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Life cycle of *Pisidium henslowanum* (Sheppard, 1823) (Bivalvia, Veneroida, Sphaeriidae) from Piediluco Lake (Umbria, Italy)

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With 3 figures and 1 table

Abstract: This paper describes the life cycle of *Pisidium henslowanum* living in Lake Piediluco (southwestern Umbria, Italy). Morphological and histological analysis of samples taken monthly over a period of two years (February 1993 – February 1995) allowed us to follow the annual changes in the gonad tissues, and to ascertain that the species is fertile for most of the year with two peak periods, which occur in July and November, when there is massive gamete release. A short period of non-fertilization takes place in January and February when few spermatozoa occur and no ova are produced. Through the monitoring of the ontogenetic stages of *P. henslowanum* in Lake Piediluco, it was possible to determine the average life span of two distinct generations per year to be 12–14 months for the main one (winter generation) and 14–16 months for the subsidiary one (summer generation). The population is semelparous and bivoltine, with hatchings in late spring and late autumn. Self-fertilization was documented in many specimens, since a large number of free spermatozoa and ova were observed within the female follicles.

Key words: freshwater molluscs, Bivalvia, Veneroida, Sphaeriidae, *Pisidium henslowanum,* reproduction, gametogenesis, Lake Piediluco, Umbria, Mediterranean area, Italy.

Introduction

The genus *Pisidium* Pfeiffer, 1821 belongs to the family Sphaeriidae, together with the genera *Byssanodonta* d'Orbigny, 1846*, Eupera* Bourguignat, 1854*, Sphaerium* Scopoli, 1777 and *Musculium* Link, 1807.

The life history and the reproductive strategies of *Pisidium,* found in a large variety of environments, have been extensively reviewed since the early 1920s (Thiel 1928, Odhner 1929) until nowadays (Araujo et al. 1999, Guralnick 2004, Mouthon 2005, Sousa et al. 2008).

More specifically Odhner (1929), Mitropol'skii (1970), Holopainen (1979) and Holopainen & Jónasson (1983, 1989) performed some direct observations regarding the life cycle of *Pisidium henslowanum*.

Sphaeriidae are hermaphroditic bivalves. According to Coe (1943a), they are normally functional ambisexuals even though they tend to be slightly protandrous. The simultaneous release of ova and spermatozoa may result in self-fertilization in the reproductive ducts as first discovered by Stepanoff (1865).

The gonad of *Pisidium* is located posteriorly, between the abductor muscle and the rectum. It consists of distinctly separated female and male regions connected with a couple of hermaphroditic ducts, which open into the supra-branchial chamber via gonopores. This organization of the gonad corresponds to the 3rd morphological type of the Pelseneer (1895) classification. Cytologically the gonad belongs to the second type according to Coe (1943b), being 'composed almost entirely of gonia, with only minute follicle cells',

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