
Aplysiopsis enteromorphae

Smith's unwashed-looking sacoglossan

Phylum: Mollusca
Class: Gastropoda
Order: Sacoglossa
Family: Hermaeidae

Description

Size: 5 to 25 mm long (Behrens 1980; Trowbridge 1993a); most are 10 mm (Goddard 1985), some to 15 mm (Gonor 1961). Illustrated specimen (Coos Bay) 15 mm long.

Color: Yellowish white, with greenish black patches; animal can be almost black: much local variation (Gonor 1961). Head uniform in color, dorsal cerata white or yellow tipped; rhinophores uniform in color, not veined.

Body: Oblong, flat bottomed; no oral tentacles or parapodial lobes, but with prominent tail (fig. 1). No circling of external gills: order Sacoglossa. Secretion of mucus and viscous white fluid when disturbed (Trowbridge 1993b).

Rhinophores: Prominent; rolled, not solid: order Sacoglossa (fig. 1). (Basal part rolled, distal part simple (Kozloff 1974)). Color uniform, without system of lines.

Foot: No parapodial lobes (which fold over body in some species); foot extends to form tail (Gonor 1961); narrowly triangular (Clark 1982).

Cerata: Dorsal processes: spindle shaped, inflated, white tipped; 8 - 15 rows of 2 to 4 per row (Gonor 1961) (fig. 1); slightly flattened (Clark 1982).

Gills: None: order Sacoglossa.

Eyes: Black, small, but conspicuous; deep set, at bases of rhinophores (fig. 1).

Genital Openings: Two, on right behind rhinophore (fig. 1).

Anus: Slightly raised, near 2nd and 3rd cerata, with black spot and near renal opening (Gonor 1961) (fig. 1). Anus on midline at "shoulders" not on a long tube.

Eggs: Yellow to white, in "C" shaped string 14 mm x 15 mm; eggs become paler as they develop (Goddard 1984; Gonor 1961). Eggs average 66 µ in diameter (fig. 3) and are ≤ 4 mg (Trowbridge 1993a). Hydrophilic (Trowbridge 1993a).

Possible Misidentifications

Sacoglossans differ from most Nudibranchia in their lack of a circling of gills, and by their rolled, rather than solid rhinophores. They also lack oral tentacles, and have a uniseriate radula (Thompson 1976). Sacoglossans are herbivorous. There are other sacoglossans with dorsal cerata and rolled rhinophores, in two families: Limapontiidae and Hermaeidae..

In the family Hermaeidae there are two species (McDonald 2007):

Hermaea vancouverensis is a bay form like *Aplysiopsis*, but very small (5 mm). It has a triangular brown patch anterior to the rhinophores, and a brown collar anterior to the cerata. Its habitat is in the sea grass *Zostera*

Hermaea oliviae (= *Aplysiopsis oliviae*, = *Hermaeina oliviae*), a rare and probably more southern species than *A. enteromorphae*. It is up to 10 mm long, and has a Y-shaped dorsal mahogany line running back from the rhinophores.

The Limapontiidae are represented locally by at least four species (McDonald 2007):

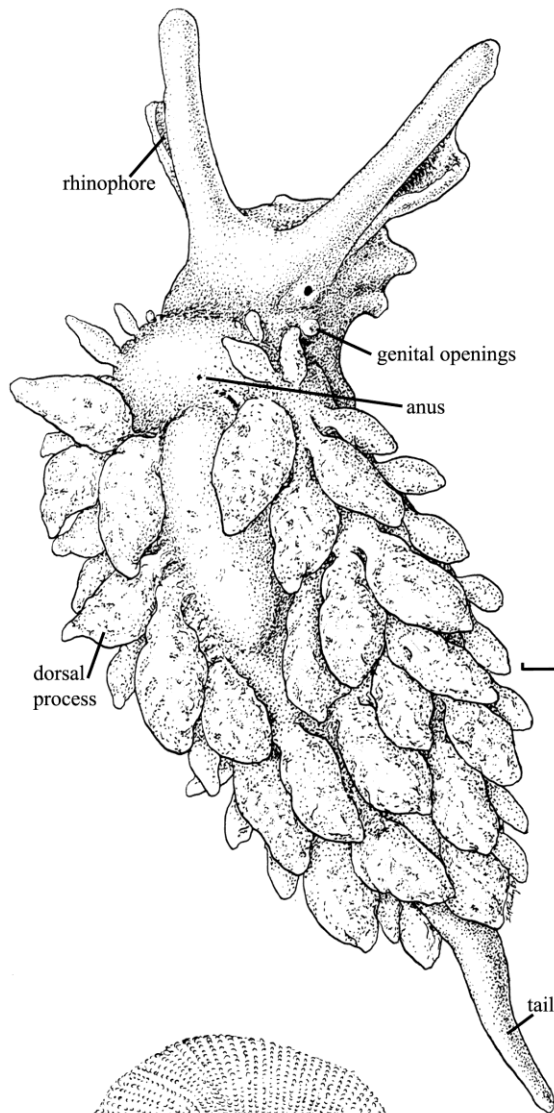
Placida dendritica (= *Hermaea ornata*) has long rhinophores and an elongate tail (like *Aplysiopsis*), but its cerata are long and not lumpy, and its ground color is pale yellow with a distinct veining of olive. It is quite small (to 8 mm), and is often found in the green algae *Bryopsis* and *Codium* in the rocky intertidal.

Olea hansineensis (formerly in Oleidae) is greenish brown. It has only 10 or fewer white tipped cerata; its rhinophores are short.

Stiliger fuscovittatus differs from most sacoglossans in having solid simple rhinophores; it is small (to 3 mm) and whitish, with rust markings. It lives in the red alga *Polysiphonia*.

