

Opisthobranch Newsletter

April, 1997, 23(4):13

Editor: Steven J. Long; 20220 21st Ave. NW, Shoreline, WA 98177; 206-546-5977; 1-800-793-6188. e-mail <miranda@oz.net> Web Site: <http://www.oz.net/~miranda>. Subscription \$20.00 per calendar year (electronic and/or hardcopy versions). Copyright © 1997.

Range Extensions of Eight Northeastern Pacific Nudibranchs. The following are unpublished range extensions of nudibranchs to or within Oregon. California Academy of Science Invertebrate Zoology (CASIZ) catalogue numbers are included for voucher specimens deposited in the Academy; otherwise, specimens are in my personal collection or were observed and left in the field. Unless otherwise noted, all specimens were found in the rocky intertidal. Species are arranged alphabetically.

1. *Acanthodoris lutea* MacFarland, 1925. One specimen, 3.5 mm long, found on *Alcyonidium* sp. at North Cove, Cape Arago, OR, 7/93. Previously known as far north as Punta Gorda, Humboldt Co., CA (Goddard, 1987).

2. *Acanthodoris rhodoceras* Cockerell in Cockerell & Eliot, 1905. One specimen, 20 mm long, collected from a crab pot in 95 m of water 9 km off the mouth of the Umpqua River, OR, 7/92. Previously known as far north as Cape Arago, OR (Goddard, 1990).

3. *Aldisa sanguinea* (Cooper, 1863). Three specimens found under rock ledges at Otter Crest, Lincoln Co., OR, 5/94. Previously known as far north as Cape Arago, OR (Sowell, R.R. 1949. Unpublished Master's Thesis, Oregon State Univ.).

4. *Catriona rickettsi* Behrens, 1984. Large numbers of specimens found on large patches of *Tubularia* sp. on the ocean side of the south jetty, Umpqua River, OR, 2/94, 2/96, 2/97 (CASIZ 107444). Previously known only from San Francisco Bay, CA and La Jolla, CA (Behrens, 1984).

5. *Cerberilla mosslandica* McDonald & Nybakken, 1975. One specimen, 11 mm long, trawled from a coarse sand bottom in 65 m of water 6.4 km west of Bandon State Park, OR, 4/96 (CASIZ 107439). Previously known as far north as Monterey Bay, CA (McDonald & Nybakken, 1975). Note: I collected this species during a cruise of the NOAA R/V McArthur off Bandon, OR.

6. *Cuthona lagunae* (O'Donoghue, 1926). One specimen, 8 mm long, found on the south side of Humbug Mtn., Curry County, OR, 6/96 (CASIZ 107440). Previously known as far north as Samuel H. Boardman State Park, Curry Co., OR (Goddard, 1990).

7. *Dirona aurantia* Hurst, 1966. Two specimens, 41 and 94 mm long, found on *Bugula pacifica* on floating docks in the Charleston, OR boat basin, 7/95 and 8/96, respectively (CASIZ 107442). Previously known as far south as Puget Sound, WA (Robilliard, 1971).

8. *Dirona picta* MacFarland in Cockerell & Eliot, 1905. One specimen, 23 mm long, found on the south side of Cape Meares, Tillamook Co., OR, 5/94 (CASIZ 107443). Previously known as far north as Charleston, OR (Belcik, 1975). - Jeff Goddard, Oregon Institute of Marine Biology, University of Oregon, Charleston, OR 97420

