

**A PRELIMINARY REPORT ON THE PHYLLOSOMAS OF THE  
INDIAN OCEAN COLLECTED BY THE DANA EXPEDITION 1928-30\***

By R. RAGHU PRASAD<sup>1</sup> & P. R. S. TAMP<sup>2</sup>  
*Central Marine Fisheries Research Institute*

SEVERAL genera and species of lobsters have been reported from the Indian Ocean. Although the validity of some of the species recorded are doubtful there are over 30 species of palinurids belonging to 7 genera and about six genera with more than 40 species of scyllarids. Consequently a wide variety of phyllosoma larvae is to be expected.

The present collection consists of 1983 larvae in different stages of development. Of these 1111 could be assigned to palinurids and the rest to scyllarids (Table I). This is note-worthy in that while there are presumably fewer species of palinurids there is a greater percentage of their larvae. Two explanations could be given for this: (1) larger population, (2) and/or higher fecundity of palinurids compared to the scyllarids. In the geographical distribution of these larvae a significant aspect is noticeable. The population of palinurid larvae is greater in the western half of the Indian Ocean, whereas that of scyllarid phyllosomas is greater in the eastern part. However, it may be pointed out that the total population in the two halves is not very much different. The data, as presented in the Table, also clearly show that both the palinurid and scyllarid larvae follow more or less an identical pattern of distribution in accordance with depth. This remarkable similarity in their depth-wise occurrence may be indicative of the same habits and behaviour of the two types of larvae.

Figures 1 to 6 show the distribution of total number of phyllosomas according to depths. It will be seen from these figures that the larvae are scarce at the surface, with a maximum concentration at about 50 m. They are abundant at 100 m. While at 150 and 250 they are again scarce fairly large numbers of them have been collected from 200 and 300 m. Their concentration at 500 m. and 600 m. is, more than at the surface or at 150, 250 and 400 m. It should, however, be mentioned here that the number of larvae caught at various depths is partly influenced by the difference in the size of nets used and the duration of hauls at the different depths. As is to be expected the number decreases with increasing depth. But it is interesting that a few have been collected from depths as great as 3500 m. Most of these larvae obtained from the deeper waters i.e., below 1000 m. are of palinurids and beyond 2000 m. no scyllarid larvae are found in the collection (Table I). While majority of these larvae are in fairly advanced stages of development, a few are in the early stages and one collected from 2000 m. appears to be in the first phyllosoma stage it being only 1.70 mm. The presence of these early stages in the deeper waters is interesting particularly because many of the lobsters inhabit relatively shallow regions.

\* Paper from the *Dana* Oceanographical Collection No. 61.

*Present address:* <sup>1</sup> Central Marine Fisheries Research Substation, Church Landing Road, Ernakulam-6.

<sup>2</sup> Central Marine Fisheries Research Substation, 10, Leith Castle South Street, Madras-28.

A cursory examination of the oceanographical conditions has revealed that at almost all stations the pycnocline is strong and well stratified in the vertical. The presence of the surface mixed layer, where the vertical gradients are weak, is found only up to 10° S latitude on the eastern part of the Indian Ocean. In areas where there is a mixed layer the pycnocline starts at about 100 m., whereas in the other cases the average depth where the pycnocline starts is 40-50 m. The density increase is very small from 200-300 m. downwards compared to the upper layers. Thus, the concentration of larvae in upper 100 m. seems to be related to the distribution of the pycnocline which acts as an effective barrier for the vertical movements of the larvae.

