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REPRODUCTIVE SYSTEM OF *LIGHTIELLA MAGDALENINA* (CRUSTACEA, CEPHALOCARIDA)

APPARATO RIPRODUTTORE IN LIGHTIELLA MAGDALENINA *(CRUSTACEA, CHEFALOCARIDA)*

Abstract *- The aim of this study was to describe the morphology of the reproductive system of* Lightiella magdalenina *the only cefalocarid species known from Europe. Two adult specimens and one larval stage of* L. magdalenina *were analysed with light microscope and findings compared with available data from* H. macracantha.

Key-words: *Cephalocarida, reproductive system, sperms, oocytes.*

Introduction - Cephalocarids exhibit several specialized traits in their reproductive biology. The well known cephalocarid species, *Hutchinsoniella macracantha,* is a hermaphrodite (possibly adopting self-fertilization) with entirely separate and functionally independent ovaries and testes (Hessler *et al.,* 1995). Two eggs are reported to be laid in *Hutchinsoniella macracantha.* whereas two eggs seem to be laid only occasionally by *Lightiella* species. One egg is also present in the unique ovigerous adult reported for *Lightiella magdalenina* (Carcupino *et al.,* 2006; Addis *et al.,* 2007). Moreover, in *L. incisa* the single ovisac appears at the opposite side of the only developed ovary (Sanders & Hessler, 1964). The aim of this paper was to describe the morphology of the female reproductive system in the *Lightiella magdalenina,* in order to verify whether the unique laid egg is either related to a different degree of development of the ovaries or an asynchronous development of the oocytes, in the right and left sides of the reproductive system.

Materials and methods - Adult and larval specimens of *L. magdalenina* were collected (May to July 2010), from a muddy sand bottom rich in organic matter on La Maddalena Archipelago. Specimens were fixed in Bouin's fixative, dehydrated in a graded ethanol series, cleared in Bioclear and finally embedded in paraffin. Sections (5 μm) were stained with Mallory's trichrome for morphology analysis with light microscope.

Results - In both adult and larval specimens, the female reproductive system consisted of two nearly round ovaries localized inside the cephalon in medio-ventral position, between second maxilla and first thoracic segments. In dorsal view, each ovary has a diameter of about 30 μm. At the postero-medial margin, each ovary continued with a long oviduct, which ran posteriorly through thorax and abdomen. At level of the trunk segment 18, the oviduct looped and went back up to the thoracic segment 6, where it joined the *vas deferens.* Along the entire length of each oviduct, oocytes at different developmental stage were visible. However, in both adult specimens observed, a single mature egg was recognizable inside the upward portion of the right oviduct (Fig. 1).

Conclusions - The female reproductive system of hermaphrodite *L. magdalenina* exhibit similar morpho-functional patterns in comparison with *H. macracantha,* since two well developed ovaries occur showing oocytes in different developmental

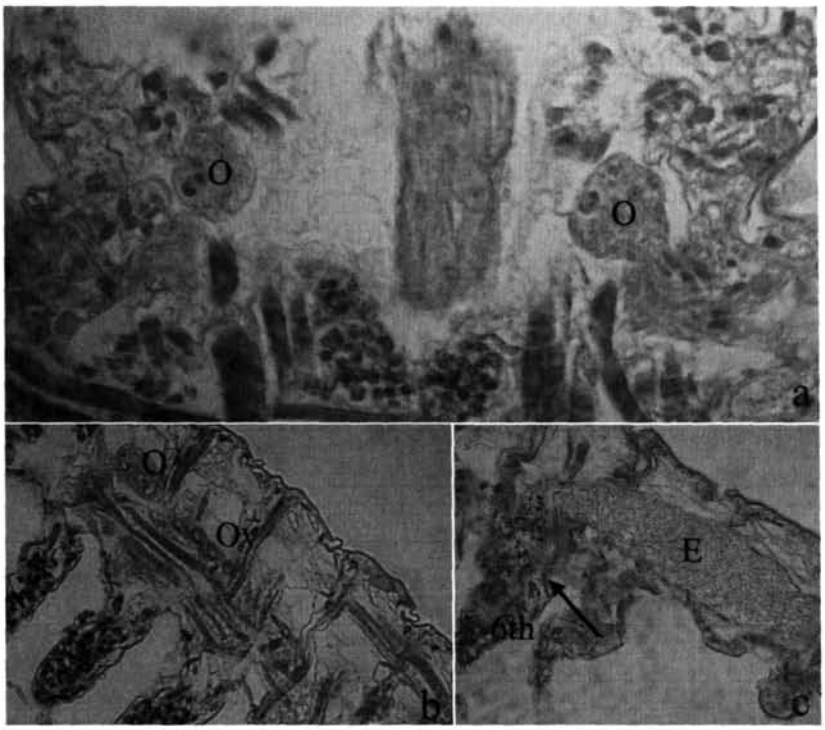

Fig. 1 - Ovaries (O) ×470 (a); ovary (O) and oocytes (Ov) in early stage of vitellogenesis ×220 (b); 6th thoracopod (6th), sperms (arrow) and mature egg (E) ×170 (c).

Ovari (O) ×470 (a); ovario (O) e ovociti (Ov) nei primi stadi di vitellogenesi ×220 (b); 6ª appendice toracica (6th), spermatozoi (freccia) e uovo maturo (E) ×170 (c).

stages inside the oviduct of both side. However, *L. magdalenina* shows mature eggs inside a single oviduct. These preliminar data seem to support the hypothesis that in *Lightiella* species an asynchronous development of the oocytes occur, producing a single ovisac in each reproductive event.

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