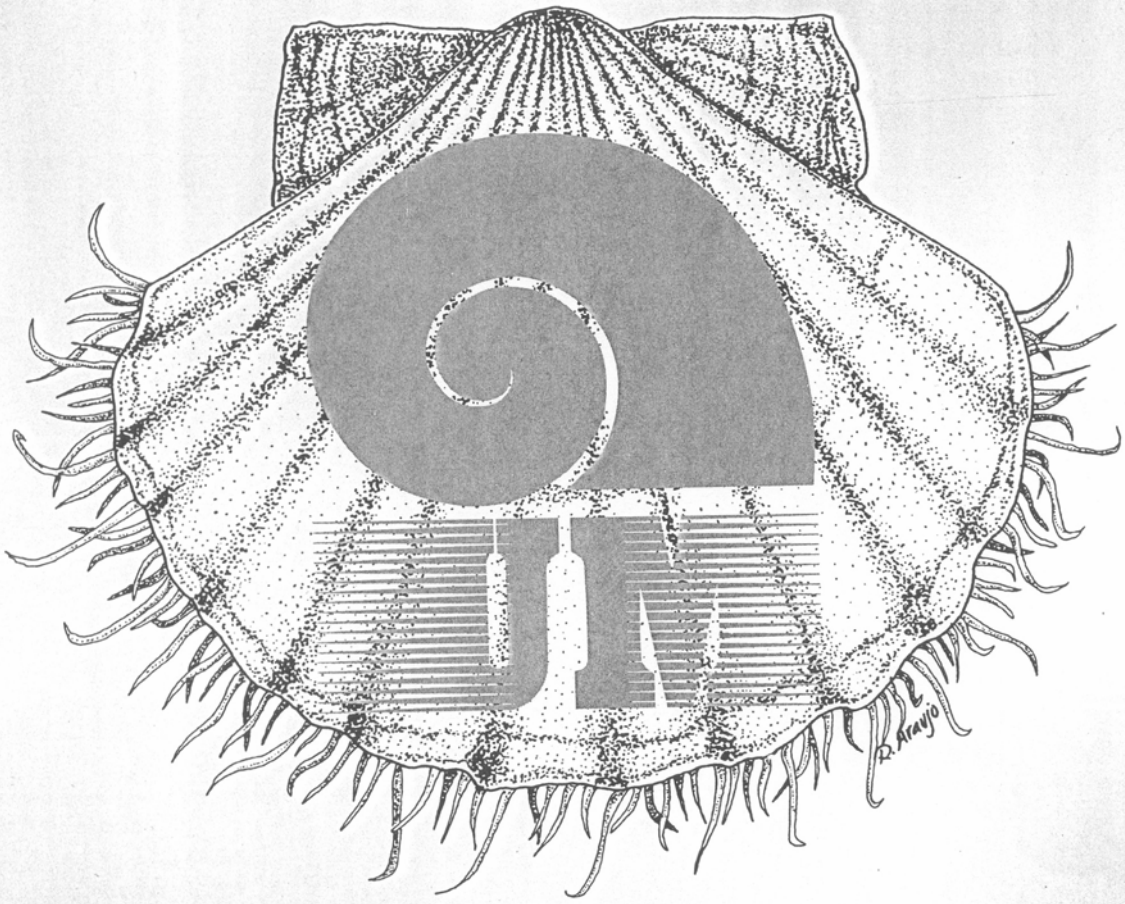
UNITAS MALACOLOGICA



Abstracts

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molluscicide Bayer-73. The TCH of the analyzed species were: *B. glabrata*: 490 ± 192 cls/mm^3, *B. tenagophila.*- 601± 391 cls/mm^3, *B. occidentalis*- 565 ± 151 cls/mm^3. The method of hemolymph extraction showed variation in *B. glabrata:* cardiac puncture: 771 ± 71 cls/mm^3 foot rettraction: 606 ± 41 cls/mm^3. Temperature and exposure to sublethal concentration of Bayer-73 also caused variation of hemocytes in the hemolymph. The morphological study of the hemocitic types revealed three categories of cells: granulocytes, hialinocytes and round-cells. The DHC showed that the granulocytes are the most numerous cells in the hemolymph of the *Biomphalaria* species studied: *B. glabrata.* 73.4%, *B. tenagophila.* 73.3% and *B. occidentalis;* 65.1%.

STUDIES ON EXPERIMENTAL INFECTION BY *Dicrocoelium dendriticum* (TREMATODA) OF *Cernuella (Xeromagna) cespitum arigonis* (MOLLUSCA) SPECIMENS IN A NATURAL ENVIRONMENT

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In order to understand the epidemiology of dicroceliosis in Spain, we have done studies on the transmission of *Dicrocoelium dendriticum* (Rudolphi, 1819) Loos 1899, the hepatic trematode responsable for this parasitic disease, in the province of León (NW Spain) in sheep and cattle (definitive hosts), molluscs (first intermediate hosts) and ants (second intermediate hosts). We were able to confirm that *Cemuella (Xeromagna) cespitum arigonis* (Schmidt, 1853) (Mollusca, Pulmonata) is an abundant and widely distributed species in our province (Manga-González, 1983). Moreover, this mollusc species acts as first intermediate host for *D. dendriticum* in nature (Manga-González, 1992) and under laboratory conditions (González-Lanza, 1994), so it plays an important role in the epidemiology of dicroceliosis. Because of this, for the interpretation of data obtained in the field, we began several studies on *D. dendriticum* larval development in *Cemuella (X.) cespitum arigonis* specimens infected in the laboratory and kept in a natural environment.