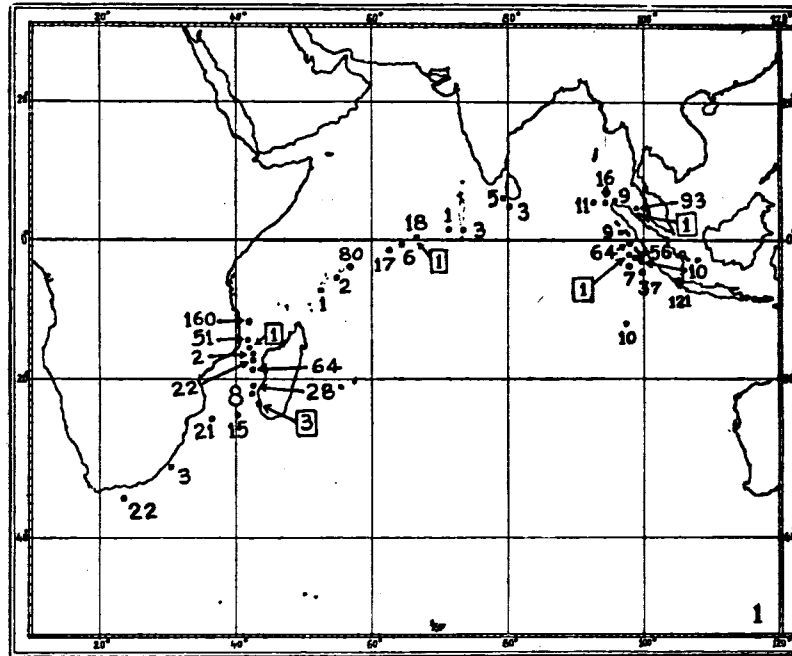


FIG. 1. The distribution of phyllosomas at the surface (numbers in boxes) and 50 m.

With the exception of a negligibly small number, the greater part of the larval population is found in the neighbourhood of landmasses (figs. 1-6). Although this may be partly due to the selection of stations, the concentration of larvae near the coast is only to be expected because most species of lobsters are confined to the shelf. The important aspect of this concentration lies in the fact that the larval populations, in spite of the prolonged planktonic life (estimated to be about 6 or 7 months), are retained in restricted areas to accomplish restocking of the areas. Johnson and Brinton (1963) have remarked that: 'This could be accomplished mainly by swimming from one depth level to another during vertical migrations, or even through seasonal migrations of this type. During these shifts of level, which occur under the directive stimulus of light, even weakly swimming animals may conceivably spend a good deal of time alternately in currents flowing in different directions, or at different speeds. In this way a retardation or prevention of the wholesale out-wash is effected.'

Amongst the different types of larvae in the collection mention may be made of the giant phyllosomas obtained from depths varying from 50-1000 m. Four

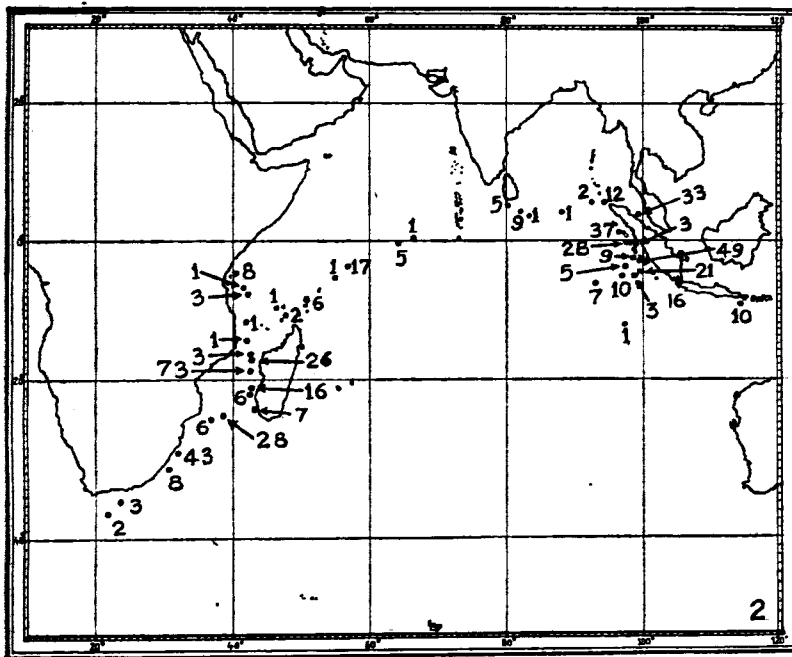


FIG. 2. Phyllosomas collected from 100 m.

