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THE REPRODUCTIVE CYCLE OF *ANODONTA CYGNEA* L. FROM MIRA LAGOON (PORTUGAL) (1)

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The freshwater mussel *Anodonta cygnea* is well spread in Portugal.

Neverthless, in this country, nothing is known about its reproductive cycle.

This is the aim of this research work, in which specimens from Mira lagoon were studied. *Anodonta cygnea* is very abundant here.

Mira lagoon is situated in the centre of Portugal, about 4 km far from the sea.

The mean atmospheric temperature (values obtained early in the morning and during the period of work) is 11.6°C and the mean water temperature is 16.6°C.

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(1) This study is included in a program of research of the «Centre of Ecology» of the INIC (Instituto Nacional de Investigação Científica).

Material and methods

Twenty specimens of *Anodonta cygnea* were monthly collected between December 1980 and July 1982.

Each specimen was measured and weighted, the shell was removed and the body was fixed in Bouin solution, after which histological sections were made in order to study the reproductive cycle.

In these histological sections gills and the visceral part of the body were observed.

Having in mind to know how long glochidia are attached on fish, specimens of *Carassius carassius* and *Anodonta cygnea* were placed in 2 aquaria, in the laboratory.

One of these aquaria was at a constant temperature of 20°C, and in the other one, the temperature varied from 15°C to 18°C, being 16.2° the mean temperature.

Results

The animals sacrified for this study had a mean length of 7.98 cm, being 12 cm the maximum size and 4.2 cm the minimum.

Concerning the weight, its mean value was 48.2 gr, being 131.4 g the maximum value and 8.4 g the minimum.

Direct examination of those animals as well as the examination of histological sections were made, and the characteristics observed are the following:

— March, April, May, June — all specimens show very reduced germinal follicles and a slight gametogenic activity, being ripe gametes absent (Fig. 1 — A, B).Glochidia are absent in the mother gills.

— July — Germinal follicles become bigger. Their development is a considerable one, however ripe gametes are not present.

— August — Development of germinal follicles is more evident. Gametogenetic activity is more intense, and large quantities of sperm can be seen (fig. 1 — C, D). In one specimen developing eggs are present in the gills.

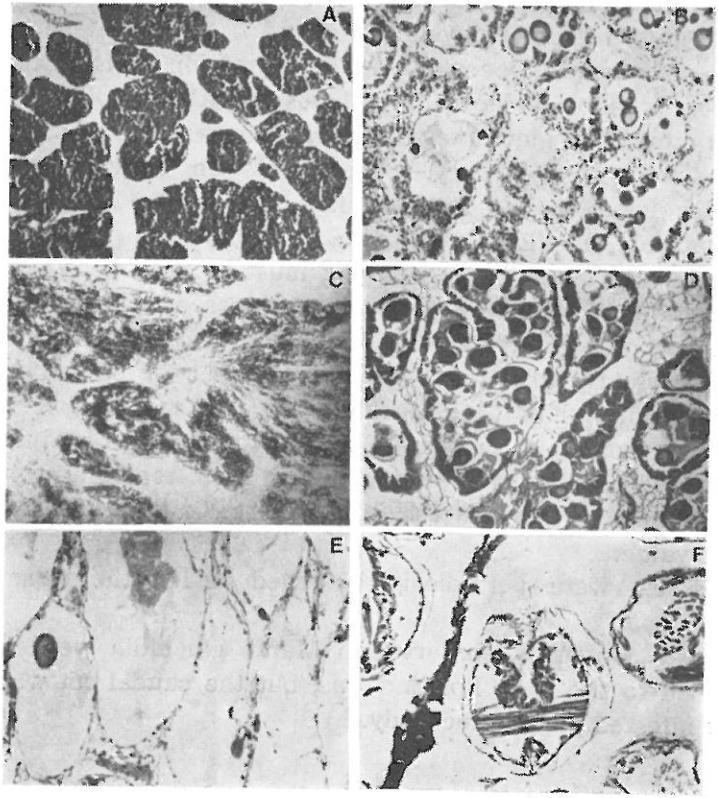

Fig. 1 — Histological sections of germinal follicles and gills in *Anodonta cygnea*.

A — Section showing male germinal follicles in April (70 ×). B — Female germinal follicles, in April (170 ×). C — Male germinal follicles showing large quantities of spermatozoa, in August (170 ×). D — Female germinal follicles showing large quantities of eggs (170 ×). E — Section showing germinal follicles in regression (170 ×). F — Section showing glochidia in the mother gills (170 ×).

— September — Individuals with developing eggs and young larvae in the gills are very abundant. Gametogenesis is very active, eggs and sperm being very abundant in the lumen of the germinal follicles.

— October — There is a regression of the germinal follicles, neverthless gametes are present. Many glochidia are present in the gills, with few developing eggs.

— November, December — The regression of the germinal follicles is more evident, but gametes are still present. A enormous number of glochidia in the gills can be seen (Fig. 1 — F).

— January, February — The regression of the germinal follicles is more and more evident, and scarce gametes are present (Fig. 1 — E).

One can admit that spawning must be very active during this period, because few glochidia can be seen in the gills.

As it was referred, some individuals of *Anodonta cygnea* and *Carassius carassius* were put together in containers, in order to know how long glochidia are attached on fish.

Two containers were used, one of them at a constant temperature of 20°C, and the other one at room temperature. This temperatura varied between 15°C and 18°C, being 16.2°C the mean value.

Fishes were periodicaly observed under the dissecting microscope.

During January, February and March glochidia were found attached to the gills, lips and fins, but the caudal fin was the most infested part of the body.

Conclusions

Concerning the reproductive cycle of *Anodonta cygnea* in Mira lagoon, some conclusions may be formulated:

- Reproductive cycle lasts from July to February, and two phasis can be considered:

— first phase (Summer: July, August, September) — germinal follicles are well developed; there is an intense gametogenetic activity; ripe gametes are present.

— second phase (Autumn/Winter: October, November, December, January, February) — there is a regression of the germinal follicles; ripe gametes are present; glochidia are present in the gills.

- During the other part of the year (March, April, May, June) there is a sexual inactivity, but not complete: germinal follicles and gametogenesis are very reduced being ripe gametes absent.
- These data are in agreement with those reported for populations from lake Trasimeno (GIUSTI *et al.*, 1975) and Po di Tolle (CASTAGNOLO, 1977).
- Concerning the period of glochidia attachment on fish, we can infer, considering field data, that the attachment begins in January because it is in this month that gills are becoming empty. This is in agreement with data obtained in laboratory — we found infestation since January only.

Neverthless, concerning the duration of attachment, our laboratory data are not in agreement with those obtained in Italy, where duration of attachment is longer.

Of course, environmental conditions are very different, specially concerning temperature.

On the other hand fish species tested were not the same.

More studies must be made using lower temperature and another fish species.

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