Cancer oregonensis

The Oregon *Cancer* crab

Phylum: Arthropoda, Crustacea

Class: Multicrustacea, Malacostraca, Eumalacostraca

Order: Eucarida, Decapoda, Pleocyemata, Brachyura, Eubrachyura, Heterotremata

Family: Cancroidea, Cancridae

Taxonomy: Several synonyms are listed for the species *Cancer oregonensis* (e.g. *Platycarcinus recurvidens, Trichocarcinus walkeri, Trichocera oregonensis*), but the most recent taxonomic debate involves the placement of this species in the recently elevated genus, *Glebocarcinus* (Schweitzer and Feldmann 2000). Molecular work does not always support the monophyly of cancrid genera (Harrison and Crespi 1999) and although many researchers have switched to the name *Glebocarcinus oregonensis* (e.g. Wicksten 2011), we follow the most current local intertidal guide that retains the name *Cancer oregonensis* (Kuris et al. 2007).

Description

Size: Individuals are usually not over 40 mm wide (Kozloff 1993). Large females are 47.1 mm wide and 36.5 mm long (Rathbun 1930). The illustrated (Fig. 1) specimen is 15 mm wide and 11 mm long.

Color: Carapace reddish dorsally, sometimes red, orange or yellow pigment spots or bands, and flesh-colored ventrally. Walking legs (perepods) with dark red to black cheliped tips and can have bands of light color or red spots. There is considerable variation in color from yellow to orange with carapaces that are sometimes gray (Jensen 1995; Wicksten 2011).

General Morphology: The body of decapod crustaceans can be divided into the **cephalothorax** (fused head and thorax) and **abdomen**. They have a large plate-like carapace dorsally, beneath which are five pairs of thoracic appendages (see **chelipeds** and **pereopods**) and three pairs of maxillipeds (see **mouthparts**). The abdomen and associated appendages are reduced and folded ventrally (Decapoda, Kuris et al. 2007).

Cephalothorax:

Eyes: Eye stocks short.

Antenna: Antennules folded lengthwise (Fig. 3) bear short, hairy flagella.

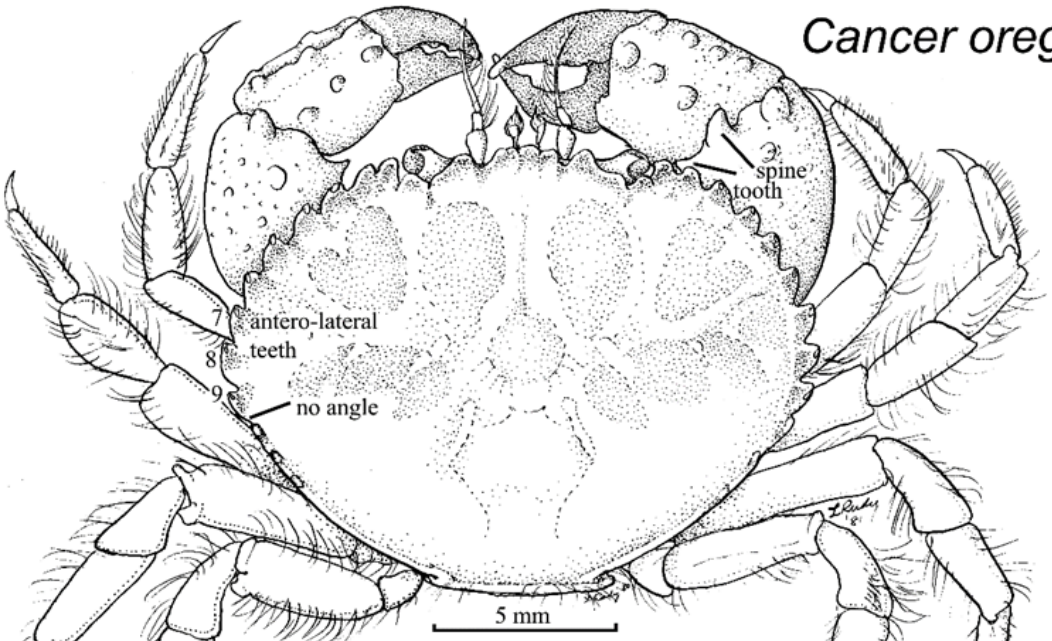
Mouthparts: The mouth of decapod crustaceans is comprised of six pairs of appendages including one pair of mandibles (on either side of the mouth), two pairs of maxillae and three pairs of maxillipeds. The maxillae and maxillipeds attach posterior to the mouth and extend to cover it and the mandibles (Ruppert et al. 2004). The outer maxillipeds in *C. oregonensis* have with merus at antero-external angle (Fig. 2).

