

Only when the last tree has died, the last river been poisoned and the last fish been caught will we realise we can not eat money.
North American Indian saying

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editorial and feedback

David Harasti has just developed a new site called the **Underwater Photo Gallery** (www2.dynamite.com.au/davidh) Of interest to you will be the section on Nudibranchs - there are over 100 pictures of 43 different species from locations such as LadyMusgrave Island, the Red Sea, Thailand and the Eastern coast of Australia.

I am the MESA web manager and would like to compliment you on your excellent site and to thank you for the link to us as well.

MESA organises Seaweed each year for early March and it may be of interest to many of your site visitors. Information about this year's Seaweed is at www.mesa.edu.au/seaweed2001. The theme this year is Ocean Culture: People and the Sea. The site has quite a bit of background info on the theme and descriptions of the various events being organised by schools and communities around Australia.

Peter Biro

sunshine coast



Chromodoris verrieri (Crosse, 1875)

When first sighted in the Mooloolaba harbour this 12 mm animal was mistaken for *C. daphne* which was also present in moderate numbers. To quote from my field notes "Same as *C. daphne* in every way except opaque patch in centre of mantle". After rechecking the photos, discussing the animal with **Nerida Wilson** and reviewing the literature it became obvious this was *C. verrieri*. Bill Rudman in his 1985 paper suggests this species has a wide distribution in the Indo- West Pacific.

References:

Rudman, W.B., 1985. *The Chromodoridae (Opisthobranchia: Mollusca) of the Indo-West Pacific: Chromodoris aureomarginata, C.verrieri and C. fidelis colour groups*

Debilius. 1998., *Nudibranchs and Sea Snails. Indo-Pacific Field Guide*



**wayne
ellis**

australian nudibranchs

akos lumnitzer

Hypselodoris bennetti Angas, 1864

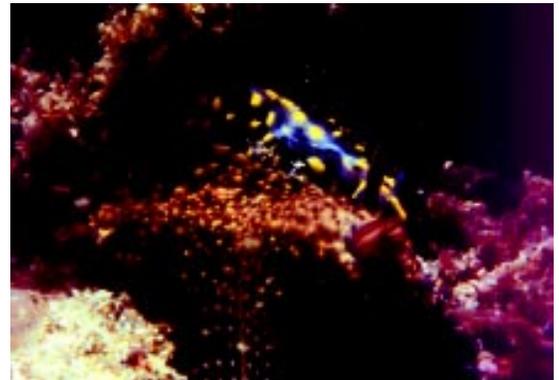
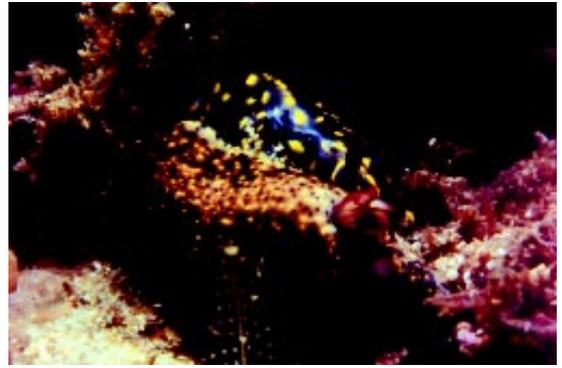
This slug is a really beautiful species, which reaches a maximum length of around 40mm. Its distribution range encompasses southeastern Queensland to northeast Victoria along the Australian east coast. I have not yet seen a specimen smaller than 30mm. The body is a typical dorid shape. The overall colour is light mauve with a mixture of small and large red spots. Most *H. bennetti* seem to have a straight row of red spots along the dorsum. On the edge of the mantle there is a very distinct yellow line all the way around with small red spots. The rhinophores are red and the gills have red lines along them. It feeds on sponges. Specimens can be found just below the surface, like I have seen in Oak Park Pool, down to 30 metres. Over the months of December and January 2000/ 2001 quite a few specimens were sighted mating in the southern half of Botany Bay. In some spots we have actually found up to six nudibranchs congregating almost side by side, perhaps in a prelude to mating. *H. bennetti* can be observed at most Sydney divesites at all times of the year.



