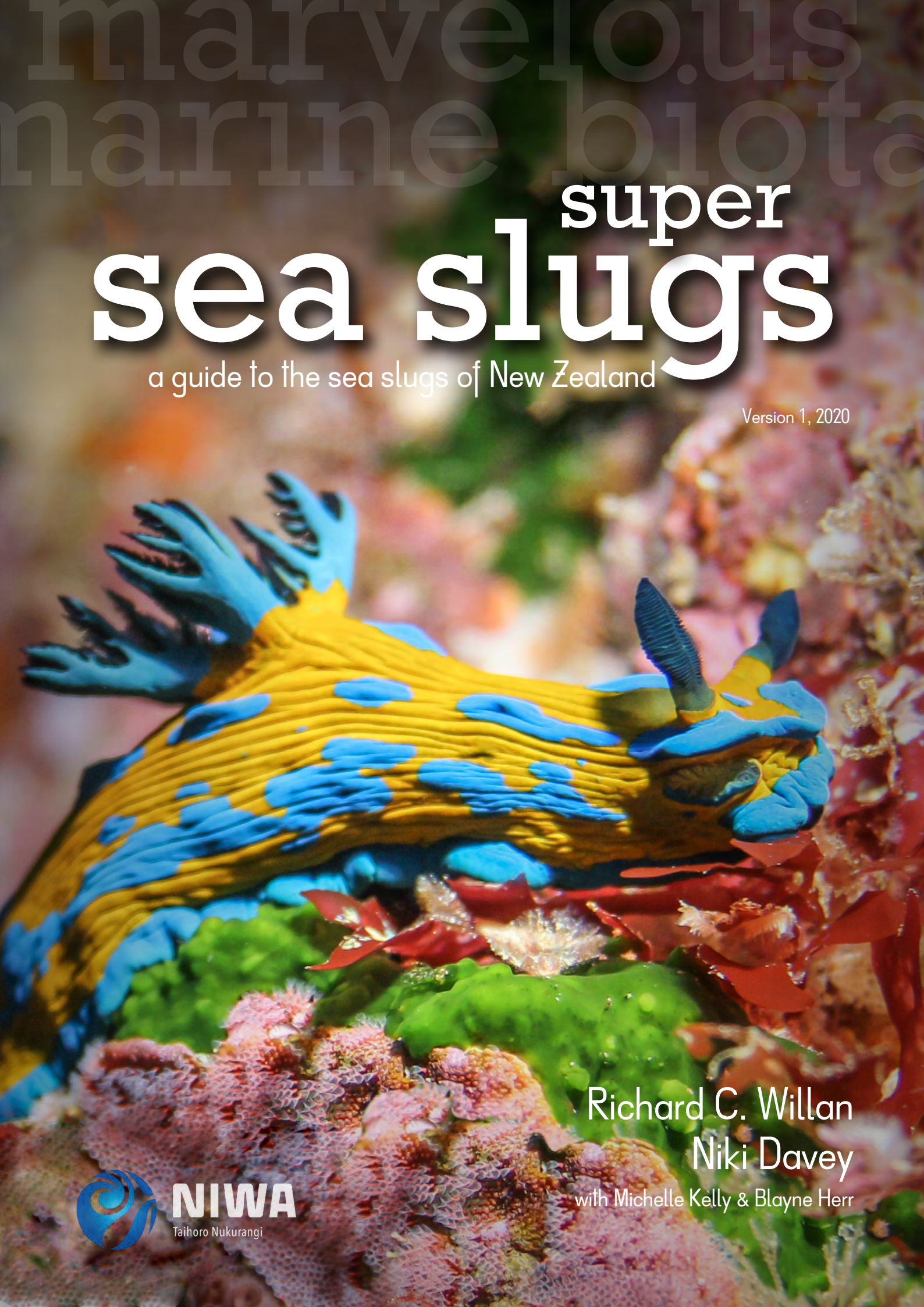

super sea slugs

a guide to the sea slugs of New Zealand

Version 1, 2020

Richard C. Willan
Niki Davey
with Michelle Kelly & Blayne Herr

NIWA
Taihoro Nukurangi

about this guide

Nudibranchs and other sea slugs are a fascinating and diverse array of marine molluscs that occur all over the world's oceans, from the surface of the open sea, to shallow continental shores, to the deep sea. The 'true nudibranchs' (order Nudibranchia) are well known because they are very colourful, but the other sea slugs are just as attractive, diverse and ecologically remarkable. We hope you will enjoy reading and using this guide to better understand "Super Sea Slugs" in the wild.