Carapace: Broadly oval, subelliptical (Rathbun 1930), widest at teeth 7–8 and aerolated. Anterior-lateral and posterior-lateral margins do not form a distinct angle (*C. oregonensis*, Rathbun 1930; Garth and Abbott 1980). Postero-lateral margin unbroken, entire and without teeth. Antero-lateral and postero-lateral margins meet without strong angle (Fig. 1). A characteristic that separates the (proposed) genus *Gleobcarcinus* from other cancrid genera is a rounded carapace with length ¾ maximum width, as seen in *C. oregonensis* (Schweitzer and Feldmann 2000; Schram and Ng 2012).

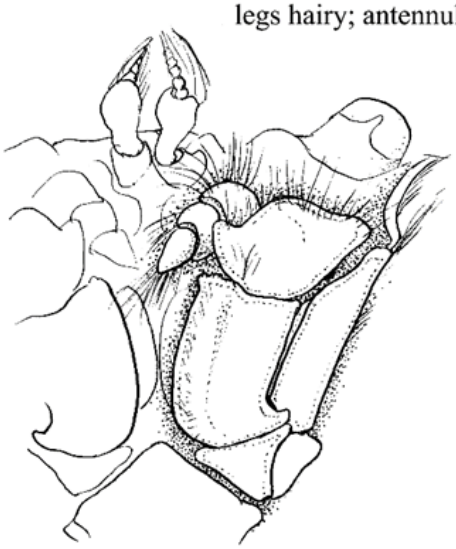
Frontal Area: Wide frontal area (about 1/2 width of carapace). Five truncate frontal teeth extend slightly beyond outer orbital angles. Three central teeth lobed (*C. oregonensis*, Rathbun 1930). Outer pair of teeth form inner orbital angles (Fig. 3).

Teeth: 12–13 antero-lateral teeth, of which the first nine are prominent, equal,

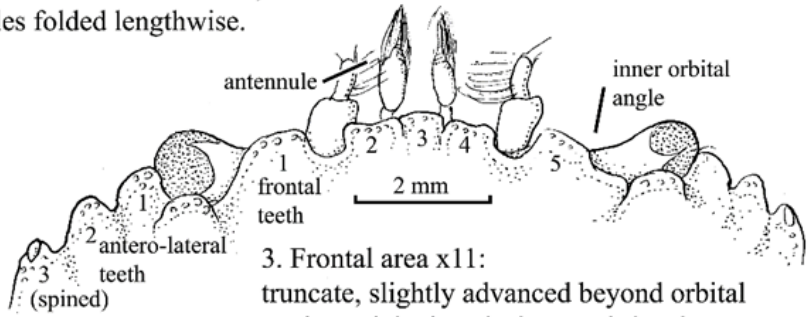
Cancer oregonensis



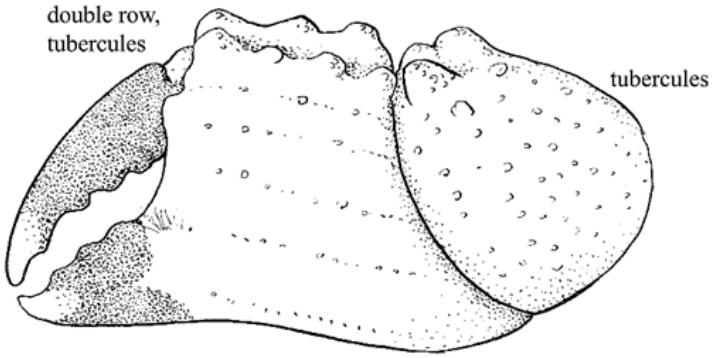
1. *Cancer oregonensis* (W: 16mm) ♂ x6: carapace wide, aerolated, elliptical; no sharp angle at antero- and posterior lateral margins; 9 prominent, equal, curved teeth (12-13 total); carapace widest at teeth 7-8; legs hairy; antennules folded lengthwise.