Hypselodoris obscura **Stimpson, 1855**

This one is another very attractive Hypselodorid ranging along the Australian east coast, from southern Queensland to southern New South Wales. *H. obscura* is similar looking to *H. infucata*, *H. saintvincentius* and there is some confusion among divers when identifying specimens in the field or from photographs. *Hypselodoris obscura's* colour can be so variable from light creamy-brown (almost grey) to dark electric blue. The creamy version is found through its entire range, which is very similar to *H. bennetti*. The dark, electric blue form is more often seen in the species' northern range, but as one of my shots from Sydney shows the two colour forms mating, it's not impossible to find them along the coast from southern Qld to southern NSW. Actually, for quite some time it was believed that the two colour forms were different species, but from the photo of the two different colours mating (in the heart of Sydney, southern NSW), they seem to be the same species. According to **Dr. Bill Rudman** from the Australian Museum in Sydney there are no anatomical differences between these two colour forms. So far the only places in Sydney we have observed *H. obscura* were, La Perouse, Kurnell and in the Port Hacking River. This slug grows to around 60mm. Perhaps our observations could be proof that the species prefers to live in quieter waterways and not open oceans along our eastern coast, which is subjected to rough seas quite a bit.

Ed: *H. obscura* are regularly sighted at the low water mark at Point Catwright which is exposed to the open ocean.



photos ©2000 -2001 akos lumnitzer

association



**bob
bolland**

Gymnodoris nigricolor is considered to be uncommon and very seasonal here (during a typical year the animals are first seen between January and about mid-June; reappearing about the middle of December). I've collected more than fifty individuals since the initial specimen was collected on 3 February, 1990 (the first was seen on 7 May, 1989, with its host goby). It should be noted that although fifty plus animals have been collected, many of these were collected along with their goby hosts and the search for these has been "labour intensive" to say the least. On some dives I've spent over 180 minutes in the upper six metres searching for these elusive little gymnodorids. Admittedly, I've been more interested in the ***gymnodorid/goby associations*** than I have with the individual dorids themselves, and have therefore allowed quite a few of the observed unattached gymnodorids go uncollected.

Baba (1960) described the species from a single 4mm animal collected from Misaki, Sagami Bay, Japan, in November of 1956. He reported that it was found in 2 meters on bottom mud. Baba (1960) in describing the morphology of the species points out, in part, that it is:

Very distinct in colouring and in the shape of the radular teeth. Length 4mm. Body smooth. Gills small, consisting of 9 plumes arranged in a semicircle open behind. Back and sole uniformly bluish black; rhinophores and gills also bluish black.

Certain species of gobies and snapping shrimps form a symbiotic relationship which is mutually beneficial for both individuals. The shrimp provide and maintain a burrow for the goby to dart into when a goby predator appears and the goby provides a tactile warning system for the poor-visioned shrimp. The goby rests at or very near the burrow entrance, waiting for the plankton it feeds upon to drift by, and as the shrimp excavates sand and rubble from the burrow it comes into close contact with the body of the shrimp, maintaining almost constant contact of the goby's body with its antennae; if the fish darts away to capture food the shrimp moves inside the burrow until the goby returns. In the event of a potential predator coming close to the burrow entrance, both the goby and shrimp rapidly disappear into the safety of the burrow.

The association of the goby and nudibranch was first reported by Williams & Williams (1986), and has been commented on by Mulliner (1991). More recently, Osumi and Yamasu (1994, 2000) report on the possible



parasitic relationship of the relationship. To my knowledge, Okinawa (Ryukyu Archipelago) and nearby islands of the archipelago, are the only locations for this unusual association. **I'd be very interested to learn of any other locations outside the archipelago where this association has been noted.** I have collection and observational data from my initial witness (11 May, 1989) of these animals continuing to the present. It is perhaps noteworthy to mention that Baba (1993) described an association between an undescribed *Gymnodoris* and the chelipeds of the crab, *Lybia hatagumoana*.