Locality data; *Doto lancei*, *Chlamylla* sp. 1, *Flabellina iodinea*, *Peltodoris* sp. 1: Species numbers from Pacific Coast Nudibranchs. 124. *Peltodoris* sp. 1. The range of this species is extended northward, being observed at Santa Barbara and Anacapa Islands (Marc Shargel, pers. comm.). 152. *Doto lancei* Marcus & Marcus, 1967. The range of this species is extended northward from Mission Bay, California to Monterey Bay (Lovell and Libby Langstroth, pers. comm.). Their specimen was dark in color, similar to the species referred to as *Doto columbiana* in Behrens (1980, species 92). 163. *Chlamylla* sp. 1. This undescribed species has been reported collected in trawl nets off the Oregon coast by Goddard (1990). 173. *Flabellina iodinea* (Cooper, 1862). The range of this species is greatly extended deep into the Panamic Providence to the Galápagos Islands (Gosliner, 1991) having been collected in the shallow subtidal at Isla Fernandina and Isla Isabella. Gosliner's record is the first south of Mexico. - Dave Behrens, PG&E, 2303 Camino Ramon, Ste 200, San Ramon, CA94583

Aspects of Chilean nudibranch biology: *Phidiana lottini*, how to survive on shore?

There are few studies dealing exclusively with specific aspects of the biology of nudibranchs. Most information on nudibranch ecology and behaviour comes from more or less casual observations, usually added to species descriptions with a few sentences. Many interesting observations of nudibranch researchers have never been published because they seemed irrelevant for taxonomic studies, but were too incomplete and empirical for a separate ecological paper. However, observational data is not trivial as these observations might not be obtained again for a long time without spending an extraordinary amount of effort and money, and, as a whole they may essentially contribute to a better general understanding of nudibranch biology.

While studying the taxonomy of Chilean nudibranchs during the last five years I spent a lot of time collecting specimens and observing them in the field and in aquaria, before preserving them for anatomical studies. Looking through the bibliography on Chilean nudibranchs I have to conclude that nearly nothing is known about their biology and that generally any observations related to living specimens are new ones. Therefore, it is intention of this and some following studies to present some small but interesting aspects of the biology of Chilean nudibranchs.

During a survey of intertidal areas of the Bay of Coliumo, central Chile, several specimens of the aeolidacean nudibranch *Phidiana lottini* (Lesson, 1831) have been found. This species was shown to be conspecific with the better known *Phidiana inca* (D'Orbigny, 1837) in an earlier study (Schrödl, 1996). It is known from Callao, Peru (D'Orbigny, 1835-1846) to Chiloé Island, Chile, commonly occurring in shallow subtidal and intertidal areas (Marcus, 1959; Schrödl, 1996). On April 16, 1992, near the estuary of the small Coliumo river, a total of 39 adult *Phidiana lottini* was found in a protected, 500 square meter sandy intertidal area with boulders, rocks and patches of unattached algae, mainly *Ulva*. All specimens were above the water surface during low tide. Nine specimens passed the low tide in small, shallow pools, eight were more or less hidden under rocks, or simply lying on moist sand, 21 specimens were covered by *Ulva* fronds. All 38 specimens were collected and observed in aquaria and did not show any sign of damage. At about 16.00 p.m., one additional specimen was found to be attached to a rock wall about 1 m above low tide sea level (see Fig. 1). At 16.23 the sea level began to rise.

Opisthobranch Newsletter

April, 1997, Volume 23(4):14

This 49 mm long specimen was observed during the following hours until its first contact with the upcoming tide at 18.43 p.m. Since it was a calm day without any higher waves it is concluded that this specimen was without seawater for a total of about 4 hours and 40 minutes. The specimen did not move and showed no visible reaction after having contact with the first slight wave. Few minutes later it was touched by several low waves in sequence. At this time, it was only about 10 cm above water surface. It began to move jerking along and crawling from on a piece of *Ulva* which partly stuck to it. It needed about two minutes to get free from considerable quantities of surrounding mucus by a combination of biting and body movements. Then it left the rock floating away with a slight wave, using the tension of the water surface. After letting it drift a few meters I collected the specimen and put it into an aquarium. I could not detect any morphological damage and the animal was actively crawling around. Over the next days this specimen was active and showed no obvious differences to other specimens collected from a subtidal area.