SUPER SEA SLUGS is a fully illustrated working e-guide to the most commonly encountered nudibranchs and other sea slug species of New Zealand waters. It is designed for people who visit the sea shore and are inquisitive about the living animals they see there, dive and snorkel, make a living from the coasts, are concerned with the country's biosecurity, and for those who educate and are charged with kaitiakitanga, conservation and management of our marine realm. It is one of a series of e-guides on New Zealand marine biota that NIWA's Marine Taxonomy group has developed.

The e-guide starts with a simple introduction to living nudibranchs and other sea slugs, followed by a quick reference morphology (shape) index, species index, individual species pages, and finally, explanations of icons used and a glossary of terms. Each species page illustrates and describes key external features that will enable you to recognise the 35 species covered here and distinguish them from each other. The species are illustrated with high quality images of all the species in life. As far as possible, we have used characters that can be seen by eye or a magnifying glass, and language that is non-technical. However, ultimately many of the groups and species are separated by microscopic characters and some technical terms are necessary. These unfamiliar terms are explained in the glossary.

In the future new species pages will be added and an updated version of this e-guide will be made available.

Outlying island groups, subsea banks, platforms and plateaus are shown on the maps as a two-letter code: AK = Auckland Islands; An = Antipodes Islands; Bo = Bounty Islands and platform; Ca = Campbell Islands and platform; Ch = Chatham Islands and Chatham Rise; Cp = Challenger Plateau; Ke = Kermadec Islands and the Southern Kermadec Ridge; Pb = Puysegur Bank, Sn = Snares Islands and platform.

Richard C. Willan is a New Zealand-born marine biologist who worked at NIWA after obtaining his PhD. He is presently Senior Curator of Molluscs at the Museum and Art Gallery of the Northern Territory, in Darwin, Australia. He is a distinguished global authority on the biology, systematics and distribution of sea slugs as well as invasive marine molluscan pests of the world.

For any ID advice on sea slugs you find, please email your photos to richard.willan@nt.gov.au

Cataloguing in Publication

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a typical species page layout

taxonomic name of species

taxonomic authority
person(s) who first described this species

common name of species

species images
inset images show variations and/or closeup detail

species classification
see species index for arrangement

body plan icon
highlighting the basic shape, or a special characteristic, that defines a group of these organisms