During a typical year the association is first noted during January and seen until about the middle of June; reappearing about the middle of December. I have seen none at other times. The nudibranchs have been seen on all eight fins of the gobies. In some cases multiple nudibranchs have been seen on the same goby (in one case four, in several others, three). The attachment of the nudibranch to the fins would appear to be quite secure; it's quite remarkable to see the goby do an instantaneous turn about at the burrow entrance without dislodging the nudibranch. Depth range for the observed associations was from the intertidal to a maximum of 29m.

No goby-nudibranch associations were ever observed during the months of July, August, September, or October.

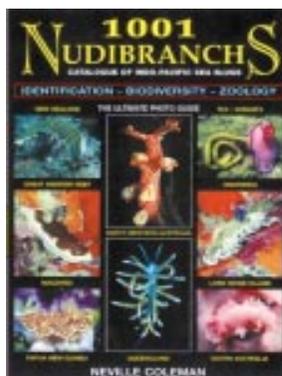
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For more details visit <http://www.rfbolland.com/okislugs/gobynudi.html>.

Bob is interested in hearing from others who have seen this association.

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**richard
willan**

Most beachgoers and divers are conservation-oriented and they would rather photograph nudibranchs in their natural habitat than collect them. However, as a scientist describing new species, I know there are occasions when I need a specimen to be collected for study. The original (or best preserved) specimen examined by the person describing the species becomes the holotype and the second (or subsequent) specimens are the paratype(s) and these specimens must be stored permanently in a museum. Such are the requirements for a scientific name to be valid. Wayne has suggested I write a couple of articles on the techniques I would recommend for collection and preservation of nudibranchs for these scientific purposes and I think this is an excellent idea to minimise the number of specimens that need to be collected and maximise the usefulness of information gained from them.

As a sensitive new age guy, I am pretty tolerant of most things humans indulge in these days. The only activities I cannot tolerate are politics and collection of live nudibranchs for the aquarium trade. I cannot do much to stamp out the former activity, but by publicising the futility of collecting nudibranchs for the aquarium trade we can all do something positive to reduce this senseless waste. There is presently a global trade in nudibranchs as living “decorations” in marine aquaria at present. Large and brightly coloured chromodorids and polycerids are collected in the Philippines and Indonesia and shipped along with consignments of fish to America and Europe for sale. In April 2000, Carlo Magenta-da-Cunha saw *Chromodoris willani* and *C. annae* for sale in an aquarium shop in São Paulo at a price of \$(U.S.) 26 each.

But what unsuspecting purchasers of nudibranchs don't realise is that it is futile to try to keep these creatures alive in aquaria. Nudibranchs seldom do well in aquaria because they are intolerant of changes in water conditions and their foods cannot be kept alive (sponges and hydroids, for example, need more water movement to keep them alive than can be supplied in any home aquarium). Often nudibranchs will get smaller and smaller in captivity as their dwindling body energy is channelled into reproduction (they will lay several spawn coils) and they eventually die. It is impossible to maintain most species for more than a few weeks at the most. All this adds up to a pretty dismal prospect for nudibranchs in captivity.

Collection of nudibranchs needs to be undertaken with great care. Even removing some nudibranchs off their substrate can harm them. For example, some *Discodoris* species cast off large pieces of the mantle (autotomy) when they are touched and this defensive behaviour is accompanied by the production of lots of mucus. Other nudibranchs (particularly *Phyllodesmium* species) often cast off their cerata very readily, and yet others (*Flabellina* species) break off their oral tentacles when they are disturbed or handled. And finally some nudibranchs are totally incompatible with others in the confined spaces of an aquarium - members of the aeolid family Facelinidae are cannibalistic and will attack and devour others of their own kind when they encounter them. When phyllidiid nudibranchs are disturbed or they detect changes in water condition they emit large quantities of fluids that can rapidly kill all the fish in even a large aquarium.

