

# SOME ASPECTS OF THE BIOLOGY OF A TROPICAL EARTH-WORM *PONTOSCOLESE CORETHURUS* (O.F. MULLER)<sup>1</sup>

S. ARUNACHALAM<sup>2</sup>

(With three text-figures)

Individuals of *P. corethurus* were found abundantly during rainy seasons of the year, distributed at a depth of 5 cm. These earthworms produced cocoons only during the rainy season. The average number of cocoons produced was  $14 \pm 2.2$  cocoons per month. The cocoons were  $c\ 3.3 \pm 0.4$  mm in diameter and  $28.3 \pm 1.18$  mg in weight. The cocoons hatched on the  $21 \pm 1$ st day of incubation at room temperature, i.e.  $28^{\circ}\text{C}$ . Temperature accelerated development. At extreme temperatures they failed to develop. Only one worm hatched out from a cocoon. Freshly hatched *P. corethurus* was  $1.7 \pm 0.18$  cm in length;  $1.4 \pm 0.06$  mm in diameter and  $13.4 \pm 0.87$  mg in weight. The average number of segments at birth was  $230 \pm 10$ . *P. corethurus* attained an average body weight of  $217.5 \pm 38.58$  mg on the 91st day.

Our knowledge of the biology of even quite common earthworms is very inadequate; and the life cycle of many species of earthworms are still obscure (Edwards & Lofty 1972). With the view that life cycle studies on earthworm may provide some useful information for effective earthworm culture, the present work on some aspects of biology of a glossoscolecoid worm of India was undertaken. The distribution of this glossoscolecoid worm *Pontoscolese corethurus* in Palni is unique since the authorities of the British museum Natural History state that this species is particularly common on beaches in most of the tropical regions of the world (in litt.).

## MATERIAL AND METHOD

Individuals of *Pontoscolese corethurus* (O. F. Muller: Family Glossoscolecidae) were

collected from shady areas in irrigated lands during the rainy season, in and around Palni when the soil temperature was about  $27 \pm 1^{\circ}\text{C}$ . These were cultured in the laboratory using natural medium. The length, width, and live body weight were measured. In taking live weight suitable corrections were made for the gut content.

20 groups of matured *P. corethurus*, each group consisting of 5 individuals were reared in glass terraria (6'' x 9'' x 12'') in the natural medium. Daily observations were made for about 3 months (November to January) to find out the average number of cocoons produced by single individual per month. Duration between successive ovipositions of a single earthworm was also observed by rearing them singly in a terrarium. Twenty earthworms were thus observed for a period of about one month.

The fresh cocoons were weighed, using a sensitive (0.01 mg) balance and the width of the cocoons was measured using screw gauge. Fresh cocoons were kept with natural medium at different temperatures, i.e. 15, 21,

<sup>1</sup> Accepted April 1977.

<sup>2</sup> Department of Zoology, Madurai University, P.G. Centre, Arulmigu Palaniandavar Arts College, Palni, Tamilnadu.



28 and 34°C and allowed to develop. The incubation period of these cocoons was noted. After hatching, the initial length, width, number of segments, and live weight were measured.

To measure the growth rate, 10 groups (5 in each) of young ones hatched at 28°C were cultured using natural medium in the laboratory for a period of 90 days. The growth was measured at regular intervals of 15 days, by taking live weight. Suitable corrections were made for the gut contents.

### RESULTS AND DISCUSSION

1. *Distribution*:— *P. corethurus* occurred abundantly in shady places in irrigated fields from October to January at a depth of 5 cm, when the soil temperature was 28°C. At other seasons of the year, these earthworms were hardly found even at a depth of over 25 cm, when the soil temperature had risen to above 32°C. It appears that as the soil temperature rises the earthworms move into deeper parts of the soil. Gerard (1967) has pointed out that *A. chlorotica*, *A. caliginosa* and *A. rosea*

were distributed at a depth of 7.5 cm of soil at suitable climatic conditions and moved into the deeper parts when the soil temperature rose or fell to a greater extent.

2. *Cocoon production*:— Cocoons of *P. corethurus* were collected from the fields along with the earthworms at a depth of 5 cm during rainy season from October to January. The cocoons were not found during other seasons. Similar observations were made by Evans & Guild (1948) and Satchel (1967) who stated that the environment influenced the production of cocoons by any species of earthworm. Such restricted breeding behaviour has also been observed in some other glossoscolecids such as the marsh dwelling worm *Criodrilus lacuum* and *Alma* sp. which produced cocoons only during cold seasons (Edwards & Lofty 1972). Bahl (1922) also reported that few species of *Phretima* produced cocoons during rainy months.