Lacking a protective shell, nudibranchs generally should be sensitive to drying, heating, ultraviolet radiation or other physical influences related to intertidal areas. In fact, most nudibranch species are suspected to preferentially inhabit subtidal areas (Todd, 1981), even if individuals of many species also may be found in the intertidal (e.g. Nybakken, 1978; Jaekle, 1984; Goddard, 1984). One species preferring lower intertidal zones is the barnacle feeding, boreo-panarctic dorid *Onchidoris bilamellata* (L., 1767) (Potts, 1970, as *O. fusca*; Thompson and Brown, 1984). Although *O. bilamellata* may survive dry periods, Potts (1970) described the bulk of the several hundred specimens were observed to keep direct water contact during low tide. Some specimens which were washed on shore were considered to be senescent animals dying after spawning. On the Californian Pacific coast, Bertsch et al. (1972) found some specimens of *Anisodoris nobilis* (MacFarland, 1905) above sea level in rocky crevices and one specimen of the smaller dorid *Hopkinsia rosacea* MacFarland, 1905 above the water surface attached to an overhanging rock. At Lantzville, Vancouver Island, Canada, Millen (1972) observed several individuals of the large dorid species *Archidoris montereyensis* (Cooper, 1862) above sea level, often exposed to direct sunlight for periods of up to six and a half hours (air temperatures 18-23°C). In desiccation experiments, however, *A. montereyensis* showed a considerable weight loss and mortality under field like conditions, even if the ability to resist desiccation and higher temperatures was highly variable individually (Millen, 1972).

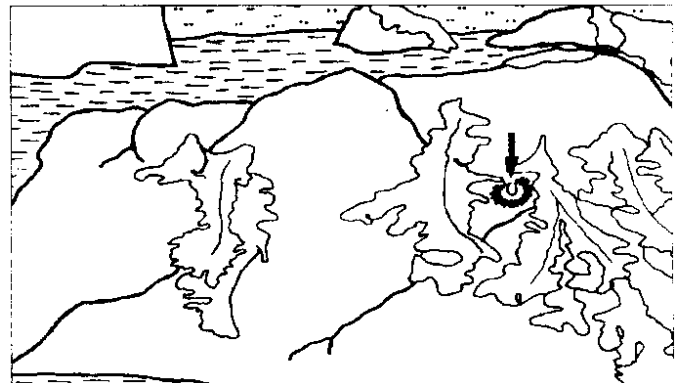
How could the relatively delicate aeolid *Phidiana lottini* survive more than 4 hours in an exposed position on a rock without contact to sea water, and without any obvious damage or injury? First, the air temperature was low (17°C) that afternoon (sea temperature 15 °C). It was sunny with few clouds, but, due to the shadow of trees, there was no direct sunlight on the most exposed specimen after 16.00 p.m., limiting the exposure time to direct ultraviolet radiation to about two hours. The boulder was entirely covered by small algae which, storing water, had not completely dried out, and the specimen was partly lying on a moist *Ulva* frond. Since 22 of 29 specimens found out of

water pools were closely attached, most completely covered by *Ulva*, this may be a protective behaviour. The thick cap of mucus covering the most exposed specimen stored water and protected the animal's epidermis from drying out. Finally, adult *P. lottini* appear to be large and robust enough, for a shellless and delicate mollusk, tolerate a surprisingly high degree of physical stress.

Acknowledgements: My thanks go to Sandra Millen for making available data from her masters thesis to me, as well as for her useful advice on the manuscript.

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<http://www2.ucsc.edu/people/mcduck/phid.htm>

Figure 1: Sandy intertidal area with boulders during low tide (approx. at 18.00 p.m.), redrawn from a photograph. A specimen of *P. lottini* (arrow-head) is laterally attached to a rock wall with small red and brown algae and scattered moist *Ulva* fronds.