life history icon
highlighting broad marine distribution & key life features

size bar
indicating typical size of organism in the main image

quick id icons
highlighting shape, surface detail, habitat, and environment

depth range
common depth range around New Zealand

scale of abundance

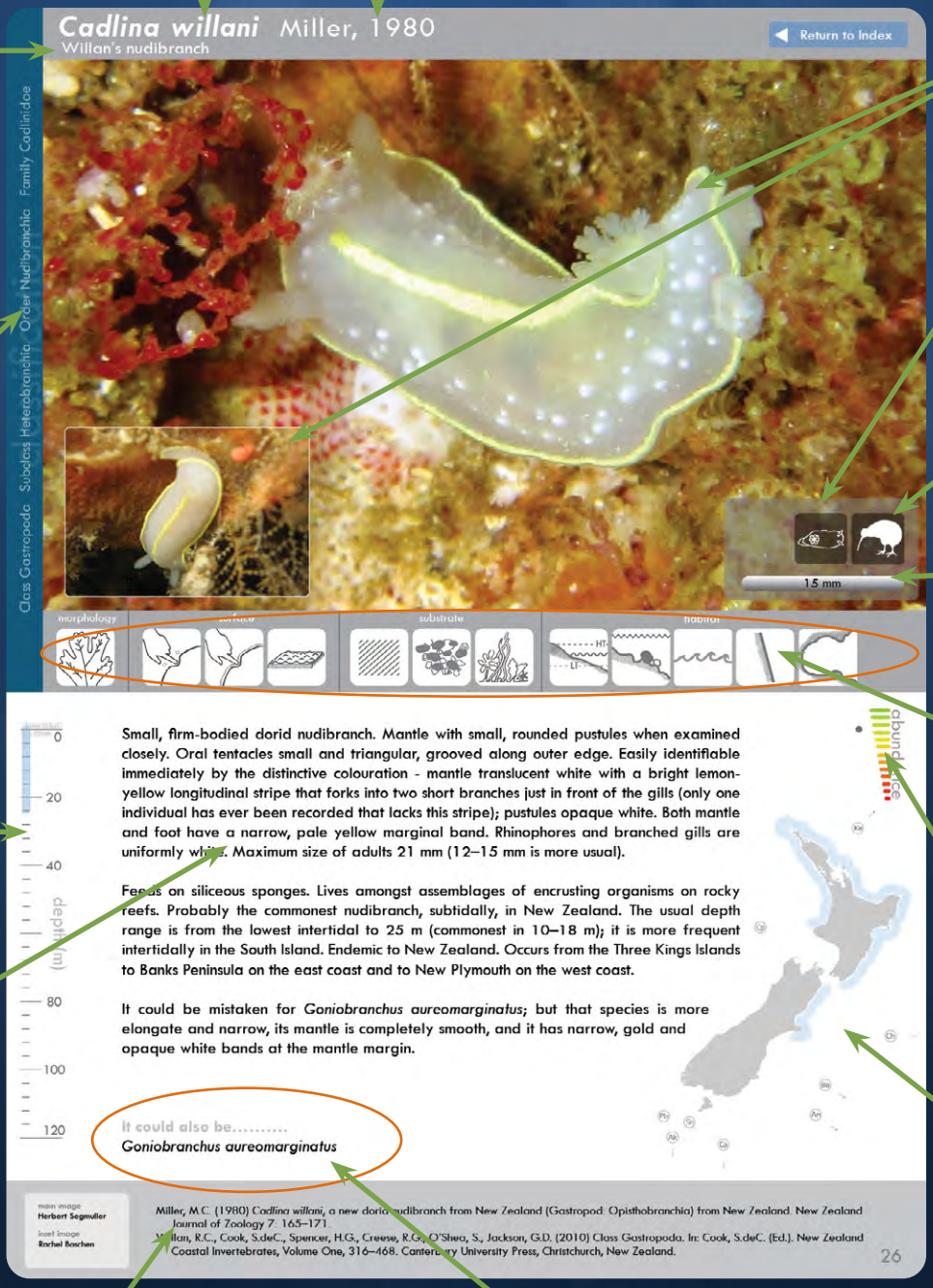
information
details on external and internal characters and habitat

distribution
section of coastline where species is most commonly found

make notes of where you encountered this species and let us know if you find it at a new location

key taxonomic references

it could also be ...
some species are difficult to tell apart without more detailed information, so check the other species in the guide listed here to make sure that you have the correct species



about nudibranchs and other sea slugs

The majority of species of the molluscan class Gastropoda have a thick, external shell into which the animal that made it can withdraw for protection, so it seems a contradiction to learn that the class also contains 11 subgroups that, during the course of evolution, have independently reduced the external shell to an internal plate or have no shell at all. These are collectively called sea slugs. Though unrelated, these subgroups have undergone parallel evolution in the transition to the complete loss of the shell. The most familiar and most speciose of these subgroups are the true nudibranchs, which are flamboyantly coloured and commonly found in every nearshore environment throughout the world.

They can be seen alive in harbours and estuaries, on rocky shores and mudflats, and even living on boats and wrecks. The 10 other subgroups are sometimes called nudibranchs for simplicity, but that is incorrect as they are mostly unrelated to each other.

Swarms of two groups of sea slugs, the sea godesses and the sea butterflies, occur in the plankton when the water temperature is at its highest when there is plenty of food available. All sea slugs are short-lived, with lifespans of a few weeks to a few months, so mass deaths of the swarms occur naturally. People think such mass strandings are caused by marine pollution, but they are simply the natural end to life following a single massive reproductive event like the mass deaths of salmon after their spawning run. Nudibranchs and other sea slugs play an important role in marine food webs as predators, or prey, or as food for decomposers after mass mortality on the seafloor, where bacteria finally process the products of their decay.

The term sea slugs is used broadly for convenience to cover all these 11 subgroups and covers a wide and fascinating range of soft-bodied gastropod molluscs. The next few pages will describe and differentiate the subgroups of sea slugs. They have different rankings (orders, suborders, superfamilies) within the Linnean system of classification, but that system is artificial and scientists are constantly changing it much to the frustration of amateurs, so don't be concerned that the rankings are different.