2. Maxilliped (ventral view) x11: produced at antero-external angle of merus.



3. Frontal area x11: truncate, slightly advanced beyond orbital angles; 5 lobed teeth: 3 central, 2 at inner orbital angles; eyestalks short; antero-lateral teeth 3-9 spined; antennules fold down.



4. Left cheliped x11 (outside): double row of tubercules, 5 rows fine granulate lines: hand; fingers dark almost to tips; wrist tuberculate.

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large and forward curving. Teeth 3–9 have spines, teeth 10–13 are small, obscure or absent.

Pereopods: Walking legs hairy, light colored and with darkly pigmented dactyls.

Chelipeds: Dark nearly to tips (Fig. 4), carpus (wrist) tuberculate above, short spine at inner angle with tooth below. Hand (propodus) thick and high, with two rows of tubercules above and five granulate lines on outer surface (Fig. 4). Chelae rougher in females than in males (Rathbun 1930).

Abdomen (Pleon): Abdomen narrow in male, broad in female (e.g. see *Cancer magister*, Fig. 3).

Telson & Uropods:

Sexual Dimorphism: Male and female brachyuran crabs are easily differentiable. The most conspicuous feature, the abdomen, is narrow and triangular in males while it is wide and flap-like in females. Additionally, males have one large chelae and two pleopod pairs specialized for copulation, however, the third and fourth pleopods are absent. Females, on the other hand, have all four pleopod pairs, each with long setae for egg attachment (Brachyura, Kuris et al. 2007). Female *C. oregonensis* often have a more uneven and lumpy textured carapace (sometimes with high, flattened elevations) and rougher chelae than males.

Possible Misidentifications

According to some authors, the genus *Cancer* comprises 23 species (Harrison and Crespi 1999 but see Schweitzer and Feldmann 2000). This genus is differentiated from other brachyuran genera by the broadly oval carapace, presence of five frontal teeth and antennules that fold back over carapace. Characters unique to *Cancer oregonensis* include 12–13 antero-lateral teeth, carapace widest at 7–8 tooth, red color, black-tipped cheliped dactyls and small size (Kuris et al. 2007). *Cancer oregonensis* is the only member of the genus with a distinctly elliptical carapace, without distinct angle at the posterior-anterior margin. It is smaller than most of the other adult *Cancer* species, but can be confused with their juveniles, which occur only seasonally, not all year, as will *C. oregonensis*. The key characteristic is the rounded, not angled carapace shape. *Cancer oregonensis* occupies a very particular niche: in the under-rock habitat, often found nestled in a well-fitting discarded mollusk or barnacle shell (Garth and Abbott 1980; Kozloff 1993).

There are eight *Cancer* species known locally (Kuris et al. 2007) and three of those are larger than *C. oregonensis* in their adult form including, *C. magister* (adults at least 30 mm in width), *C. productus* (adults over 20 mm in width) and *C. antennarius* (adults typically 100 mm in width). *Cancer productus* and *C. magister* have 10 antero-lateral teeth and five subequal frontal teeth (Kuris et al. 2007). The carapace of *C. magister* is widest at the tenth tooth, is more subtly pigmented and does not have black tipped dactyls seen in *C. productus* (Wicksten 2011). The two species are often collected together in crab pots. *Cancer antennarius*, like *C. productus*, is dark red with spots ventrally and with black tipped chelae. However, the carapace width in *C. antennarius* is widest at the eighth tooth and there are a total of 11 antero-lateral teeth (Schmitt 1921; Kuris et al. 2007; Wicksten 2011).