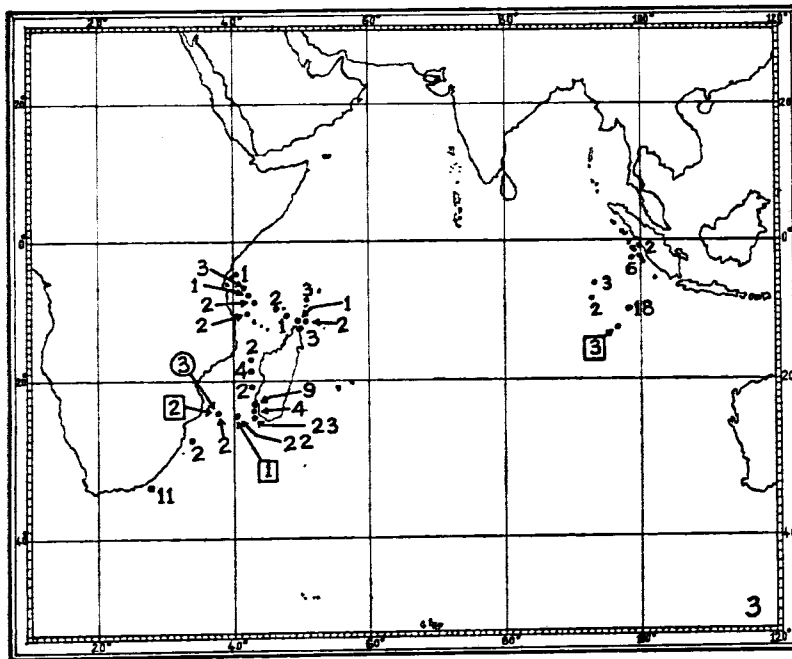


FIG. 3. Phyllosomas collected from 150 m. (numbers in circles) ; 200 m. and 250 m. (numbers in boxes).





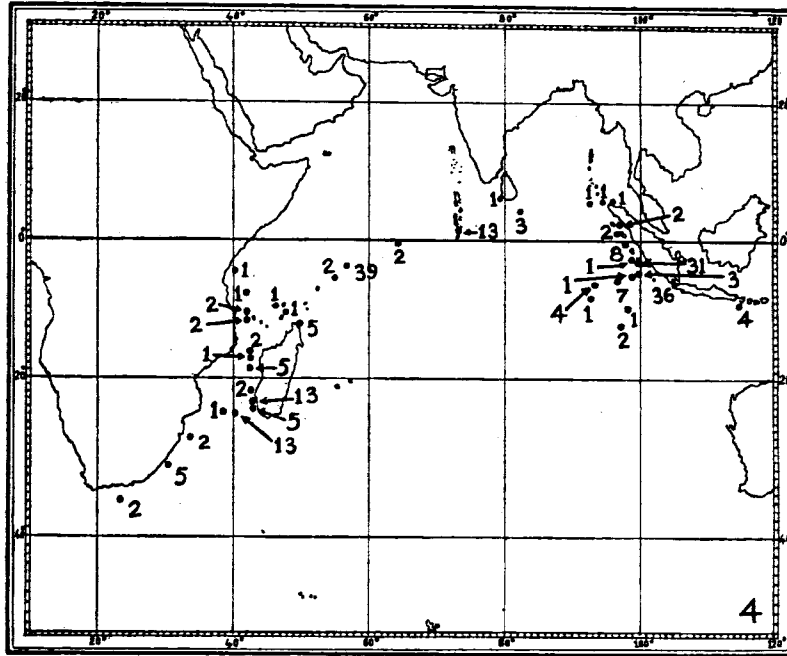


FIG. 4. Phyllosomas collected from 300 m.