If a nudibranch does need to be collected for scientific purposes, one should first check with local fisheries authorities whether a collecting permit is required.

Avoid handling the specimen. I use a clear plastic “slurper” (a tomato sauce container) to collect smaller specimens and larger specimens can be put into screw top jars (not glass because they might break) to bring them ashore. On the sea shore, tweezers and a paint brush are useful implements for collecting smaller specimens. Make sure the temperature of the sea water in the container is the same as that the specimen is living in because nudibranchs respond badly to rapid changes in temperature. Collect only one specimen per container.

Once on dry land it is important to check the animal immediately. Forget the post-dive cool beer until the specimen has been properly dealt with. Nudibranchs are ephemeral creatures and some characteristics can vanish only a short time after the specimen becomes unhealthy. These field observations as they are called are very important for the later identification of the species. Besides photographing or sketching the specimen, make notes on its shape, colour, texture, odour and behaviour. Some nudibranchs have quite specific behavioural characteristics that they only demonstrate when they are fresh and healthy, for example *Miamira sinuata* rhythmically rocks the anterior part of its body from side to side as it is crawling whereas its relation *M. magnifica* does not rock its body at all. Look for the way the rhinophores and gills are extended and how the mantle is held. Examining the specimen under a microscope can enable a whole range of additional useful information to be gathered when the specimen is still alive; but not everyone has access to a microscope of course.

In the next article in this series I will discuss the different methods used to relax specimens prior to preserving them.

Recently, during some invertebrate surveys in sea-grass habitat, three *Gymnodoris* - like species have been recorded. These surveys were carried out using a quadrat system in intertidal mud flats near Wynnum, Moreton Bay, Australia. The following observations were made on live animals. The latter two species were very fast moving.

Gymnodoris sp 1- The first species found was one of those tricky translucent white ones with orange spots. It didn't seem to match closely any of the recorded cf *citrina* species either. It had approximately 20 nodules on the anterior margin. The orange spots on the body were slightly raised and pointed. The genital pore was situated on the side of the animal, in the midpoint between gills and rhinophores. The most distinctive feature was the rhinophores. The stalk was translucent, and the clubs were brown/green with an orange ring at the top.



Gymnodoris sp 2- The next species appeared to be black with white spots. I say appeared, because under the microscope, the 'white' spots were just places that lacked pigment. The 'black' body consisted of rather large black speckles in close proximity. Some of the 'white' dots had an orange tinge from the viscera showing through the body wall. The foot was lighter. Three specimens were recorded, two were 10mm, and one was 12mm. The gill cirlet was translucent white, and tipped with orange pigment. The cirlet appeared dark because of a band of no pigment that surrounded it. A similar condition occurred around the base of the actually dark rhinophores. The rhinophore lamellae were few and pronounced. The genital pore was quite pronounced and was closer to the rhinophores than the gills.



Gymnodoris? sp 3- The last species was completely black (and therefore difficult to photograph), and ranged from 13-15mm in length. Although the animal was black, it appeared to be a translucent pigment, rather than the velvety, opaque black of some larger *Tambja* species. The foot was somewhat lighter in colour. When crawling, this species was relatively thin and elongate. There were 8 gills that were relatively large, and the gill cirlet was open posteriorly. The genital pore was positioned closer to the rhinophores than the gill. This animal reminded me of a miniature *Tambja*, rather than a *Gymnodoris*.



dave
behrens

Underwater Guide - Madeira, Canary Islands and Azores - Invertebrates – Peter Wirtz

