Paranemertes peregrina

"The wanderer"

Phylum: Nemertea
Class: Enopla
Order: Hoplonemertea, Monostylifera
Family: Emplectomenatidae

Taxonomy: Coe (1905) found two morphotypes within *Paranemertes peregrina* (var. *alaskensis*, var. *californiensis*) that differed in size, color and stylet morphology (Roe et al. 2007). Whether these morphotypes represent two difference species or intraspecific divergence is currently unknown.

Description

Size: Individuals vary in size from 2–40 cm with average size range 15–25 cm (Coe 1901; Roe et al. 2007). Northern specimens (var. *alaskensis*, 40 cm) larger than southern ones (var. *californiensis*, 10 cm) (Coe 1905).
Color: Dark dorsally, purple or olive green with head brown. Lighter ventrally, white or pale yellow with mid-ventral section sometimes lighter than the rest. No lines or other patterns, except V-shape behind head.
General Morphology: Long and slender
Body: Elongate, contractile and non-segmented (phylum Nemertea). Body soft but muscular and can lengthen and shorten easily (Kozloff 1974).

Anterior: Head usually truncate, a little larger than body immediately posterior (Coe 1901). No cephalic grooves. A distinct narrow v-shaped marking just back of the head, but sometimes quite faint. A pair of white transverse lines are apparent on the lateral anterior-most margins (Fig. 2) (Kozloff 1974).

Posterior: No caudal cirrus.

Eyes/Eyespots: Two groups on each side of head consist of 5–12 minute ocelli. The first group is anterior and arranged along the antero-lateral margins and the second is irregular and near the brain (Fig. 2) (Coe 1901).
Mouth: In front of brain and united with proboscis pore (suborder Monostilifera).

Proboscis: Eversible (phylum Nemertea) and, when not everted, coiled inside rhynchocoel (cavity). Rhynchocoel half to three-quarters body length (genus *Paranemertes).* Proboscis whitish with one (suborder Monostilifera) short, stylet (order Hoplonemertea) of lengths 85–90 µm (Coe 1905; Stricker and Cloney 1981). Stylet sculpture is variable and is either with (var. *californiensis*) (Fig. 4) or without spiral grooves (var. *alaskensis*) (Roe et al. 2007). Two (var. *californiensis*) to four (var. *alaskensis*) pouches of accessory stylets are present, each pouch with 6–10 stylets (Fig. 3) (Roe et al. 2007). Proboscis eversion can be induced with fresh water or dilute acetic acid (Haderlie 1980).

Possible Misidentifications

There are five genera of the family *Emplectonematidae* on the Pacific coast, all of which have a short proboscis, numerous ocelli and a long, slender body. They are each easily differentiable from the genus *Paranemertes*: *Carcinonemertes* is parasitic on crabs; *Emplectonema* is very slender with 12–14 eyes in each of two rows; *Nemertopsis* and *Dichonemertes* have only four ocelli (Coe 1940).

Of the five known Pacific species of *Paranemertes*, none is as common as *P. peregrina. Paranemertes pallida* has been found only in Alaska (Coe 1901). *Paranemertes carnea,* with six accessory stylet pouches, is whitish, pink, or flesh-colored, and is reported only from Alaska to Puget Sound (Coe 1901). *Paranemertes californica* is pale gray or orange anteriorly and gray or salmon posteriorly, where exterior pigmentation is often obscured by its green digestive tract, and has not been found north of Monterey Bay (Coe 1904). *Paranemertes sanjuanensis* is beige in color with five stylet

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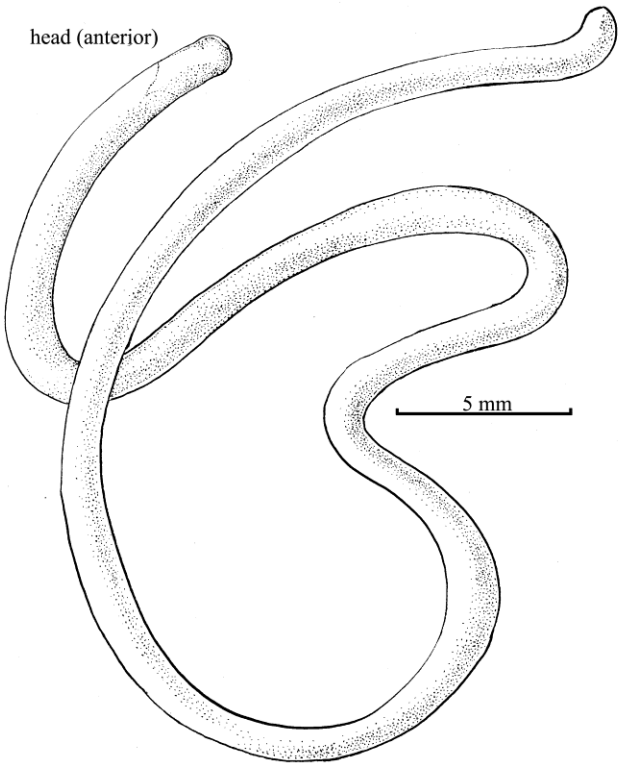
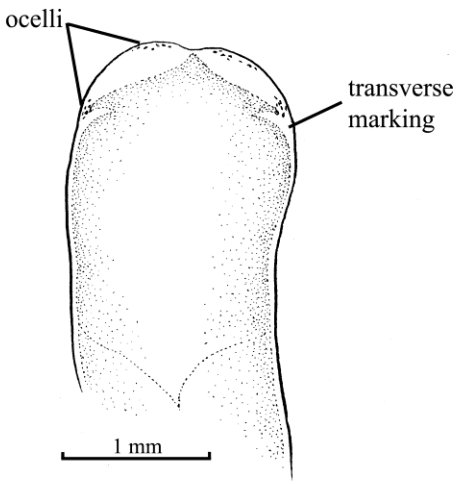
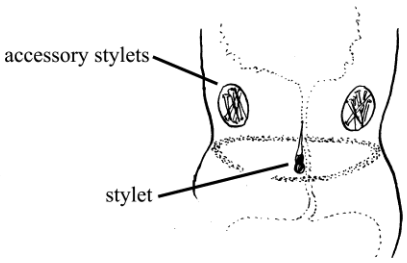
Paranemertes peregrina