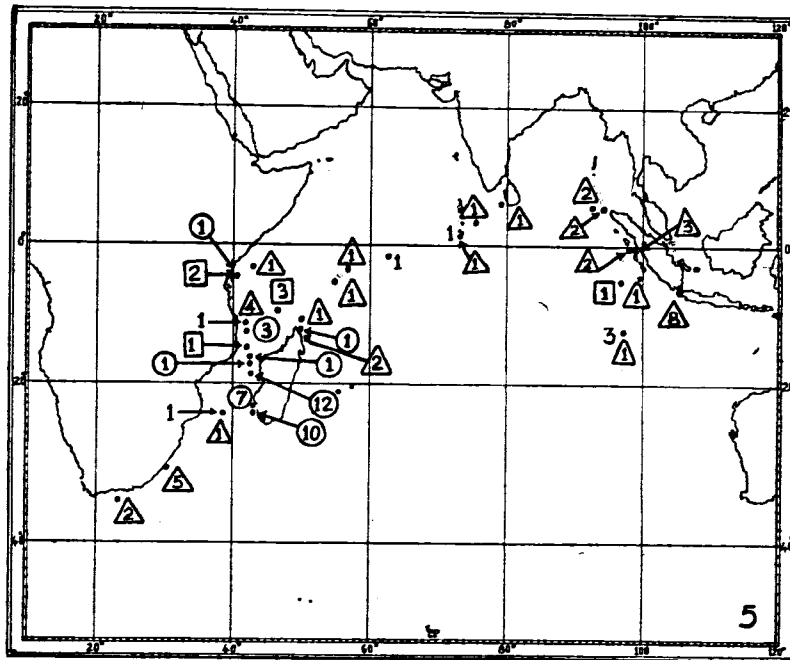


FIG. 5. Phyllosomas obtained from 400 m. (numbers in boxes) ; 500 m. (numbers in circles) ; 600 m. (numbers in triangles) and 1000 m.

larvae, three of which seem to belong to the same species and almost the same stage of development, range in size from 76-80 mm. The fourth one which bears a close

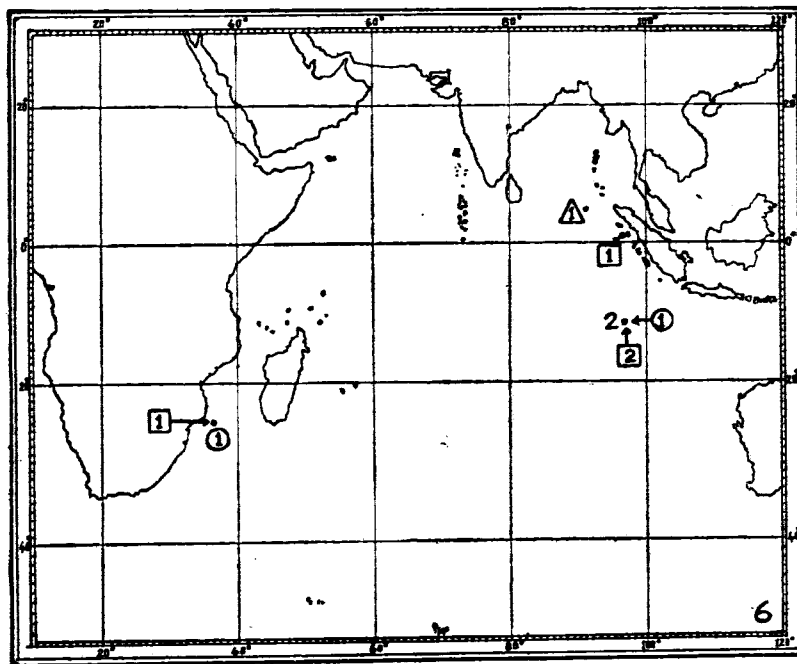


FIG. 6. Phyllosomas collected from 2000 m. (numbers in boxes); 2500 m. (numbers in circles); 3000 m. (numbers in triangles) and 3500 m.

resemblance to the giant phyllosoma described by Johnson (1951) measures 67 mm. The other three larvae are distinct from these.

A detailed study of the collection is in progress and a fuller report will be published elsewhere.

The authors are grateful to the Carlsberg Foundation for placing the collection at their disposal and to the Director, Central Marine Fisheries Research Institute for permission to publish this paper.

REFERENCES

JOHNSON, M. W. 1951. A giant phyllosoma larva of a loricate crustacean from the tropical Pacific. *Trans. American Micro. Soc.*, 70 : 274-278.

JOHNSON, M. W. AND BRINTON, E. 1963. Biological species, water-masses and currents. *The Sea : Ideas and observations on progress in the study of the Seas*. 2 : 381-414. Interscience Publishers, London.