Glycera robusta

The large proboscis worm

Phylum: Annelida

Class: Polychaeta, Errantia

Order: Pyllodocida, Glyceriformia

Family: Glyceridae

Taxonomy: There are relatively few glycerid genera and *Glycera* contains the largest number of species. Several authors have attempted to divide this genus into subgenera or genera. Groups have been divided based on proboscideal organs (but no formal genera designated) by Hartman (1950) and recent reviews have synonymized species (Böggemann 2002) or split the genus into many sibling species (e.g. O'Connor 1987). *Glycera robusta,* however, is unique in its universal stability as a valid taxon with a reliable description (Scamit 2002; Blake and Ruff 2007).

Description

Size: The largest of the Glyceridae, up to 800 mm in length and 22 mm in width (Berkeley and Berkeley 1942; Hilbig 1997) and can have up to 300 segments (Hartman 1968). The illustrated specimen, from South Slough of Coos Bay, was 500 mm in length and 20 mm in width.

Color: Dark red, but can be yellow-brown. Their color gives rise to the common name of the family Glyceridae – the blood worms (Blake and Ruff 2007).

General Morphology: Long, stout and stiff worms with numerous densely packed segments and a conical and annulated anterior that tapers to a point (Glyceridae, Blake and Ruff 2007). *Glycera robusta* is dorsoventrally flattened in cross-section, is widest in anterior regions, and gradually tapers to a point posteriorly (Hilbig 1997) (Fig. 1).

Body: Members of the family Glyceridae lack a separate circulatory system and their coelomic fluid contains hemoglobin (Terwilliger et al. 1976; Morris et al. 1980) that is visible through the thin body wall. Unlike other glycerids, *Glycera robusta* contains both coelomic cell hemoglobin and myoglobin within the body wall musculature (Terwilliger and Garlick 1978).

Anterior: Glycerids are characterized by their conical, annulated and elongate prostomia that taper to a fine point anteriorly (Blake and Ruff 2007). The prostomium is small and bears 10 biannulate rings, the first being approximately one third of the total length (Fig. 2). The prostomium is longer than it is wide (Hilbig 1997) (Fig. 2) and the basal prostomial ring is fused with the peristomium (Blake and Ruff 2007).

Trunk: Segments posterior to peristomium are considerably wider than anterior most segments (Hilbig 1997) (Fig. 2). The body bears numerous, tightly packed segments.

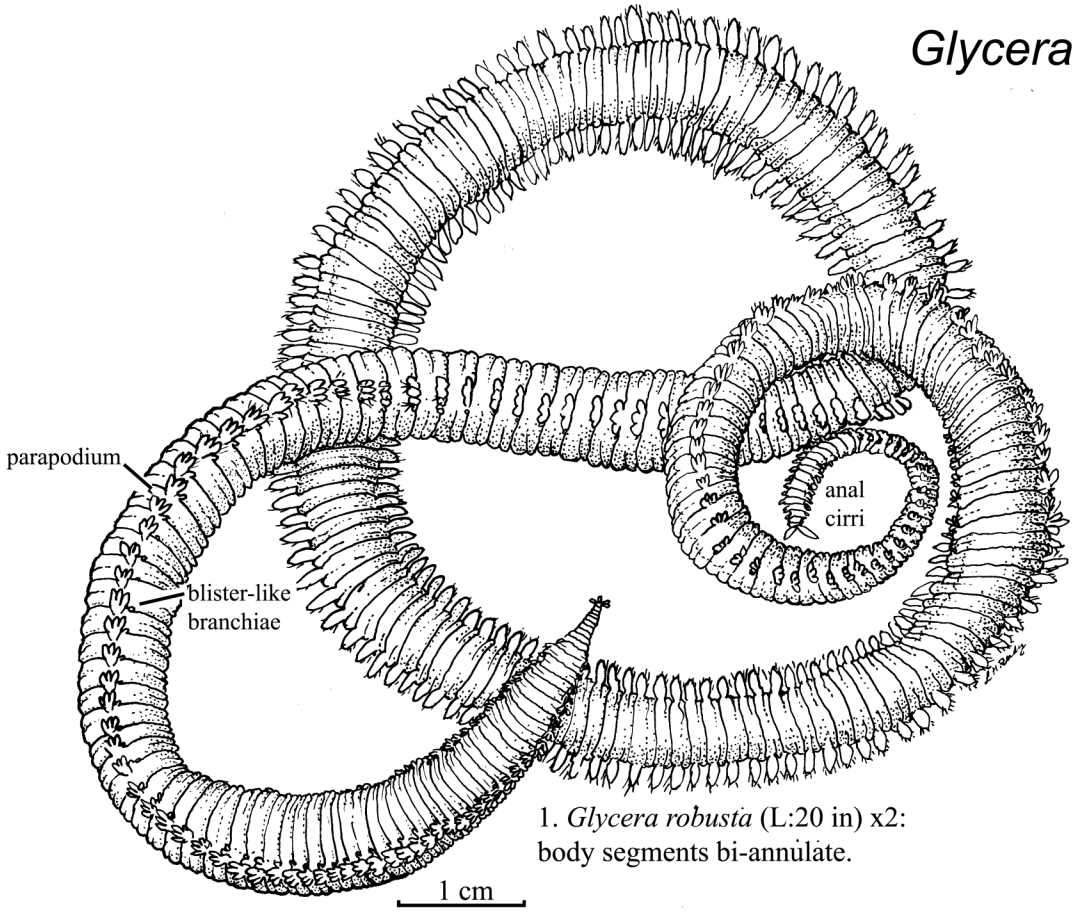
Posterior: Anal end is narrow and tapers to a fine point, adorned with a pair of small cirri (Fig. 1) (Berkeley and Berkeley 1942).