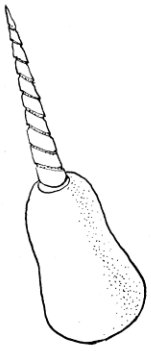
1. *Paranemertes peregrina* x6:
long, slender; dark dorsally; no cephalic grooves or caudal cirrus; solid color, no patterns; narrow, v-shaped marking behind head.



2. Head (dorsal view) x25:
a pair of transverse lateral white markings; two groups of 5-12 ocelli near anterior edge, two groups farther back; light ventral color shows at edges.



3. Stylet area, proboscis:
everted; central stylet and two pouches of accessory stylets (Coe, 1905).



4. Central stylet and base showing spiral grooves (var. californiensis Coe 1905, Gibson 1973).

pouches having two to three stylets each (Stricker 1982). Stylets are spiraled as in *P. peregrina* with which it co-occurs. Range San Juan Island, WA to Bodega Bay, CA (Roe et al. 2007).

Ecological Information

Range: Bering Sea, AK to southern California where it is widely distributed in many habitats.

Local Distribution: Coos Bay sites include Barview, North South Slough, Haynes Inlet, Kentuck Inlet, South Slough and Charleston as well as rocky outer shores.

Habitat: Found under a great variety of conditions, on rocky shores and mudflats and amongst mussel beds, seaweeds, coralline algae. Avoids bright light.

Salinity: Individuals collected in estuarine habitats as well as open coast at salinities of 30.

Temperature: The wide distribution range would indicate a tolerance of very cold to temperate conditions.

Tidal Level: Intertidal and below.

Associates:

Abundance: Common in many habitats with a maximum average density of 14 worms/m^2 (Coe 1905), usually less (Haderlie 1975; Roe 1979). Easily the most common mudflat nemertean at Charleston.

Life-History Information

Reproduction: Females may outnumber males in some populations (Washington, Haderlie 1980). Spawning occurs in spring and summer and eggs take up to six months to mature. Eggs are yellow to pinkish in color and approximately 250 µm in diameter and are surrounded by a large egg chorion (Maslakova and von Döhren 2009; T. Hiebert pers. obs). Deposits of single or gelatinous clusters of many fertilized eggs can be found in the warmer months (Coe 1940).

Larva: Lecithotrophic larvae hatch two to three days after fertilization and deposition of the eggs, are bullet-shaped, uniformly ciliated and possess an apical tuft of longer cilia and 4–6 ocelli and are planktonic for 3–8 weeks (Roe 1976; Malskova and von Döhren 2009).

Juvenile:

Longevity: 1.5 to 1.75 years where adults may spawn three times (Roe 1976; Haderlie 1980).

Growth Rate:

Food: Diet consists almost entirely of nereid worms. Although individuals will occasionally eat the polychaete *Polydora sp.* *Paranemertes peregrina* eats *Nereis vexillosa* and appears to prefer the small, timid *Platynereis bicanaliculata,* which lives in tubes on *Ulva sp.* (Puget Sound). Some syllid polychaetes are partly immune to the venom of *Paranemertes peregrina* (Roe 1971).

Predators: Crabs will eat nemerteans only if very hungry and after first cleaning off the mucus with their claws (Gibson 1972).

Behavior: A diurnal feeder, *P. peregrina* is well known as a voracious, aggressive hunter. It conducts its haphazard searches when the tide is out and nereids are unable to escape. Individuals are most abundant as the tide recedes. On cloudy days, individuals have a temporary burrow to which they retreats on a slime track (Kozloff 1974). Its predatory attacks may involve chemoreception (Amergongen and Chia 1982). During an attack, its proboscis wraps around the prey (e.g., a nereid) and it emits a venomous mucus (toxin anabaseine) (Gibson 1970; Roe 1971), which stuns the prey for about 20 minutes (Roe 1971). The proboscis then withdraws, drawing the prey into the mouth. Worms of a great length can be eaten by *P. peregrina*, but not those of a large diameter.

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