Between October 1992 and October 1994, 24 experiments were carried out using 200 *Cernuella (X.) cespitum arigonis* specimens in each one. After 3 days without food, 150 molluscs were tested with an individual dose of 50 eggs of *D. dendriticum*. After 48 hours in contact with contaminated food, these molluscs and 50 control specimens were moved to lots measuring 75 x 50 x 60 cm, enclosed with thin metal fabric, located on a piece of fenced-in irrigated sown sward on the CSIC experimental farm. This is situated on a plain, at 800 m altitude, about 10 Km to the south of León and has a continental climate within the Mediterranean-Atlantic transition. The weather information used in this study was obtained from the meteorological observatory nearest to the farm. In order to detect the parasite in the molluscs by the stereomicroscope and be able to follow its

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larval development with the microscope, the snails were sacrified periodically from the 2nd post-infection (p.i.) month, according to our previous experiments done in the laboratory. As far as the development degree of the parasites found is concerned, three levels were considered: 1/ sporocysts with non-evolved germinal mass; 2/ sporocysts with germinal mass starting to differ or with very immature cercariae; 3/ sporocysts with evolved cercariae.

From the 24 experiments carried out, infected molluscs were only observed in 14 of them. The minimum post-infection period necessary to detect the parasites in the molluscs for the first time, was 2 months in the experiments begun in June 1993 (Fig. l) and June and July 1994, although the maximum period was 9 months in the experiment begun in Octuber 1992. In general, the parasites detected for the first time in the 14 positive experiments were at one or more spots in the mollusc hepatopancreas and consisted of daughter sporocysts with non-evolved germinal mass. Daughter sporocysts with well developed cercariae (but not mature) were only found in the molluscs of the experiments begun from February to May. The shortest period for their observation was 6 moths p.i. Due to the fact that the experiments carried out from June to October 1994 are still going on, these results could be modified. According to our data, it seems that high temperatura (Fig. l) helps *D. dendriticum* larval development.

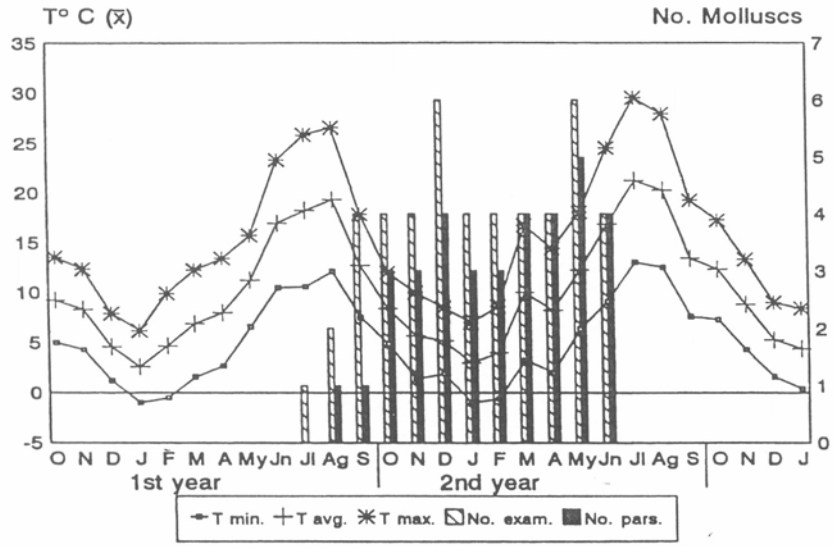

Fig. 1. June 1993 experiment.

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COMPUTER ASSISTED 3-D RECONSTRUCTION TECHNIQUES MAY PROVIDE NEW INSIGHTS INTO THE PATTERN OF HISTOLOGICAL ORGANISATION OF THE BIVALVIAN DIGESTIVE GLAND

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The digestive gland of molluscs is an important organ of extra and intracellular digestion characterised by its high plasticity. This plasticity allows a great adaptability to any changes in enviromental conditions. The current model about the organisation of the digestive gland in bivalve was suggested in the eighties on the basis of classical records. The model describes the digestive gland like a series of blind-ending tubules communicating with the stomach by a sequence of branching ducts. Since this structural model of the digestive gland is not fully adequate to explain properly the processes of food digestion, xenobiotic detoxification and response to enviromental changes, which are its main functions, we have attempted to elaborate an alternative model by means of computer-assisted 3D reconstruction of serial sections of the digestive gland.

The digestive gland of mussels, *Mytilus galloprovincialis* Lmk. was excised and processed for histological examination. Serial paraffin sections (7 μm) were stained with haematoxylin eosin. Digestive diverticula (35-40) related with a given digestive duct were drawn from each section at 330x magnification with the aid of a drawing tube attached onto a light microsccpe. Projections were introduced into the 3D reconstruction system by means of a digitiser. The 3D images were then automatically formed by triangulation between successive projections for each introduced object. The same method was used to reconstruct the communicaton of the branching ducts with the stomach.

A 3D-model of the "plastic digestiva sac" has been attained and the distribution of basophilic cells and digestion phases in this digestive sac have been determined. In addition, the branching pattern of the digestive ducts from the stomach to the digestive diverticula has been reconstructed. Although our results are preliminary, if the model hypothesised is confirned many assumptions concerning feeding and digestion in bivalves should be revisited and interpreted again.

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