By Michael Schrödl, Zoologisches Institut der Ludwig Maximilians-Universität, Abt. Prof. Bohn, Karlstr. 23, 80333 München, Germany

Feeding Behavior of *Phyllaplysia taylori*: I've found that the anaspidean *Phyllaplysia engeli* makes a pretty good aquarium cleaner. It has direct development, so it reproduces without any assistance (just like humans), and very happily eats the algal film that collects on the inner glass walls of aquaria. It ignores the macrophytes in the tank, and doesn't even scratch the glass, leaving everything sparkling clean. They seem to be active 'round the clock, and make one circuit after another. I suspect that there is a beneficial interaction between this slug and *Thalassia*, cleaning epiphytes that may compete with the seagrass for light. This slug has good potential as a commercial aquarium species that can be grown entirely in culture without impact on natural populations. - Kerry Clark, Florida Institute of Technology, Melbourne, FL 32901

Opisthobranch Newsletter

April, 1997, Volume 23(4):15

EDITOR'S NOTES:

Thanks to Antonio Perrone, Jeff Goddard, Dave Behrens, Gary McDonald, Jeff Jeffords, Italo Norfroni, Michael Schrödl, Bob Bolland, Kerry Clark, Robyn Cumming, George Sangioulglou, Jeff Tuppen, Juan Lucas Cervera, Machiko Yamada, Bill Rudman, Kerry Werry, Ángel Valdes, Sandra Millen and Mike Miller for help this month.



I still consider things on the web to be unpublished or "personal communication". This goes back to the past requirements that an official "publication" be printed (not photographically reproduced) and be "available" by subscription. I also believe this required that the publication be cataloged in institutional libraries and peer review. The Opisthobranch Newsletter works hard to meet these requirements.

We do not publish new species descriptions but we DO publish range extensions, technical notes, feeding notes,

and other items relating to opisthobranchs. In most cases the major publications have little space for these articles.

The Opisthobranch Newsletter will change a bit more now that we are settling back in and more of you are subscribing. I would like to increase the number of pages published this year. Content has always been limited by one-half ounce air mail postage rates. The only answer is to ignore the cost and print more pages as more material comes to me. Sooooo – send them and I will print more.

Garia Talavera, F. 1982. Los Moluscos gasterópodos anfiatlánticos, estudio paleo y biogeográfico de las especies bentónicas litorales. Secretariado de Publicaciones de la Universidad de La Laguna: La Laguna, Tenerife 352pp. [does this contain opisthobranchs?]

The ON web site has been growing. Current file sizes: illustration file - 655 entries; bibliography – 11649 citations; taxon – 10981 entries; systematic – 8186 entries; biography – 4550 entries.

NOTES:

Italo Nofroni (Rome, Italy - Email: inofroni@pelagus.it). I am the President of Centro Italiano di Studi Malacologici (CISMA). I am interested in taxonomy and systematics of Mediterranean, European and W. African seashells, world-wide Pyramidellidae, Caecidae, Neritidae, micromollusca.

Jeff Jeffords is a diver from Memphis who spends a lot of energy diving and photographing opisthobranchs in the Philippines. A lot of his work is visible on the Web, linked from Mike Miller's site and from the ON site. Jeff would love to have some help identifying some of the unknowns on his site <<http://www.themall.net/~seaslugs>>.

"I concur with your plugs of the photo CD medium ... the nudibranch shots on my site are from Kodachrome 25/64 slides scanned into photo CD. I start with a 9 megabyte file and use the Windows clipboard to switch between various 'paint' programs clip, add borders, contrast, sharpness, add copyright info, file compression, etc. It's all much faster than my scanner and the scans are high in quality. I don't think you can really consider them archival because of the physical vulnerability of the disk to aging, but the digital image itself may be stored on more permanent media if desired, with no loss in quality between copies. Additionally,

the unit cost of scanning in slides is reduced with volume. I use the local Wolf Camera to scan mine in ... they provide a color thumbnail index, and I can get up to around 70 on one disk." – 3459 Highland Park Pl.; Memphis, TN 38111

From Jeff Goddard: I'm still 'branching. I am currently working on a manuscript on dietary specialization in sponge-feeding dorids from Cape Arago, and have a paper in press in The Veliger on the opisthobranchs of the outer Washington coast. To pay the bills (at least for now), I am doing some contract work for the Oregon Dept. of Fish and Wildlife and will be co-teaching (with my naturalist/ evolutionary biologist friend Dr. Stewart Schultz) a short course this summer at OIMB on the coastal biology of Oregon.