The remaining four species tend to be smaller and have nine antero-lateral teeth (sometimes ten in older specimens, Wicksten 2011). *Cancer branneri* is a small species (35 mm) that is rare intertidally and recognizable by cheliped dactyls that are long, straight, black and spiny. *Cancer gracilis* (27 mm) has white-tipped cheliped dactyls and *C. jordani* (25 mm) has a hairy carapace and sharp curving teeth. *Cancer anthonyi*, the yellow rock crab, is larger than the previous three at 52

mm and has black-tipped cheliped dactyls (Kuris et al. 2007; Wicksten 2011). Populations of *C. productus*, *C. anthonyi* (southern California) and *C. magister* support commercial fisheries (Kuris et al. 2007).

Ecological Information

Range: Type locality is Puget Sound, Washington. Known range includes Aleutian Islands in Alaska to Lower California (Schmitt 1921; Ricketts and Calvin 1971; Wicksten 2011). Rare south of Oregon (Kuris et al. 2007).
Local Distribution: Coos Bay distribution at Fossil and Pigeon points.
Habitat: Rocky intertidal and subtidal areas of quiet bays, tidepools and well embedded rock and mud. Likes closely fitting shells, crannies.
Salinity: Found at lower (saltier) end of bays.
Temperature: A cold and temperate water dweller (by geographical range).
Tidal Level: Low intertidal to 435 m (Rathbun 1930; Wicksten 2011).
Associates: In the under-rock low intertidal of bays associates include burrowing clams (Pholadidae), terebellid polychaete *Thelepus* and its associate *Halosydna*. Subtidally, the large barnacle *Balanus nubilis*, whose discarded shell is often home to *C. oregonensis*. A parasitic barnacle (Rhizocephalan) becomes prevalent in Alaskan animals (Ricketts and Calvin 1971).
Abundance: Occurs commonly within its habitat.

Life-History Information

Reproduction: All decapod crustacean females attach recently laid gelatinous egg masses to their pleopods. The outer embryo membrane thickens and a strand develops that attaches each embryo to pleopod setae (Decapoda, Kuris et al. 2007). Mating occurs from April–June (Puget Sound, Washington), when the female is about to molt, male *C. oregonensis* clasp females several days prior to molting and copulation takes place after molting occurs. Fertilization is internal and occurs after molting and egg deposition occurs months later, November–March (December, Coos Bay) (Garth and Abbott 1980; Jaffe et al. 1987). Eggs are bright orange and approximately 400 µm in diameter and each brood contains approximately 20,500 eggs (Knudsen 1964). A second brood is sometimes produced after the first hatches (Jaffe et al. 1987). Eyespots and chromatophores are easily visible in advanced embryos (Jaffe et al. 1987; Kuris et al. 2007).
Larva: Larval development proceeds via a series of zoea (five total, telson with single lateral spine at each fork, Lough 1975) and megalopae stages, each marked by a molt. *Cancer oregonensis* zoea are planktotrophic and have large compound eyes and four spines: one each dorsal and rostral and two lateral (Lough 1975; see *Cancer* spp., Fig. 31, Puls 2001; Martin 2014). Larval size (measured from tip of rostrum to tip of telson) proceeds from 1.6 mm (Zoea I) to 2.3 mm (Zoea V) (Puls 2001). Megalopae are of similar size to *C. productus*, at 3.4 mm (from rostrum tip to posterior carapace) and total larval duration is unknown (Puls 2001). The zoea and megalopae of cancrid species are difficult to distinguish. The megalopae of *C. oregonensis* and *C. productus* were described by DeBrosse et al. 1990 (see Fig. 1-2, 3-4, DeBrosse et al. 1990).
Juvenile: Very much like adults (Schmitt 1921).
Longevity:
Growth Rate: Growth occurs in conjunction with molting. In pre-molting periods the epidermis separates from the old cuticle and a dramatic increase in epidermal cell growth occurs. Post-molt individuals will have soft shells until a thin membranous layer is deposited and the cuticle gradually hardens. During

a molt decapods have the ability to regenerate limbs that were previously autotomized (Kuris et al. 2007).

Food: Predator and scavenger on other small invertebrates, especially barnacles (Jaffe et al. 1987).

Predators:

Behavior: Reclusive.

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