

## **Variability in duration and intensity of euphausiid spawning off central Oregon, 1996-2001.**

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*Euphausia pacifica* and *Thysanoessa spinifera* are the two most common species of euphausiid found in the shelf waters off the coast of Oregon, USA. Their larvae comprise 99% of those that we find at our shelf stations discussed in this paper.

A few studies were reported interannual variability in the timing and magnitude of the spawning seasons. There are some problems; 1) Due to the high degree of interannual variability, data of one or two seasons are difficult to compare because it is not known how representative they are of standard patterns and variability in regions. 2) Most of these studies did not directly sample the eggs of these euphausiids (Smiles & Percy, 1971; Cooney, 1971; Heath, 1977; Bollens et al., 1992; Tanasichuk, 1998).

This paper focuses on the spawning of *Euphausia pacifica* and *Thysanoessa spinifera*. It describes the timing, duration and characteristics of these events for a six-year period from 1996 through 2001, in relation to coastal upwelling events, phytoplankton blooms. We present data on egg and nauplii densities along with chlorophyll a and temperature between May of 1996 and December of 2001.

We tracked the duration and intensity of the euphausiid spawning season through biweekly sampling along a transect off Newport, OR (latitude 44°40'N) over a six year period from 1996 to 2001. Our sampling consisted of vertical plankton tows, CTD casts, and collection of water for determination of chlorophyll a. We report on data collected from two stations, 5 and 15 nautical miles (9.3 and 27.8km) offshore.

The density of euphausiid eggs in our samples was highly variable spatially and temporally; we saw the most striking differences in egg densities and length of the spawning season. The years 1996 and 1997 were characterized by one large, late summer peak in egg density at our inshore station(NH05). 1998, an El Niño year, followed this pattern for our offshore station(NH15), but eggs were nearly absent at our inshore station(NH05). Starting in 1999, we saw multiple peaks in egg density and found that the spawning season extended from spring through early fall. Peaks in egg densities were often associated with phytoplankton blooms, but not in a predictable way. Peaks in egg densities often followed cold-water upwelling events, especially at the inshore station. It is not yet clear whether this connection is due to changes in advection or changes in upwelling-induced productivity.

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