From Juan Luca Cervera: Terry Gosliner was in Spain from 4th to 13th February, first five days in Cadiz and then other four in Sevilla (both cities from southern Spain) to continue the joint research started last June in San Francisco (California) with Dr. García Gomez and me. Moreover, we also discussed future joint projects, one of them that would include some Portuguese colleagues. We also had time to taste something of the wide spectrum of the sea food from southern Spain, good wines and also a little bit of the Cadiz's Carnival. Regards - Dpt. Biología Animal, Vegetal y Ecología, Fac. Ciencias del Mar, Univ. Cadiz, 11510 Puerto Real (Cadiz) Spain

From Bob Bolland: In the Sept '96 ON you mentioned the possibility of an upcoming issue having "techniques useful with opisthobranchs", e.g., radula removal & preparation. Any luck with reader input on this? Seems to me to be a most worthwhile project. Would REALLY like to see this happen. How about optimum pre-preservation relaxation techniques, as well? Another project would be a data base of opisthobranch radulae covering all radula-possessing groups (admittedly, terribly ambitious in scope). Would be a definite asset to be able to access radulae photos, much the same as we can with all the on-line 'branch photos Steve Long is providing. [ed., I already have permission for several groups of radular illustrations - would appreciate everyone sending me photos and permission as well as drawings.] - Univ. of Maryland, Asian Division, Okinawa, PSC 80, Box 14149, APO AP96367-4149

Machiko Yamada has a beautiful web page with many micro-shell illustrations and other information. - 5-6, Hinokuchi, Fukuoka Kuramoto, Shirosi, Miyagi, 989-02, JAPAN

From Robyn Cumming: I have published a photo of a pyramidellid *Turbonilla* sp., which is parasitic on giant clams. - The Swire Institute of Marine Science, The University of Hong Kong, Cape d'Aguilar, Shek O, Hong Kong

From George Sangioulglou: My interest in Opisthobranchs is new and I can say, started with your WEB page and I have download almost all images. For the first time this year I took some under water pictures in Kota Kinabalu, Borneo and Phuket but I am very amateur. Now I plan to travel in Philippines and my interest area is Palawan Cebu and Bohol and I try to collect information for snorkeling shelling and under water photo. I am free diver more than 45 years and have seen a lot of sea life. I had seen some nudibranchs in Greece also, but I know little about them. My big love is seashells mostly *Cypraea*. [George sent underwater photo attachments] - Xenofondos 40; Voula 16673; Athens, Greece

Opisthobranch Newsletter

April, 1997, Volume 23(4):16

From Kerry Clark: Incidentally, my Metazoa CD-ROM has many more opistho images and video clips (about 200) than I've loaded to the Web, if you want to mention that; I have a site that describes it at: <http://users.aol.com/kbclark/metazoa> I'm developing anatomically-detailed 3D animations of nudibranchs and ascoglossans and will probably finish some of these this summer (the stresses of the academic year tend to burn out the spirit of creativity; I put in a 20-hour day for a class field trip yesterday). Once enough material has accumulated to justify a separate CD-ROM on molluscs, I will publish this at a lower COST. - Florida Institute of Technology, Melbourne, FL 32901

Odostomia and Norrisia, San Luis Obispo County: Last week I collected a couple of *Norrisia norrisi* that had small, white snails attached(?) to their opercula. They appear to be *Odostomia*, and lack any obvious shell ornamentation. They look much like *O. nota* (McLean 1978).