Parapodia: Inconspicuous, biramous (Fig. 4) and one-tenth of total body width in mid-body regions (Hilbig 1997). Pre- and post-acicular lobes are equally bifid, the former resembling the ventral cirrus (Fig. 4) (Blake 1975) while the post-acicular lobes are short (Hartman 1968). The dorsal parapodial margin with blister-like, fleshy branchia (see **Branchiae** below) (Fig. 4).

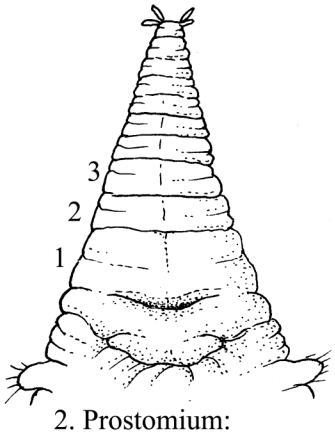
Setae (chaetae): Notosetae simple, slender and finely serrated capillaries and neurosetae are compound spinigers that are slightly wider than notosetae (Hilbig 1997) (Fig. 5).

Eyes/Eyespots: No eyespots are visible, alt-

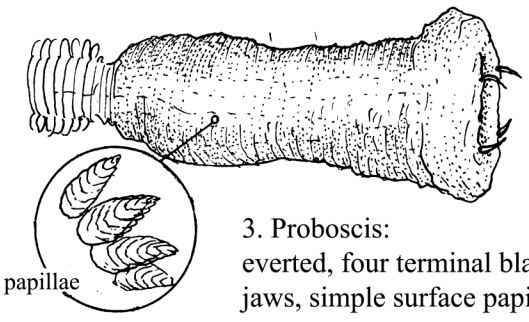
Glycera robusta



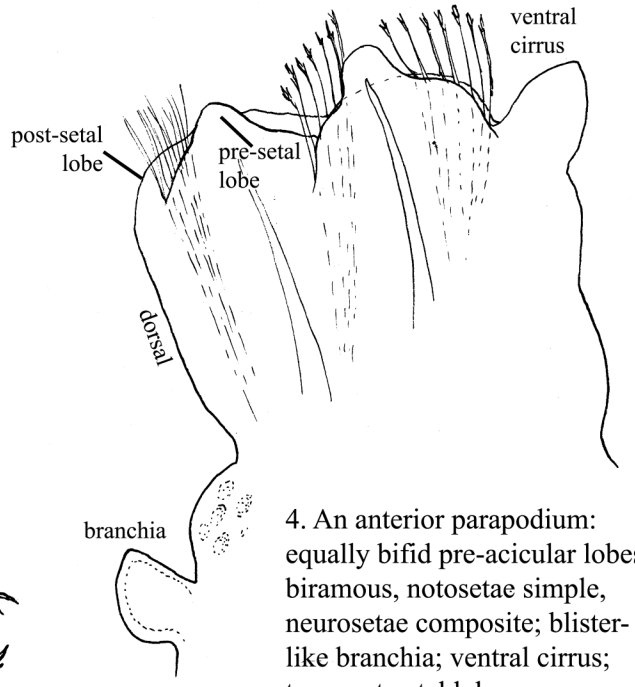
1. *Glycera robusta* (L:20 in) x2: body segments bi-annulate.



2. Prostomium: ten bi-annulate rings, four small terminal cirri.



3. Proboscis: everted, four terminal black jaws, simple surface papillae.



4. An anterior parapodium: equally bifid pre-acicular lobes; biramous, notosetae simple, neurosetae composite; blister-like branchia; ventral cirrus; two post-setal lobes.