Alderia modesta (which see) has reduced rhinophores and an anus on a long posterior tube like a ceras. It lives in *Salicornia* marshes.

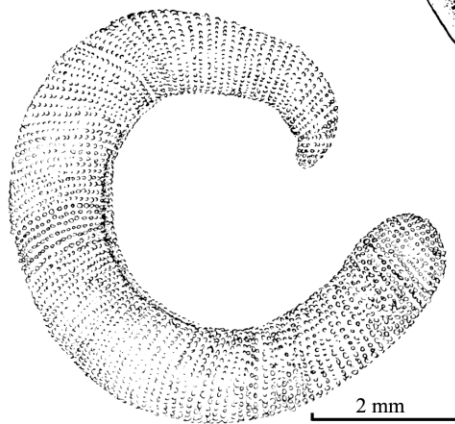
Aplysiopsis enteromorphae



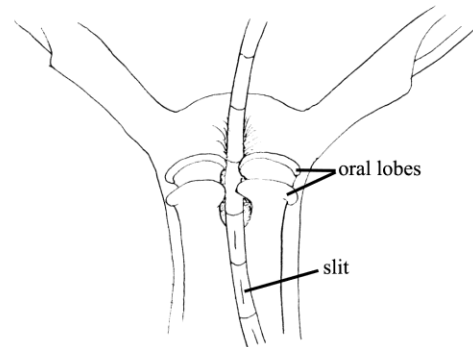
1. *Aplysiopsis enteromorphae* (L: 15mm) x12: dolioliform, no tentacles or gills; large, rolled rhinophores; yellowish white with greenish black patches; dorsal processes inflated, lumpy, white-tipped; no parapodial lobes but a prominent tail.



2. Lateral view x6.



3. Egg string x12: actual size 14 x 1.5mm; string "C" shaped; pale yellow eggs 66 μ m in diameter.



4. Head, feeding animal (ventral view): oral lobes grasp stem; radular tooth (within mouth); slits filamentous algal cells (from Gonor 1961).

Ecological Information

Range: Ketchikan, Alaska to San Diego, California; also in Gulf of California (Behrens 1980; Trowbridge 1993b).

Local Distribution: Coos County: South Slough, in Metcalf Preserve, and South Cove, (Trowbridge 2002).

Habitat: Sacoglossans are typically restricted to certain algae species (Gonor 1961; Thompson 1976). In bays, *Aplysiopsis* is commonly found on the green filamentous algae *Rhizoclonium* and *Enteromorpha*. It also likes quiet, shallow mud-bottomed bays which have *Zostera* at low tide level and bare mudflats above (San Juan Island). In Coos Bay it is found on bare mudflats near *Enteromorpha* beds. Also found seasonally on green algae *Cladophora* and *Chaetomorpha* in high to mid intertidal pools on open coast rocky shores, as well as in kelp holdfasts (Goddard 1984; Goddard 1985; Keen and Coan 1974). Not found in areas with high levels of wave action (Trowbridge 1993b).

Salinity: Collected at 30.

Temperature: 10-15 °C.

Tidal Level: On San Juan Island, found at 0.0 tide level; in Coos Bay at +5.0 ft. MLLW. Intertidal to 10 m subtidally (Keen and Coan 1974).

Associates: In Coos Bay, amphipods *Ampithoe valida*, *Grandidierella japonica*, alga *Enteromorpha*, isopods, and prosobranch gastropods (Trowbridge 2002).

Weight: 4-227 mg (wet weight) (Trowbridge 1993b).

Abundance: Probably the most abundant sacoglossan of this coast (Goddard 1985; Gonor 1961); seasonally common (Goddard 1984; Goddard 1985; Steinberg 1963); only sacoglossan species that fills the niche of eating green filamentous algae (Trowbridge et al. 2011).

Life History Information

Reproduction: Hermaphroditic; produces a single generation per year (Trowbridge 2002); (illustrated) eggs found July (Coos Bay) with recruitment in June (Trowbridge 1993b). Lays eggs on *Enteromorpha* strands continuously in lab; lays eggs on *Mastocarpus papillatus* in high tidepools and on *Enteromorpha* in mudflats (Trowbridge 2002); larvae emerge

as free swimming veligers and have long planktonic feeding phase (Gonor 1961). Embryonic period 7 days at 15-17 °C.; larvae without eyespots at hatching; newly hatched veligers have shell about 113 μ long (Goddard 1984). Sexually mature a few days after hatching (Trowbridge 1993b).

Growth Rate: 10 mg/week or 1.4 mg/day (Trowbridge 1993b).

Longevity:

Food: Prefers *Rhizoclonium*, *Urospora*, *Cladophora columbiana*, *Cladophora trichotoma*, *Chaetomorpha linum*, *Chaetomorpha aerea* (Trowbridge 1993a, 2002); prefers *Chaetomorpha* over *Cladophora* (Trowbridge 1993a); rejects *Enteromorpha* (Gonor 1961). Feeds by slitting each filament cell with a radular tooth, then moving on to the next cell (Gonor 1961) (fig. 4). Suctorial feeding (Trowbridge 1993a). Starts at the distal tip and moves toward the proximal end of each filament (Trowbridge 1993a).

Predators: Rarely consumed by most predators, but eaten by mudflat crabs and Dungeness crabs in experiments (Trowbridge 1994).

Behavior: Some sacoglossans emit unpleasant repellants from cerata to repel predators (Thompson 1976). When disturbed, it reduced surface pH, became acidic, and waved and autotomized cerata (Trowbridge 1994). Attracted to conspecifics; found living near one another (Trowbridge 1993b).

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