Does anyone know of information describing this general or specific relationship? I've seen Pyrams on holothuroidians, but never on *Norrisia*. Thanks - Jeff Tupen, Diabolo Canyon Marine Lab, P.O. Box 400, Avila Beach, CA93424

Norrisia and Chrysalida: The pyramidellid you have is almost certainly *Chrysalida cincta*, Carpenter, 1864. I reported it's occurrence on *Norrisia norrisi*, among other species, in:

LaFollette, Patrick I., 1977. Inbreeding and Intraspecific Variation in *Chrysalida* Carpenter, 1857 (Gastropoda: Pyramidellidae). Western Society of Malacologists. 10th Annual Report, pp.18-23.

In the LACM [Los Angeles County Museum] collection, I have assembled a fair number of pyramidellid/host specimen lots to document host relationships, but more are always appreciated. If you wouldn't mind sending along one of the *Norrisia* with the odostomes attached I would be happy to confirm the identification. Just a few months ago I found *C. cincta* living in the umbilicus of *Tegula aureotincta* at Corona del Mar, adding yet another species to the long list of known hosts of *C. cincta*. - Patrick I. LaFollette, Electronic Publishing, Auto-Graphics, Inc., 3201 Temple Ave., Pomona, California 91769-3200

Chrysalida on Norrisia? Thanks for the reply concerning the pyramidellids that I found on *Norrisia norrisi*. I question the tentative assignment of my specimens to *Chrysalida cincta*, as they have neither axial nor spiral sculpture. In fact, they are quite "plain", lacking any apparent markings. I have two specimens only, and would be happy to send you one for taxonomic classification. Might this suffice? Unfortunately, I detached the pyrams from their host *Norrisia*, as I need the latter for an experiment. Additionally, are there range considerations that might limit the assignment of my specimens to a species? The distribution information available to me at this time is dated, and I suspect, outdated. Thanks again, and let me know if one critter is sufficient for your needs. - Jeff Tupen

Chrysalida cincta on Norrisia. The sculpture of *Chrysalida cincta* is quite variable, ranging from highly sculpted with axial and spiral ribs to spiral grooves only to quite smooth, and all combinations and permutations in between. I figure specimens representing six points along range of variation in the paper I cited previously. Important characters for recognizing *C. cincta* are the overall shape (height about twice width), slightly inflated whorls, and smooth (unsculpted) nuclear whorl. It ranges north as far as Monterey, so Avila Beach is within its range. I have no information on other pyramidellids occurring on *Norrisia norrisi*. In addition to nestling among the fibers of the operculum, *C. cincta* may also be

found within the umbilicus of *Norrisia*. Actual feeding on *Norrisia* has not been observed. If you have the opportunity to observe the odostome in an aquarium, a description of feeding behavior, the degree to which it appears to annoy the *Norrisia*, and so on, would be of great interest. - Pat LaFollette

INFORMATION WANTED:

Michael Schrödl: Dear colleagues: I am a PhD student working for several years on a taxonomic revision of Chilean nudibranchs. For comparison with Chilean material and anatomical studies I would urgently need well-preserved specimens of *Hancockia californica*, *Doto kya*, and any *Cadlinella* spp. (*C. ornatissima*, *C. hirsuta* or others). Please, if you have specimens of one of these species which you do not need yourself, or if you know where to get some, contact me by email schroedl@zi.biologie.uni-muenchen.de. I would greatly appreciate any help you can give me. Thank you very much.

I will go to a workshop related to biological and oceanographic research within Magellanic waters in Punta Arenas, Chile, from April 7 to 11th.

I am happy about so many reprint requests, but, I am sorry, I am running out of reprints now. So further requests can be attended just by xeroxes. - Zoologisches Institut, Karlstr. 23, 80333 München Germany

Dr. Juan Lucas Cervera: Could someone to help me to find the appropriate reference for the following old notaspidean names: *Tylodina excentrica* Tiberi, 1857 and *Pleurobranchaea chiajei* Locard, 1886? or 1882? Thank you very much. - Universidad de Cadiz; Pol. Rio San Pedro s/n; Apdo. 40; 11510 Puerto Real (Cadiz), SPAIN

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