

ON THE CALORIC CONTENT OF THE FISH, *AMBASSIS COMMERSONI* (CUVIER)

JOSEPH P. ROYAN* AND K. VENKATARAMANUJAM

Marine Biological Station, Porto Novo, Tamil Nadu — 608502

ABSTRACT

Caloric values for *Ambassis commersoni* (Cuvier) from egg to adult stages were estimated. Gross efficiency from egg to postlarva was found to be low (25.81) as compared to the available data for other animals. From post larva to adult the caloric content steadily increased.

Much emphasis is being given in recent years on the energy values of organisms and increased use is being made of caloric measurements as units for the study of energy transfer. Several factors such as developmental stages, reproductive condition and food intake are known to have an effect on the caloric values. Hence an attempt has been made presently to estimate the caloric content of *Ambassis commersoni* during its different developmental stages.

Eggs, larvae and juveniles of *Ambassis commersoni* were collected from the river mouth of the Vellar Estuary, Porto Novo (11° 29' N, 79° 49' E). The following stages were chosen for caloric estimations:

Egg: Fertilised. Average diameter 0.6 mm. and weight 0.0008 g.

Prolarva: Hatched out from the egg membrane, still bearing yolk.

1.2 - 2.5 mm. in length and weighing 0.0041 g.

Postlarva: Larval stage in which after the absorption of yolk the structure and form continue to be strikingly unlike that of the juvenile. 5.0 - 7.0 mm in length and 0.0095 g in weight.

Juvenile: Essentially similar to adult except in size. 12.5 - 25.0 mm in length and 0.0204 g in weight.

Adult: Sexually mature. 67.0 mm in length and 3.1750 g in weight.

All caloric estimations were made with oven-dried samples using the method of Karzinkin and Tarkovskaya (1964).

Table I gives the caloric content of *A. commersoni* from egg to adult stage. The caloric values decrease from 11640.72 cal/g in the egg to 3074.14 cal/g in the prolarva. In the prolarva only

*Present address: National Institute of Oceanography, Dona Paula, Goa 403 004

26.4% of the caloric content of the egg is retained and the rest (73.6%) seem to be expended during the course of development. This energy is referred to as "work of growth and development" by Brody (1945). The energy content of postlarva shows a slight decrease from that of the prolarva. From the postlarva onwards the caloric values increased.

Pandian (1967 a & b) reported a decrease of 17.9% from egg to protozoa in the case of *Crangon crangon* and 16% in *Eupagurus bernhardus* from egg to zoea stage. The energy content of the postlarva shows only a slight decrease from that of the prolarva - only 2.25% having been spent as the work of development. This indicates that the prolarva is not ecologically independent. It derives the energy from

the egg in the form of yolk. It can therefore be presumed that the energy spent up to the postlarval stage during development amounts to 74.19%. The gross efficiency works out as 25.81%. This when compared with the available data on the other animals appears to be rather low (Table II.).

The rise in caloric values observed from postlarval stage onwards may be because of the active feeding habits of the animal and the deposition of storage materials in the body of the fish.

ACKNOWLEDGEMENT

The authors are thankful to Dr. R. Natarajan, Director, Marine Biological Station, Porto Novo and to Dr. S. Z. Qasim, Director, National Institute of Oceanography, Goa for their valuable suggestions.

TABLE I. Caloric content of *A. commersoni* from egg to adult

| Developmental stage | No. of estimates | Energy content (cal/g dry wt) |
|---------------------|------------------|-------------------------------|
| Egg | 2 | 11640.72 |
| Prolarva | 2 | 3074.14 |
| Postlarva | 4 | 3005.00 |
| Juvenile | 3 | 4174.00 |
| Adult | 5 | 4207.00 |

TABLE II. Percentage of gross efficiency in different animals.

| Material | Gross efficiency % | Reference |
|----------------------|-----------------------|----------------|
| <i>A. commersoni</i> | 25.81 | Present work |
| Chick embryo | 63.00 | } Brody (1945) |
| Frog embryo | 51.00 | |
| Silk worm embryo | 63.00 | |
| Sea urchin embryo | 59.00 | |

REFERENCES

- Brody, S., 1945. Bioenergetics and growth. New York, Reinhold. 1023 pp.
- Karzinkin, G. S. and O. I. Tarkovskaya, 1964. Determination of caloric value of small samples. In: *Techniques for the investigation of fish physiology*, E. N. Pavlovskii (Ed), Israel Programme for Scientific Translation, 122 - 124.
- Pandian, T. J., 1967 a. Changes in chemical composition and caloric content of developing eggs of the shrimp *Crangon crangon*. *Helgolander wiss. meeresunters* 16 : 206 - 224.
- Pandian, T. J., 1967 b. Chemical composition and caloric content of egg and zoea of the hermit crab *Eupagurus bernhardus*. *Ibid.* 16 : 225 - 230.
- Venkataramanujam, K., 1972. Life history and feeding habits of *Ambassis commersoni* (Cuvier) (Ambassidae, Teleostei). *Recent Researches in Estuarine Biology*, R. Natarajan, Ed. Hindustan Publishing Corporation (1); Delhi, (India), pp. 296 - 303.