*P. corethurus* reared in the laboratory also produced cocoons only during cold season from October to January. After January they did not produce cocoons, confirming the field

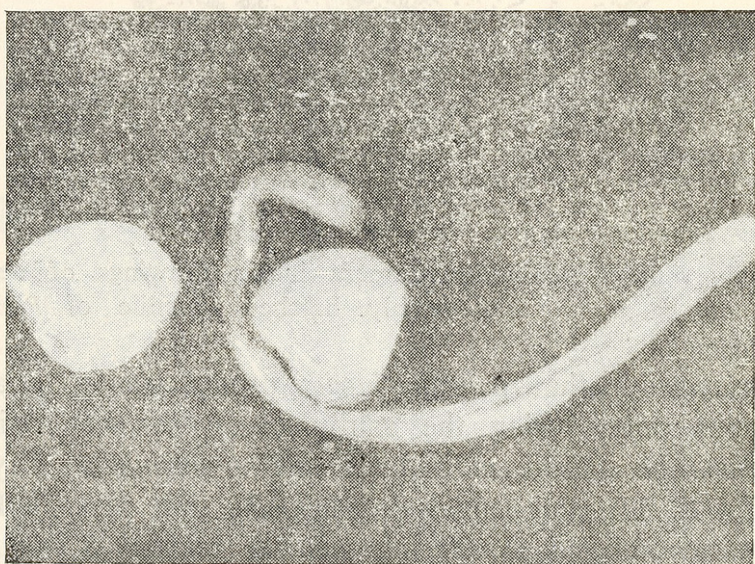
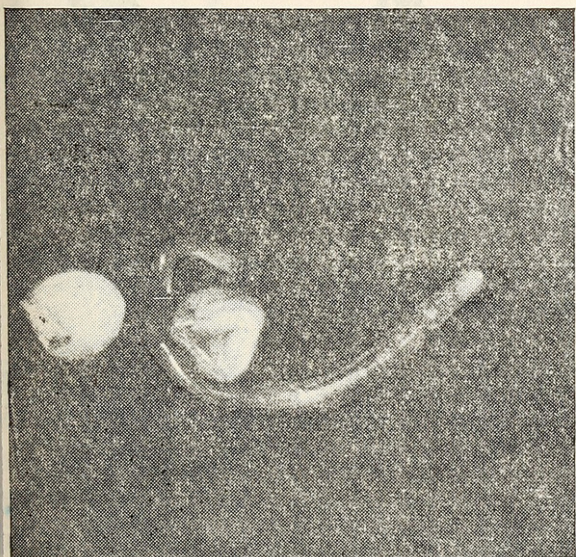
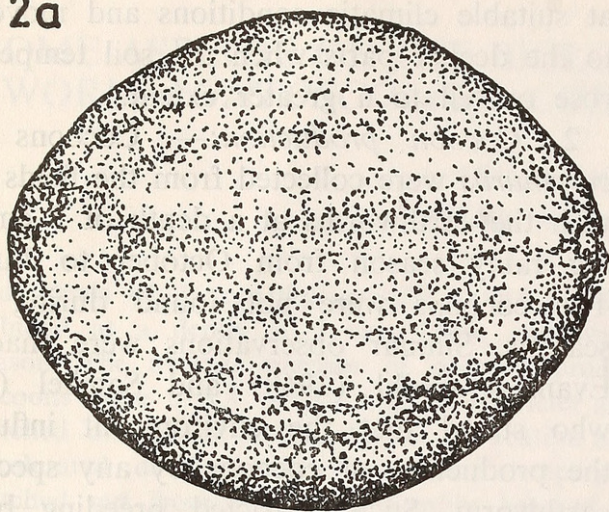


Fig. 1. Photograph of developing cocoons and freshly hatched *Pontoscolecus corethurus*.

