Cerebratulus marginatus

A ribbon worm

Phylum: Nemertea
Class: Anopla
Order: Heteronemertea
Family: Lineidae

Taxonomy: *Cerebratulus marginatus* was described by Renier (1804) from Naples, Italy. This species now has a worldwide distribution and an extensive list of synonyms (see Gibson 1995). Thus it is very likely that there are several different species currently referred to as *C. marginatus* from differing regions.

Description

Size: Among the largest of local nemerteans, where sizes range from 50 cm to 1 m in length and up to 15 mm in width (Coe 1901, 1905).

Color: Slate brown, dark grey or grayish green (Coe 1901). Individuals vary in color; locally they can be very dark brown. Sometimes more pale ventrally, thin lateral margins often colorless or white (Coe 1901, 1905).

General Morphology: Large, thick and round worm anteriorly but very flat and ribbon like in mid-body. Non-segmented (phylum Nemertea).

Body: Rounded anteriorly and very dorso-ventrally flattened posteriorly with thin lateral margins in intestinal region, ribbon-like (Coe 1943) (Fig 2). Not very contractile, individuals fragment easily when handled (Roe et al. 2007).

Anterior: Head spade-shaped with pointed anterior tip (Fig. 1a), widening to just wider than or equal to body width. Cephalic grooves large and deep (Coe 1905), often flaring when swimming.

Posterior: Caudal cirrus (tail) present, thin (Coe 1943) and easily lost when collecting.

Eyes/Eyespots: No ocelli.

Mouth: Ventral and behind the brain and distinct from proboscis pore (order Heteronemertea) (Kozloff 1974).

Proboscis: Eversible (phylum Nemertea) and, when not everted, coiled inside rhynchocoel (cavity). Proboscis of moderately size with sticky glandular surface is everted less readily than in *C. californiensis.* Proboscis bears no stylet (class Anopla) (Kozloff 1974).

Tube/Burrow: An excellent swimmer and strong burrower, *C. marginatus* does not inhabit a permanent tube or burrow.

Possible Misidentifications

Eight *Cerebratulus* species are reported from central CA to OR (Roe et al. 2007). Species in this genus have firm, non-contractile and often ribbon-like bodies. One species that is easily mistaken for *C. marginatus* is *C. californiensis.* Both are slate colored and possess thin lateral margins that are colorless or white. *Cerebratulus californiensis* can be identified by a head that is smaller than the body width (compare Figs. 1a and 1b) and by thin wide margins that span anteriorly farther than in *C. marginatus* (T. Hiebert and Maslakova, pers obs).

Other NE Pacific *Cerebratulus* species include *C. albifrons,* a dark brown species with white head, up to 30 cm in length and found intertidal and subtidal in Alaska to San Diego, CA (Coe 1901; Roe et al. 2007); *C. montgomeryi* with red body and head with white tip, occurs intertidal and subtidally from Alaska to Monterey Bay (Coe 1901); *C. occidentalis* is a subtidal species, up to 30 cm in length, reddish brown dorsally with lighter ventral pigment, from Alaska to Puget Sound and San Francisco Bay (Coe 1901); *C. longiceps* is found in the low intertidal, dredged, is up to 30 cm in length, dark reddish brown with pale anterior and occurs from Alaska and Tamales Bay (Coe 1901; Corrêa 1964); *C. herculeus* is enormous in size (up to 2 m long and 25 mm wide),

Hiebert, T.C. 2015. *Cerebratulus marginatus. In:* Oregon Estuarine Invertebrates: Rudys' Illustrated Guide to Common Species, 3rd ed. T.C. Hiebert, B.A. Butler and A.L. Shanks (eds.). University of Oregon Libraries and Oregon Institute of Marine Biology, Charleston, OR.

Cerebratulus marginatus

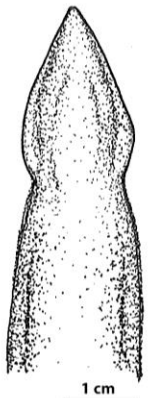

Fig 1a.
Cerebratulus marginatus anterior.

Fig 1b.
Cerebratulus californiensis anterior.

Fig 2.
Cerebratulus marginatus.