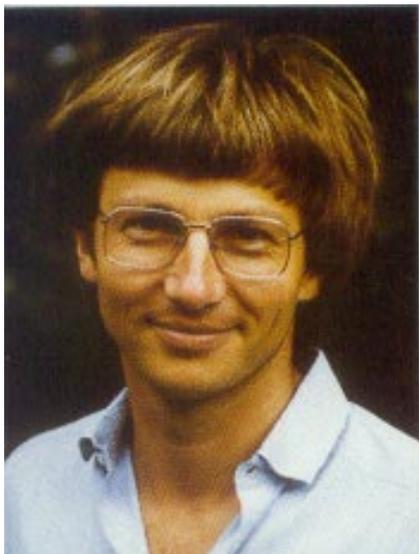
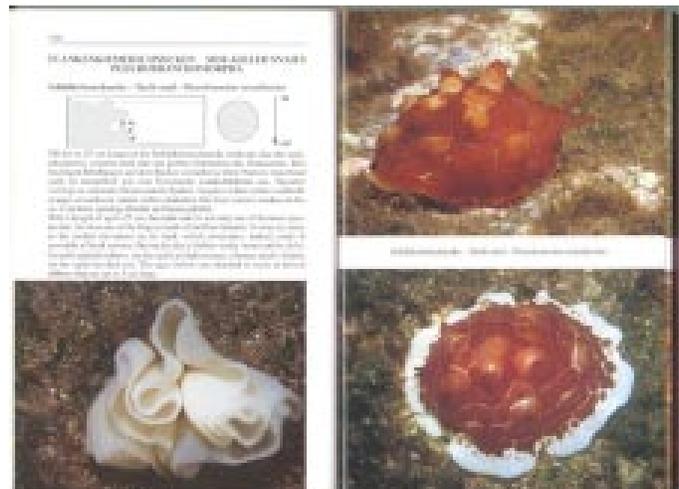
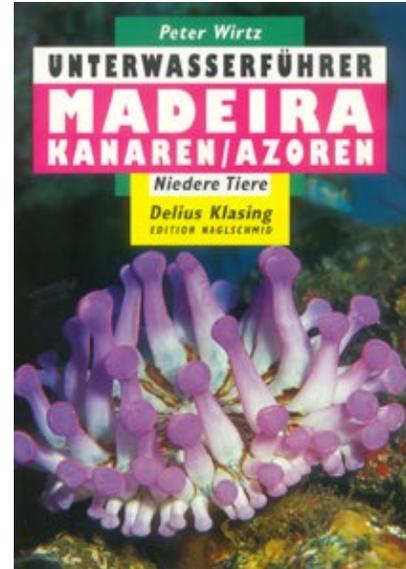
247 pages, Softcover, 5 ¾ x 8 ¼ inches (143 x 210 mm)

This month our book review takes us far from the Sunshine Coast of Australia to another fauna, much colder, but certainly worth studying. Colleague, Peter Wirtz published **Underwater Guide - Madeira, Canary Islands and Azores - Invertebrates** (actual title is in German), in 1995. The text is presented both in German and English, providing value to a wider global audience. This book, like all comprehensive invertebrate guides includes coverage of the 49 major taxonomic groups.

The page layout of this guide is particularly appealing having a large half or full page photograph of each species, and an informative diagram of the profile of a typical reef contour showing the locations, habitat or niches you would expect to find each species. As if this is not enough, Peter has included a graphic portraying the day-night activity preferences and one providing depth preferences. As shown in an example here, in the opisthobranch chapter, photographs of the egg mass are presented when known.

Peter's reader friendly text includes **scientific name, common name, size and a brief description of the species anatomy**. Comparison to related eastern Atlantic fauna and populations of the same species is included where appropriate.

While the opisthobranch fauna of this west Atlantic province is not huge, Peter has presented 33 of the more common species in the guide. The other invertebrate sections contain equal coverage, and all in all, this handy guide fills the marine faunal information gap for that corner of the globe.



Author Peter Wirtz

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