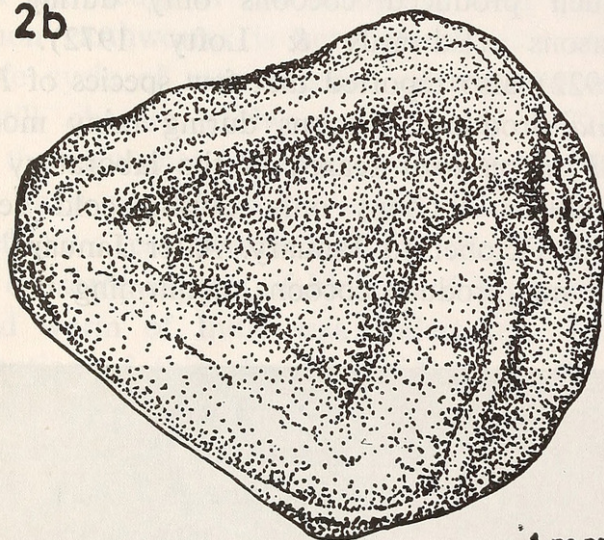


Fig 2a



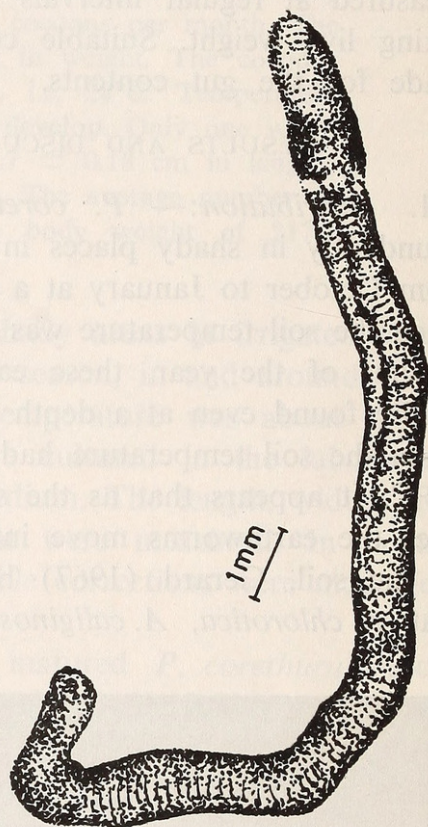
1 mm

Fig 2b



1 mm

Fig 2c



1 mm

Fig. 2. Camera lucida drawings of developing cocoons (a, b) and freshly hatched juvenile of *Pontoscolese corethurus* (c).

observation that *P. corethurus* produces cocoons only during the rainy season of the year. The mature individuals of *P. corethurus* ( $7.4 \pm 1.04$  cm length;  $3.2 \pm 0.28$  mm diameter;  $533.5 \pm 39.09$  mg weight) reared as groups in different terraria produced as many as  $14 \pm 2.2$  cocoons per month per indivi-

dual. The duration between two successive ovipositions of *P. corethurus* was 3 to 13 days.

Fresh cocoons of *P. corethurus* were more or less spherical in shape, opaque and milk white in colour. Cocoons were about  $3.3 \pm 0.4$  mm in diameter and  $28.3 \pm 1.18$  mg in



