

SPAWING INDUCTION, FERTILIZATION AND LARVAL DEVELOPMENT OF *HEDISTE DIVERSICOLOR* (NEREIDIDAE, POLYCHAETA) UNDER DIFFERENT EXPERIMENTAL CONDITIONS

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Abstract

A suite of experiments with the polychaete *Hediste diversicolor* were performed to assess the induction of gamete spawning by endogenous substances, to evaluate the percentage of fertilised and hatching eggs in two different conditions ("natural" and *in vitro* fertilization), and to measure the density effects on larval growth and survival. The results showed that mature females were induced to spawn by adding mature male tissue homogenate in the medium. The percentages of fertilised and hatching eggs were higher in the *in vitro* fertilisation and larval/juvenile survival was affected by density.

Keywords: *Polychaeta, Larvae, Reproduction*

Introduction

The ragworm *Hediste diversicolor* is a polychaete belonging to the Nereididae family which is used and appreciated as commercial bait for fishing [1]. This gonochoric species has a holobenthonic life-cycle and can be easily reproduced in laboratory conditions [2]. A series of laboratory experiments were performed to standardize a number of biological parameters to be included in rearing technical procedures.

Materials and Methods

The influence of endogenous substances on gamete spawning was evaluated in sw aquaria at 16 psu and 16°C, where individual mature females and males were separately exposed to homogenates made up with whole mature organisms, male and female respectively, up to one week.

To evaluate the influence of different fertilisation conditions ("natural" and *in vitro*) on the percentage of fertilised and hatching eggs two types of experiments were performed. In the first one pools of mature female and male organisms were introduced in aquaria with glass tubes on the bottom reproducing the natural burrows within which the whole organism life-span occurs. In the second type of experiments, naturally spawned eggs were fertilised *in vitro* with a sperm suspension obtained from mature males. The fertilisation occurred in a becker containing 0.5L of filtered (0.2 µm) sw at 16 psu and 16°C. For both experiments, 6 replicates of 100 eggs were collected and the larval development was followed until nectochaete hatching.

To test the influence of density on the development and survival of nectochaetes the following experiment was performed. The sw aquaria (16 psu and 16°C) were provided with biological filters and 2 cm of fine sand sediments. Groups of ten-days nectochaetes were established in order to obtain two experimental densities: 5200 ind/m² (3 replicates) and 10400 ind/m² (2 replicates). Organisms were fed *ad libitum* using commercial fish feed (classic C22, Hendrix) three times a week for 8 weeks. Survival and growth rate were checked at the end of the experiment.

Results and Discussion

The results of the spawning experiments showed that the percentage of spawned animals, determined at the end of the experimental period, was significantly higher than in the controls only for females (57% vs 14%), indicating preliminarily that mature females were susceptible to spawning induction by a likely mixture of not determined endogenous compounds.

The results of the fertilisation experiments showed that the percentages of fertilised (64-91%) and hatching eggs (46-88%) obtained from the "natural" fertilisation experiment were always lower than the ones from the *in vitro* fertilisation, when the values ranged from 94-100% (fertilised eggs) and 94-99% (hatching eggs). This may be tentatively explained by a safer microbiological condition of the medium in the second experiment, as suggested by the observed minor number of swimming protozoa.

The growth rates of nectochaete maintained at two densities showed similar values, and juveniles reached a mean fresh weight of 30 mg in 8 weeks. On the contrary, density affected the mortality rates of nectochaetes and juveniles, survival resulting in the ranges of 57-81% and 53-57 % at low and high density, respectively.

References

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