5. Composite neuroseta.

Hiebert, T.C. 2015. *Glycera robusta. 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.

hough small eyespots may be present on the terminal prostomial ring (Glyceridae, Blake and Ruff 2007).

Anterior Appendages: The anteriormost prostomial ring bears two pairs of small and bifurcate terminal cirri, but no other anterior appendages are present (Blake and Ruff 2007) (Fig. 2).

Branchiae: Blister-like branchiae begin on setiger 23 (Fig. 1, 4). The branchiae protrude from dorsal parapodial walls from setiger 23–34 and (in large specimens) branchiae are present along the ventral parapodial walls beyond setiger 35 (Hilbig 1997). The presence of branchiae ventrally and dorsally was once thought to be characteristics of different species, but was found to be a character that varies with individual size (Berkeley and Berkeley 1942; Hilbig 1997).

Burrow/Tube:

Pharynx: Bears large and powerful proboscis (up to 26 mm long) (Hartman 1968). When fully everted, four terminal black chitinous jaws are visible, each jaw composed of a hook-like fang and a V-shaped support (called an aileron). The ailerons in *G. robusta* consist of a thick outer ramus and a very thin inner ramus (Hilbig 1997). The proboscis epithelium is densely covered with pear-shaped papillae, called proboscideal organs (Berkeley and Berkeley 1942; Blake and Ruff 2007) (Fig. 3). These proboscideal organs are oval to flask shaped, bearing 6–8 ridges (Hilbig 1997) (Fig. 3).

Genitalia:

Nephridia:

Possible Misidentifications

Distinctive characters of the Glyceridae include a pointed and annulated prostomium with two pairs of anterior appendages and a long, powerful proboscis with four hook-shaped jaws and accessory ailerons (Böggemann et al. 2012). The other proboscis worm family, the Goniadidae, is morphologically similar to the Glyceridae and identification requires examination of the parapodia and proboscis. The Goniadidae have bodies divided into three parts by different types of parapodia and their bodies are usually more cylindrical and slender than is seen in the Glyceridae (Hilbig 1997; Blake and Ruff 2007). The everted proboscis of goniadids also have two jaws, not four, and a row of denticles (called chevrons, Böggemann et al. 2012). The genus *Glycera* is characterized by its pointed and annulated prostomium, four small anterior cirri, peristomium fused to basal prostomial rings, a cylindrical proboscis with proboscideal organs and four fang-like jaws terminally (Hilbig 1997). Members of this genus also have biramous parapodia with two pre-setal and 1–2 post-setal lobes, short dorsal cirri and elongate ventral cirri. They usually have branchiae, simple notosetae and compound neurosetae. There are currently five local *Glycera* species (Blake and Ruff 2007).

G. americana, with four-lobed parapodia and branched, retractile branchiae (Hartman and Reish 1950), is found intertidally to 120 m. *G. nana (=capitata)*, another large species (but only up to 100 mm), with two pre-setal parapodial lobes, and one post-setal lobe, but no branchiae. *G. macrobranchia (=convoluta)* has a single non-retractile branchia and 14 to 16 annulations in the prostomium (unlike 10 in *G. robusta*). *G. dibranchiata* has two finger-like branchiae, one above and one below the setal lobe, this species is commonly harvested for bait in Canada and along the eastern coast of the United States. *G. tenuis* has but one pre-setal parapodial lobe on its posterior setiger, is only 80 mm in length, when mature, and 13–16 proboscideal organs (Blake and Ruff 2007).

Ecological Information

Range: Type locality is California (Hartman 1968). Known range includes the western (Japan) and eastern Pacific (Washington to southern California), however, *G. robusta* is not currently in Puget Sound Keys (e.g. Kozloff 1974).

Local Distribution: Coos Bay distribution includes many sites in the bay, such as South Slough and Fossil Point, and outside the bay, in the small sandy beaches at Cape Arago (Hartman and Reish 1950).

Habitat: *Glycera robusta* preferred substrates include beds of black mud (Ricketts and Calvin 1971), gravelly sand (Hartman 1968), and sand and cobble sediments (Blake and Ruff 2007).

Salinity:

Temperature:

Tidal Level: Intertidal and shelf depths (Hartman 1968; Blake and Ruff 2007).

Associates:

Abundance:

Life-History Information

Reproduction: The reproduction and development of *G. robusta* is not known. Most glycerids become epitokous in spring and summer months (Morris et al. 1980) and females release lens-shaped oocytes (Fernald et al. 1987).