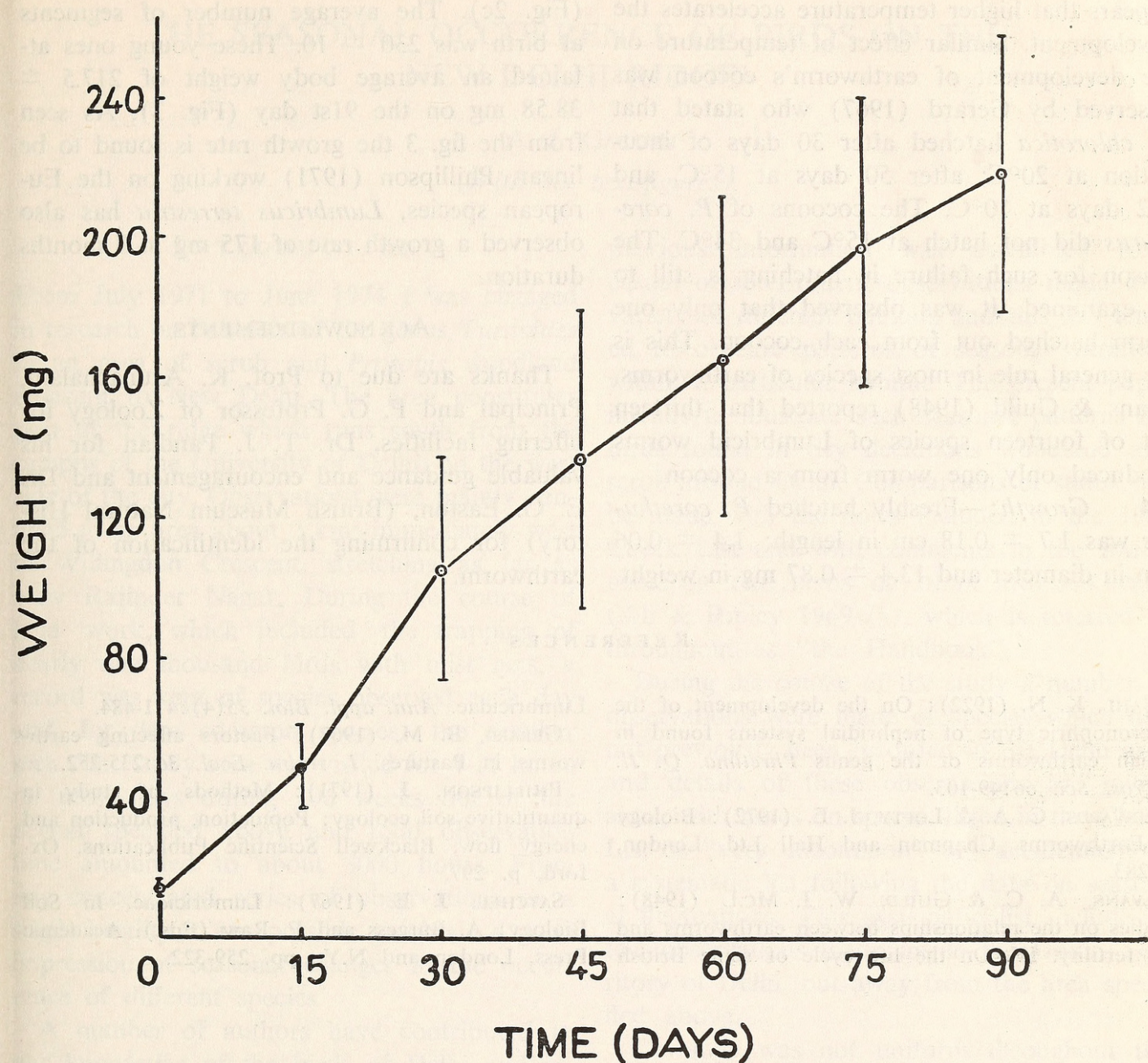


Fig. 3. Growth of the earthworm *Pontoscolese corethurus*; each value represents the average performance of 50 individuals cultured in laboratory.

weight. The shape and size of the cocoons vary in different species of common earthworms (Edwards & Lofty 1972).

3. *Incubation*:—The cocoons were kept at room temperature, i.e. 28°C. As development proceeded, the cocoons became translucent; after one week white streaks appeared

in the cocoons; and after two weeks the cocoons became slightly red in colour apparently due to blood circulation (Figs. 1 and 2a and 2b). The cocoons hatched on the 21st  $\pm$  1 day of incubation. The incubation period increased from 21  $\pm$  1 day to 26  $\pm$  1 day when the cocoons were kept at 22°C. It



appears that higher temperature accelerates the development. Similar effect of temperature on the development of earthworm's cocoon was observed by Gerard (1967) who stated that *A. chlorotica* hatched after 30 days of incubation at 20°C; after 50 days at 15°C, and 112 days at 10°C. The cocoons of *P. corethurus* did not hatch at 15°C and 34°C. The reason for such failure in hatching is still to be examined. It was observed that only one worm hatched out from each cocoon. This is the general rule in most species of earthworms. Evans & Guild (1948) reported that thirteen out of fourteen species of Lumbricid worms produced only one worm from a cocoon.

4. *Growth*:—Freshly hatched *P. corethurus* was  $1.7 \pm 0.18$  cm in length;  $1.4 \pm 0.06$  mm in diameter and  $13.4 \pm 0.87$  mg in weight.

(Fig. 2c). The average number of segments at birth was  $230 \pm 10$ . These young ones attained an average body weight of  $217.5 \pm 38.58$  mg on the 91st day (Fig. 3). As seen from the fig. 3 the growth rate is found to be linear. Phillipson (1971) working on the European species, *Lumbricus terrestris* has also observed a growth rate of 175 mg in 3 months duration.

#### ACKNOWLEDGEMENTS

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