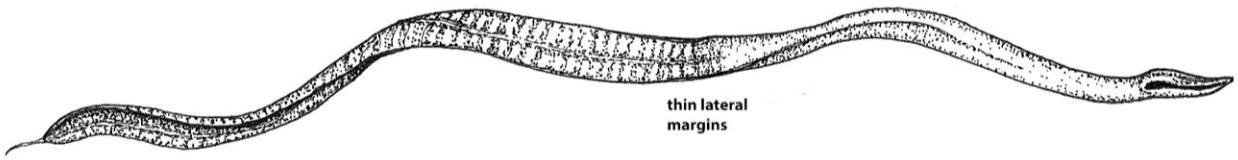

Fig 3.
Cerebratulus marginatus lateral view.

burrows in soft sediment inter tidally and subtidally from Alaska to southern California (Coe 1901); *C. lineolatus* is pale grey with olive longitudinal lines extending the entire body length (up to 20 cm) and is found intertidally up to 70 m from southern California to Mexico, and also in Miami, Florida (Coe 1905; Corrêa 1964).

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

Ecological Information

Range: Described from specimens in Naples, Italy (Renier 1804). The distribution of *C. marginatus* is not known with certainty as the synonymy of this species is complicated. Widespread in the northern hemisphere, Pacific coast of North America, Japan, western North Atlantic, Arctic, northern Europe including the Mediterranean (the type region). Southern distribution reaches Madeira (Gibson 1995; Roe et al. 2007).
Local Distribution: Coos Bay and South Slough, at many sites.
Habitat: Sand, mud, or fine gravel sediments (Gibson 1995).
Salinity:
Temperature: The distribution of this species suggests a wide temperature tolerance.
Tidal Level: Intertidal to sublittoral, dredged at 50 m (Coe 1905, 1940) to 150 m (Gibson 1995).
Associates:
Abundance: Frequently encountered in estuarine mudflats in Charleston, OR. Common, rendering this species useful for experimental research (e.g. Bianchi 1969; Bianchi et al. 1972; Voogt 1973).

Life-History Information

Reproduction: Males and females sexually mature in summer, gametes can be seen through body wall in serially arranged transverse lines.
Larva: A classic species for embryological work, the development of this species was documented in 1899 (Coe) and fully described in 1930 (Schmidt) and proceeds indirectly via a planktotrophic pilidium larva (Coe 1899; Schmidt 1930; Coe 1905, 1940).
Juvenile:
Longevity:
Growth Rate:
Food: Predatory and feeds on polychaetes and clams.
Predators:
Behavior: Excellent swimmers and burrowers (Coe 1901) (Fig 3), individuals sometimes collected by net swimming at night (Coe 1943; Gibson 1995).

Bibliography

1. BIANCHI, S. 1969. Histochemistry of neurosecretory system in *Cerebratulus marcinatus* (Heteronemertini). General and Comparative Endocrinology. 13:206-213.
2. BIANCHI, S., V. ESPOSITO, and N. GRANATA. 1972. Cerebral organs of *Cerebratulus marginatus* (Heteronemertini). General and Comparative Endocrinology. 18:5-20.
3. COE, W. R. 1899. On the development of the Pilidium of certain Nemerteans. Transactions of the Connecticut Academy. x:235-262.
4. —. 1901. Papers from the Harriman Alaska Expedition. The Nemerteans. Proceedings of the Washington Academy:1-110.
5. —. 1905. Nemerteans of the west and northwest coasts of North America. Bulletin of the Museum at Harvard College. xlvii:1-318.
6. —. 1940. Revision of the nemertean fauna of the Pacific coasts of north, central and northern South America. Allan Hancock Foundation of Scientific

Research. Allan Hancock Pacific Expeditions. Reports. 2:247-323.
7. —. 1943. Biology of the nemerteans of the Atlantic coast of North America. Transactions of the Connecticut Academy of Arts and Sciences. 35:129-328.
8. CORRÊA, D. D. 1964. Nemerteans from California and Oregon. Proceedings of the California Academy of Sciences (series 4). 31:515-558.
9. GIBSON, R. 1995. Nemertean genera and species of the world: an annotated checklist of original names and description citation, synonyms, current taxonomic status, habitats and recorded zoogeographic distribution. Journal of Natural History. 29:271-562.
10. KOZLOFF, E. N. 1974. Keys to the marine invertebrates of Puget Sound, the San Juan Archipelago, and adjacent regions. University of Washington Press, Seattle.
11. ROE, P., J. L. NORENBURG, and S. MASLAKOVA. 2007. Nemertea, p. 221-233. *In:* Light and Smith manual: intertidal invertebrates from central California to Oregon. J. T. Carlton (ed.). University of California Press, Berkeley, CA.
12. SCHMIDT, G. A. 1937. Bau und Entwicklung der pilidien von *Cerebratulus pantherinus* und *marginatus* und die frage der morphologischen merkmale der hauptformen der pilidien. Zoologische Jahrbuecher Jena Anatomie. 62:423-448.
13. VOOGT, P. A. 1973. Biosynthesis and composition of sterols in nemertean *Cerebratulus marginatus*. Archives Internationales De Physiologie De Biochimie Et De Biophysique. 81:871-880.