

## ***Crossota millsae* (Cnidaria: Trachymedusae: Rhopalonematidae), a new species of viviparous hydromedusa from the deep sea off California and Hawaii**

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### **Abstract**

A new species of deep-sea jellyfish, *Crossota millsae* (Cnidaria: Hydrozoa: Trachymedusae: Rhopalonematidae), is described from the North Pacific Ocean off California and Hawaii. Discrete depth sampling showed this species lives at depths below 1000 meters in both geographic locations. The species is more abundant off California than off Hawaii. The greatest population densities were found at ~2500 m off California and at ~1250 m off Hawaii. The burnt-tangerine color of the inner bell and bright pink to lavender color of the ring and radial canals, manubrium and gonads make living specimens of this species difficult to confuse with any other known species of hydromedusa. Sexually dimorphic differences in gonad morphology are evident. The pendant testes contained spermatids at various stages of spermatogenesis as observed using scanning electron microscopy. Ova develop directly into small medusae that reside subumbrellarly between the radial canals of the mother. Various developmental stages of *C. millsae* are shown in photographs and terminology of brooding and viviparity is discussed relative to other Cnidaria.

**Key words:** Cnidaria, Hydrozoa, Coelenterata, *Crossota*, gelatinous zooplankton, reproductive biology, vertical distribution, bathypelagic jellyfish

### **Introduction**

Brooding and viviparity by deep-sea animals are considered to be adaptations to the scarce resources of the deep sea, and these strategies have evolved in many different types of animals, including bivalves, crustaceans, chaetognaths, polychaete worms and cnidarians (*cf.*, Gage & Tyler 1991; Young 2003). For medusae, it is difficult to view extended parental care of young strictly as a “deep-sea adaptation”, because many kinds of cnidarians, including tropical corals and intertidal anemones, are known to harbour their young after fertilization or brood asexually produced juveniles. The well-known plasticity of cnidarian