# Larval 2006
# 7th Larval Biology Symposium

# Program and Abstracts

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Sponsor: Oregon Institute of Marine Biology,
University of Oregon

Venue: Southwestern Oregon Community College


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**DO MATERNAL EFFECTS CONTRIBUTE TO FLUCTUATIONS IN RECRUITMENT?**

Recruitment of most marine organisms is notoriously variable, and there has been a long battle to explain the causes of this variation. Considerable recent attention has been paid to larval supply and more recently, larval production, as it is influenced by fertilization kinetics as drivers of recruitment. Recognition of the extent of maternal effects on offspring quality suggests another potentially important contributor. A link between maternal effects and recruitment could occur if offspring quality varies temporally, such that times of high quality generate recruitment peaks, or spatial variation could lead to populations with high quality offspring contributing disproportionately to recruitment. Alternatively, varying post-settlement environments could modify the contribution of high quality offspring to the pool of recruits. Testing this hypothesis requires systematic examination of sources of variation in offspring quality and the nature of post-settlement filters, with simultaneous estimation of recruitment success. We review available data, and present new results to test this hypothesis using the bryozoan *Watersipora subtorquata*.

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**HISTOLOGICAL AND ULTRASTRUCTURAL DESCRIPTIONS OF THE PSEUDOCYPHONAUTES LARVAE OF *FLUSTRELLIDRA HISPIDA* (BRYOZOA: CTENOSTOMATA).**

*Flustrellidra hispida* (Fabricius, 1780) broods lecitotrophic shelled larvae called "pseudocyphonautes". Such larva is present only in a few species of gymnolaemate bryozoans. Here we provide the new data on its histology and ultrastructure. The pseudocyphonautes larvae of *Flustrellidra hispida* possess an elongated transparent bivalve shell 198-350x500-620 um in size. Unlike the cyphonautes, shell valves are lined by a simple squamous nonciliated epithelium. Larval epithelial cells have different ultrastructure, some of them resemble blastemal cells and may correspond to the polypide or cystide rudiment of the ancestrula as it is in unshelled pseudocyphonautes larva of Alcyonidium polyoum. The apical organ comprises of nervous, ciliated and undifferentiated cells, but no blastemas were found. Corona consists of at least two cell types: locomotory multiciliate cells and primary sensory cells. The rudimentary gut consists of blind-closed oesophagus. Revealed anterior and posterior chambers correspond to inchalant and exchalant chambers of the filter-feeding system of the cyphonautes. Anterior chamber epithelium has no cilia, posterior chamber is lined by ciliated epithelium. At the border with coronal cells epithelium forms papillas with ciliary tufts, especially at the region of the ciliated cleft of pyriform organ. All epithelial cells comprising the corona and the outer larval surface between the valves and the oral pole have apical surfaces with long branched microvilli. According of this investigation the pseudocyphonautes larvae of *Flustrellidra hispida* is morphologically similar to unshelled pseudocyphonautes larvae of some ctenostomate bryozoans, but differ from them by an arrangement of blastemal cells.

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**EVOLUTION OF NON-FEEDING DEVELOPMENT IN THE SEA SLUG GENUS *ELYSIA*: CONSEQUENCES FOR CARIBBEAN POPULATION CONNECTIVITY**

A major goal of larval biology is to elucidate the selective forces behind, and biochemical mechanisms of, transitions to non-feeding development. Changes from planktotrophy to pelagic lecithotrophy or benthic development have occurred numerous times in the genus *Elysia* (Opisthobranchia: Sacoglossa), sea slugs coevolved with obligate algal hosts. We present a partial molecular phylogeny of the genus, emphasizing Caribbean species that show a diversity of development modes. Preliminary results indicate at least 4 independent origins of non-feeding development accompanied by increased maternal allocation of extra-zygotic yolk (EZY). Additional EZY reserves allow larvae to hatch at a larger size from a smaller egg than is otherwise possible. A further 2 origins of benthic development resulted from increased egg size without EZY. Phylogeography of Caribbean species with dispersing larvae versus benthic development was then compared. Planktotrophic species exhibited gene flow across large distances, whereas species with lecithotrophic or benthic development had highly structured populations. Genetic data suggest populations declined during Pleistocene sea level fluctuations, after which many sites were re-colonized from refugia in the southwestern Caribbean, which retain considerable ancestral polymorphism. The northern Bahamas experienced a bottleneck but harbors divergent clades in two sacoglossans, similar to results for a shallow-water fish. Planktotrophic species may have evaded local extinctions during rapid climate change and retained polymorphism that was widely lost in species with reduced dispersal potential. Patterns of intraspecific divergence and clade survivorship are thus strongly affected by larval dispersal, in turn affected by maternal investment in EZY and egg size.