Larva: Development proceeds via an eyeless trochophore larva. These planktotrophic larvae feed on diatoms and detritus, eventually developing to epibenthic stages and become predatory once their jaws are fully formed (Fernald et al. 1987). Many of the locally known *Glycera* species produce nectochaete larvae that are characterized by a long, pointed and annulated prostomium as is seen in the adults (Fig. 14, Crumrine 2001).

Juvenile:

Longevity:

Growth Rate:

Food: Glycerids are mainly carnivorous (Crumrine 2001).

Predators:

Behavior: Individuals use their proboscis to burrow quickly.

Bibliography

1. BERKELEY, E., and C. BERKELEY. 1942. North Pacific Polychaeta, chiefly from the west coast of Vancouver Island, Alaska, and Bering Sea. Canadian Journal of Research. 20:183-208.
2. BLAKE, J. A. 1975. Phylum Annelida: Class Polychaeta, p. 151-243. *In:* Light's manual: intertidal invertebrates of the central California coast. S. F. Light, R. I. Smith, and J. T. Carlton (eds.). University of California Press, Berkeley.
3. BLAKE, J. A., and R. E. RUFF. 2007. Polychaeta, p. 309-410. *In:* The Light and Smith manual: intertidal invertebrates fromc California to Oregon. J. T. Carlton (ed.). University of California Press, Berkeley, CA.
4. BOEGGEMANN, M. 2002. Revision of the Glyceridae GRUBE 1850 (Annelida: Polychaeta). Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft:1-249.
5. BOEGGEMANN, M., C. BIENHOLD, and S. M. GAUDRON. 2012. A new species of Glyceridae (Annelida: 'Polychaeta') recovered from organic substrate experiments at cold seeps in the eastern Mediterranean Sea. Marine Biodiversity. 42:47-54.
6. CRUMRINE, L. 2001. Polychaeta, p. 39-77. *In:* Identification guide to larval marine invertebrates of the Pacific Northwest. A. Shanks (ed.). Oregon State University Press, Corvallis, OR.
7. FERNALD, R. L., C. O. HERMANS, T. C. LACALLI, W. H. WILSON, JR, and S. A. WOODIN. 1987. Phylum Annelida, Class Polychaeta, p. 138-195. *In:* Reproduction and development of marine invertebrates

of the northern Pacific coast. M. F. Strathmann (ed.). University of Washington Press, Seattle, WA.
8. HADERLIE, E. C. 1980. Polychaeta: the marine annelid worms, p. 448-489. *In:* Intertidal invertebrates of California. R. H. Morris, D. P. Abbott, and E. C. Haderlie (eds.). Stanford University Press, Stanford, CA.
9. HARTMAN, O. 1968. Atlas of the Errantiate Polychaetous Annelids from California. Allan Hancock Foundation, University of Southern California, Los Angeles.
10. HARTMAN, O., and D. J. REISH. 1950a. Goniadidae, Glceridae and Nephtyidae. Allan Hancock Pacific Expedition. 15:1-182.
11. —. 1950b. The marine annelids of Oregon. Oregon State College, Corvallis, Oregon.
12. HILBIG, B. 1997. Family Glyceridae, p. 187-205. *In:* Taxonomic atlas of the benthic fauna of the Santa Maria Basin and Western Santa Barbara Channel. Vol. 4. J. A. Blake, B. Hilbig, and P. H. Scott (eds.). Santa Barbara Museum of Natural History, Santa Barbara, CA.
13. KOZLOFF, E. N. 1974. Seashore life of Puget Sound, the Strait of Georgia, and the San Juan Archipelago and adjacent regions. University of Washington Press, Seattle and London.
14. O' CONNOR, B. D. S. 1987. Glyceridae (Polychaeta) of the North Atlantic and Mediterranean, with descriptions of two new species. Journal of Natural History. 21:167-189.
15. RICKETTS, E. F., and J. CALVIN. 1971. Between Pacific tides. Stanford University Press, Stanford, California.
16. SCAMIT. 2002. Minutes of the 21 October Meeting. SCAMIT Newsletter. 27:1-6.
17. TERWILLIGER, R. C., and R. L. GARLICK. 1978. Hemoglobins of *Glycera robusta*: oxygen equilibrium properties of celomic cell hemoglobin and body wall myoglobin. Comparative Biochemistry and Physiology Part A. 59:359-362.
18. TERWILLIGER, R. C., R. L. GARLICK, and N. B. TERWILLIGER. 1976. Hemoglobins of *Glycera robusta*: structures of coelomic cell hemoglobin and body wall myoglobin. Comparative Biochemistry and Physiology Part B. 54:149-153.

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