

THE EGG-CAPSULE OF THE MILLIPEDE,
*THYROGLUTUS MALAYUS ATTEMS**
(SYN. *THYROPYGUS MALAYUS CARL.*)

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WHILE studying the ecology of the local millipedes, the author noticed that the eggs in case of *Thyroglobulus malayus* are not laid in groups or masses but singly, one in each small capsule. As many as 31 egg-capsules have been obtained from a single female. These capsules are made of earth and are so well designed and symmetrical in shape as to attract special attention from the surrounding soil.

The general external outline of these capsules bears a superficial resemblance to a miniature fresh-water mussel, the two valves of which represent the two convex walls of the capsule. These capsules have practically a uniform size, showing very slight variations in their dimensions. The average measurements of the capsule are: length 9 mm.; breadth in the middle 6 mm.; thickness, *i.e.*, distance between the two convex walls externally 5 mm.; the curvature of the rim 10 mm.

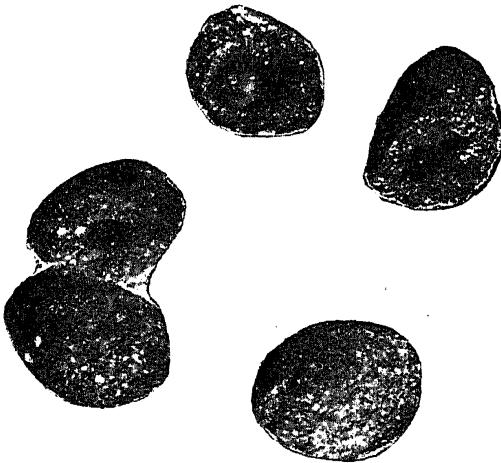


FIG. 1

Photograph of five egg-capsules of *Thyroglobulus malayus*
The cut capsules show the cavity and the egg *in situ*

* According to Attems the genus *Thyropygus* has been restricted and some of the species originally put under it have been transferred to his new genus, *Thyroglobulus*. *Thyropygus malayus* Carl. is now synonymous with *Thyroglobulus malayus* Attems.

The capsule has a very smooth surface on the inside (in contrast to the rough external surface), exhibiting the wonderful workmanship of the animal, that provides a velvety soft surface for the developing embryo. If an egg-capsule is cut transversely in the middle, the egg is seen lying loosely in the cavity which is somewhat oval; the cut surface measures 5 mm. \times 6 mm. The wall of the capsule in this region is 1.5 mm. thick, so that the cavity is really 2 mm. 3 mm. in cross axes. This cavity does not extend right up to the two ends of the capsule but stops short by 2 mm. at each tip. These tips are merely solid portions of earth as can be clearly seen in a median longitudinal section of the capsule. The entire space inside the capsule at the disposal of the developing embryo is more or less ellipsoidal with its axes measuring 5 mm., 3 mm. and 2 mm.

It has been observed in this case that during the process of egg-laying the tail and head ends of the animal are brought nearer to each other by the bending of the body. As soon as the egg emerges out of the vaginal opening it is received by the open valves of the anal ring where part of the inner rectal membrane along with a drop of gelatinous fluid protrudes out through the anus. In some cases egg-capsule like pellet of earth is seen adhering to the gaping anal valves of the female millipede. The egg capsule is shaped

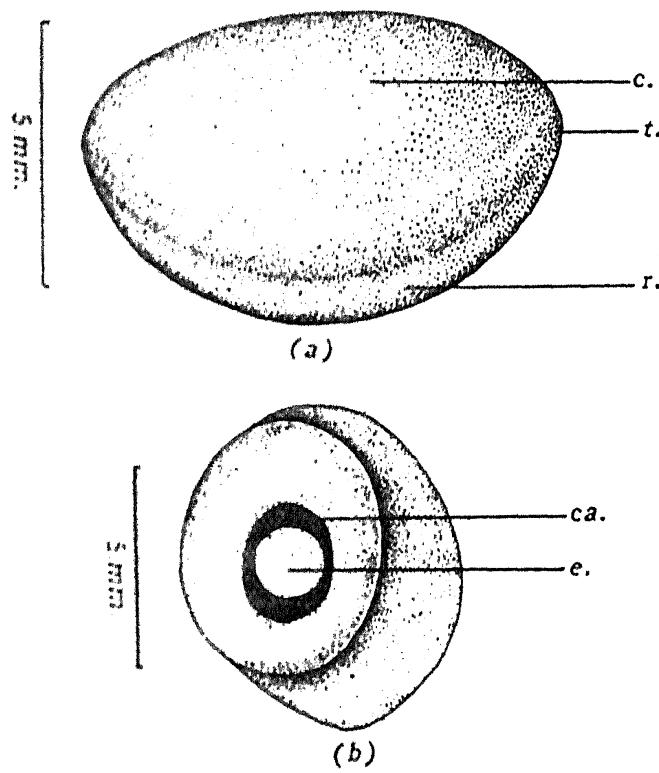


FIG. 2

Diagrammatic sketch of the egg-capsule: (a) entire capsule in latero-ventral view; (b) a capsule cut transversely in the middle to show the cavity and the egg. *c.*, convex outer surface; *ca.*, cavity of the capsule; *e.*, egg; *r.*, rim of the capsule; *t.*, tip of the capsule.

according to the hollow of the anal valves where it is formed by the accumulation of more and more earth. The rim of the capsule is the portion which projects out when the anal valves containing the capsule are pressed together. It has also been noticed that the female millipede spews a large quantity of mucus during the breeding period and this is spread over the capsule while it is being formed and is held in position between the anal valves. This mucus helps in sticking soil on to the external surface of the capsule.

It is difficult to state the exact reasons for the formation of these egg capsules but it is definite that their formation is a physiological necessity as otherwise the eggs shrink and do not develop if even slightly exposed to the air. The capsule further protects the developing embryo from injury due to exposure or attacks of the enemies.

The embryo with its developing appendages is set free by the breaking open of the capsule at one of its tips.

It has also been possible to study the optimum egg-laying period in this millipede. The average temperature and humidity variations during this period are: maximum temperature 85°-95° F.; minimum temperature 62°-73° F.; humidity 65-95%. Observations extending over a period of three years show that the most suitable time of the year for egg-laying in this millipede is middle of September to end of October; but this period may also vary if the monsoon is late or feeble as in India the heat of the summer simply bakes the soil and makes it too dry for these delicate processes to take place.

BIBLIOGRAPHY

Attems, C.	.. "Diplopoda" in Kukenthal's <i>Handbuch der Zoologie</i> , 1926-30, Band 4.
Evans, T. J.	.. "Bionomical observations on some British millipedes," <i>Ann. Mag. and Nat. Hist.</i> , 1910, 6, Series 8.
Verhoeff, K. W.	.. "The egg-capsule of <i>Glomeris</i> ," <i>Zool. Anz.</i> , 1911, 37. .. "43. Aufsatz. Mitteilung, betreffend Okologie, einrollung- sarten und Metamorphosecharakter bei <i>Glomeris</i> ," <i>ibid.</i> , 1910, 36.