.77 × 0.53 mm.
Stage I larva. size	1.9 to 2.00 mm.	2.17 mm.
Rostrum	Reaching beyond the ant. peduncle.	Reaching upto the tip of ant. peduncle.
Dorsal tubercle on the carapace	Absent	Present
Elevations on the anterior margin on either side of the rostrum	Absent	Present
Pterygostomial spines	Absent	Present
Lateral denticulations on the carapace	Absent	Present
Number of setae in the endopodite of the 1st maxilliped	3, 1, 2, 3	4, 2, 1, 3

Pike and Williamson (1960) have also noticed marked differences in the first larva of certain pagurids in different places. In *Diogenes pugilator* they found local variations in the larvae. Sankoli and Kewalramani (1962) have also noticed differences in the larval characters of *Saron marmoratus* (Oliver) from those of the larva recorded by Al-Kholy (1961) from Red sea. According to them these differences may be due to the different ecological conditions. The same may also be applicable in the present study on the larva of *H. vittata*, though the possibility of the genetical variation is not ruled out.

SUMMARY

A brief study on the eggs and early larval stages, upto the third stage of *H. vittata* reared in the laboratory are made and the differences noticed in the larval characters of allied forms are noted.

ACKNOWLEDGEMENT

I wish to express my sincere thanks to Dr. R. Raghu Prasad, Deputy Director, Central Marine Fisheries Research Institute, for going through the manuscript and giving many helpful suggestions for the improvement of the paper. I am also grateful to Dr. M. D. K. Kuthalingam, Assistant Research Officer of the same Institute for his help rendered in the preparation of the manuscript.

REFERENCES

- AL-KHOLY, A. A. 1961. Larvae of some macruran Crustacea (from the Red sea). *Publ. Mar. Biol. Sin.*, Al-ghardaqa (Red sea) No. 2 : 73-94.
- BENSAM, P. AND RASACHANDRA KARTHA, K. N. 1965. Notes on the eggs and early larval stages of *Hippolysmata ensirostris* (Kemp). *Symposium on Crustacea*. Mar. Biol. Ass. India (in press).
- GURNEY, R. 1937. Larvae of Decapod Crustacea Part IV. *Hippolytidae*. *Discovery reports* 14 : 353-403.
- , R. 1939. *Larvae of Decapod Crustacea*. Ray Society, London, 192-225.
- KURIEN, G. 1951. A note on the eggs and first stage larva of *Hippolysmata vittata* (Stimpson). *Jour. Bombay. Nat. Hist. Soc.*, 50 : 416-417.
- LEBOUR, M. V. 1931. The larva of the Plymouth Caridea I. The larva of the Cragonidae II. The larva of the Hippolytidae. *Proc. Zool. Soc. London*, p. 1 and 2 : 1-9.
- MENON, M. K. 1940. Decapod larva from Madras plankton. *Bull. Madras Govt. Mus. N.S.* (Nat. Hist.) 3(6) : 1-47.
- *PIKE, R. B. AND WILLIAMSON, D. I. 1960. Larva of decapod crustacea of the families *Diogenidae* and *Paguridae* from the Bay of Naples. *Publ. Staz. Zool. Napoli*. 39(3) : 493-552.
- SANKOLI, K. N. AND KEWARLRAMANI, H. G. 1962. Larval development of *Saron marmoratus* (Oliver), in the laboratory. *J. Mar. Biol. Ass. India*, 4(1) : 106-120.