**Carinoma mutabilis**

A ribbon worm

**Phylum: Nemertea**
**Class: Palaeonemertea**
**Order:**
**Family: Carinomidae**

**Taxonomy:** Originally described as *Carinoma griffini* by Griffin (1898), this species was re-described by Coe (1904) as *Carinoma mutabilis*. Initially, two varieties were described (*C. mutabilis argillina* and *C. mutabilis vasculosa*) based on size and degree of muscle development but these differences were determined to be intraspecific variation (Gibson 1995).

**Description**

**Size:** Great size variation is reported for this species, from 2.5 to 50 cm, although few are over 20 cm on the California coast. The largest width is 3–5 mm with average sizes much less (Coe 1901, 1905; Kozloff 1974). Specimens are approximately 14 cm in length and 1 mm in width when preserved (Griffin 1898).

**Color:** Homogeneous (no variation dorso-ventrally). Anterior and head milk white, not translucent, sometimes with brownish mottling (Coe 1901). Intestinal region cream or brownish where internal organs show as transverse dark lines. Males dark yellow or orange, females reddish (Griffin 1898; Kozloff 1974) (Fig. 1). Posterior-most region white (Griffin 1898).

**General Morphology:** Soft, elongate (but not stretchy) non-segmented (phylum Nemertea).

**Body:** Thickened and rounded anteriorly, slightly compressed dorso-ventrally from behind head and very flattened posteriorly (Fig. 1). Individuals tend to coil from the sides posteriorly (Coe 1905).

**Anterior:** Anterior shape changes constantly and can be rounded or elongate. Head is wider than neck and not distinctly marked from the body (Coe 1901). When crawling, head is narrower than body with slight narrowing at neck (Griffin 1898). No cephalic grooves (order Paleonemertea).

**Trunk:**

**Posterior:** No caudal cirrus.

**Eyes/Eyespots:** No ocelli.

**Mouth:** Just behind brain (class Anopla).

**Proboscis:** Eversible (phylum Nemertea) and, when not everted, coiled inside rynchocoel (cavity). No stylets and proboscis pore (opening to rynchocoel) almost terminal.

**Tube/Burrow:** Individuals are commonly surrounded by thin sandy mucous tube and worms are happiest in the lab if allowed to burrow in sand.

**Possible Misidentifications**

The Genus *Carinoma* is small and comprises seven described species worldwide including (Gibson 1995): *C. patagonia*, intertidal from southern Chile (Magellan Straits); *C. patriciae*, an Australian species found in silty sand, mud and shell mix; *C. tremaphoros*, intertidal and sublittoral in sand and mud from the Atlantic and Gulf coasts; *C. hamanako* occurs in sand and mudflats near Honshu, Japan (Kajihara et al. 2011); *C. armandi* occurs in the low intertidal and is found among polychaete tubes in the British Isles; *C. crabica* from the Venezuelan coast in Curaçao (Gibson 1995).

*C. mutabilis* is believed to be the only carinomid species on the Pacific coast, but research suggests that there are likely at least four other species in the genus *Carinoma* in Coos Bay, alone (2008-2014, T. Hiebert and S. Maslakova, unpublished).
1. *Carinoma mutabilis* (L:27cm) x3:
   - head changes shape constantly; no ocelli or cephalic grooves;
   - internal organs show as transverse lines; body thickened anteriorly,
   - flattened posteriorly, coiled (Coe, 1940).
these five species based on morphology alone is currently very challenging.

One local heteronemertean, which might cause confusion is *Baseodiscus punnettii* which has many very minute eyespots, and slight, oblique cephalic grooves. Although both species flatten posteriorly, they can be differentiated from one another by the fact that *B. punnettii* can retract its head and *Carinoma* cannot. Other palaeonemerteans that are superficially similar to *C. mutabilis* are *Carinomella lactea* and *Tubulanus pellucidus*. They by possess lateral or cerebral sensory organs (Roe et al. 2007).

It is sometimes very difficult to distinguish among nemertean without dissecting them because many identifying characteristics are internal and not visible. Ways in which the worms flatten, contract, and coil are useful as aids to identification of live specimens.

**Ecological Information**

**Range:** Described by Griffin from specimens collected in Puget Sound, Washington (Griffin 1898). Known range includes the pacific coast of North America, from British Columbia to Gulf of California (Gibson 1995).

**Local Distribution:** Coos Bay sites include South Slough, Pony Slough and North Spit.

**Habitat:** Most commonly encountered in sand and sandy mud. Also found in clay (Haderlie 1975) and amongst wharf pilings (Griffin 1898).

**Salinity:** Estuarine.

**Temperature:** Latitudinal range would indicate a wide temperature tolerance.

**Tidal Level:** Intertidal and below (to 40 m) (Corrêa 1964).

**Associates:**

**Abundance:** Regularly encountered in South Slough, common in San Pedro Harbor, California but less abundant in San Diego, California (Coe 1905).

**Life-History Information**

**Reproduction:** Sexually mature in August (California and Puget Sound, Coe 1901, 1905). Dioecious (separate sexes), with many gametes released at once. Fertilization occurs in the water column. Development has been described for *C. tremaphorus* where eggs are 90–110 µm and surrounded by a chorion (Maslakova et al. 2004a, 2004b). *Carinoma mutabilis* larvae from ripe adults collected in January and February (Friday Harbor, WA) have been reared in the lab and the development of their protonephridia documented (Bartolomeaeus et al. 2014).

**Larva:** Planktonic larvae of *C. tremaphorus* are uniformly ciliated, possess both apical tuft and posterior cirrus and are 150 µm in length (Coe 1943; Maslakova et al. 2004a, 2004b). Larvae of the genus *Carinoma* are distinct in having a single, mid-ventral eye that is anterior to the mouth (Norenburg and Stricker 2002; Maslakova et al. 2004a, 2004b; Bartolomeaeus et al. 2014).

**Juvenile:**

**Longevity:**

**Growth Rate:**

**Food:** A predator, *C. mutabilis* captures prey with its sticky, eversible proboscis.

**Predators:**

**Behavior:**

**Bibliography**


Updated 2014

T.C. Hiebert