Phylum Mollusca and class Gastropoda
All sea slugs and land slugs belong to the phylum Mollusca and the class Gastropoda. Therefore, they all have an external shell (at one time in their life cycle, but it is frequently cast off at the end of the larval stage), that larval shell has a unique orientation with respect to the adult shell (heterostrophic protoconch), a specialised protective tissue (called a mantle), a foot for locomotion, a feeding organ (called a radula), and their reproductive systems are hermaphroditic (i.e. each individual has both male and female reproductive systems and each can produce both sperm and eggs). As explained above, sea slugs are very diverse gastropods and spread across 11 taxonomic categories. Until recently, all these subgroups were thought to be related to each other and all were classified together as the subclass Opisthobranchia, but molecular studies have now proved they are not related to each other and so are now classified as separate subgroups of a much larger group, the subclasss Heterobranchia, that also includes the land slugs and some unusual groups of marine snails. Therefore, the once-familiar term Opisthobranchia is not used any more.

Order Nudibranchia (nudibranchs)
The sea slugs in this order never have a shell as an adult. The body forms of nudibranchs are incredibly varied with five different-looking major subgroups – dorids, aeolids, proctonotids, arminoideans, and denodrontoideans. Most species of nudibranchs live on rocky shores, but others live in soft substrates and a few live in the plankton. Nudibranchs are inherently rare in time and space, so a particular species might not be seen again for ten years. Like their bodies, their diets are also incredibly varied with sponges and hydroids being the most common prey, but every animal group in the sea is predated by nudibranchs of one sort or another, even fishes! Of the approximately 80 species of nudibranchs recorded from New Zealand waters, 27 are included in this version of this guide, of which 12 are endemic. Additional species of nudibranchs are constantly being recorded from New Zealand resulting from descriptions of newly discovered species, refined species' boundaries resulting from molecular studies, vagrants from the tropical Pacific Ocean, and non-native species hitch-hiking with biofouling on boats. Indeed, it is quite possible that you could find an additional species on your next visit to the seashore.

Cephalaspidea (bubble snails, head-shield slugs)
The sea slugs in this order have an external shell, or an internal shell (the majority), or no shell at all. Most species inhabit sandy or muddy substrates, where they burrow just below the surface. They feed on a diverse array of foods – algae, cyanobacteria, sponges, foraminiferans, bristleworms, acoels, and other sea slugs. Only two New Zealand endemic species are included in this version of this guide.

Rhodopoidea (rhodope slugs)
The sea slugs included in this enigmatic superfamily have no shell. They are all microscopic. Their diet is unknown. Only one species is presently known from the subantarctic islands south of New Zealand, but it is not included in this guide because it is not commonly encountered.

Runcinoidea (runcinid slugs)
The sea slugs included in this superfamily have no shell. They are all less than 5 mm long. They have an internal shell or no shell at all (the majority). Their diet is unknown. Only four species occur in New Zealand, but they are not included in this guide because they are not commonly encountered.

Acochlidia or Acochlidiimorpha (caddis slugs)
The sea slugs included in this superorder have a secondary shell made of spicules that resembles the case of a caddisfly, or no shell at all. They are all less than 5 mm long and live in the water spaces between sand grains. Their diet is unknown. Only two species occur in New Zealand, but they are not included in this guide because they are not commonly encountered.

Euthecosomata (sea butterflies)
The animals in this suborder have a very thin external shell. They live permanently in the plankton with the foot enlarged into 'wings', used both for swimming and intercepting the microscopic plant plankton on which they feed. They can form massive swarms. No sea butterflies are included in this version of this guide because they are not commonly encountered in New Zealand coastal waters.

Gymnosomata (sea goddesses)
The sea slugs in this suborder have no shell. They live permanently in the plankton with the enlarged foot used for swimming. They are very agile and catch sea butterflies, their sole prey, after spotting them with their enormous eyes. Despite their angelic common name, they eat the captured sea butterflies ravenously. No sea goddesses are included in this version of this guide because they are not commonly encountered in New Zealand coastal waters.

Aplysiomorpha (sea hares)
The sea slugs in this order have a very simple internal shell (the majority) or no shell at all. Most species inhabit hard substrates where they live on the surface. They feed on algae and (rarely) cyanobacteria, gorging vast amounts day and night so they grow very rapidly and can become enormous when fully grown. Three species of sea hares are included in this version of this guide.

Sacoglossa (sap suckers)
The sea slugs in this order have an external coiled shell, an external bivalved shell (which is remarkable considering they are actually snails), an internal shell, or no shell at all (the majority). Most species live on hard substrates. They feed on algae and (very rarely) eggs of other sea slugs and fishes. One cell of the prey is pierced with the specialised stylet-like feeding organ and the cell's contents are sucked into the pharynx. Only one species is included in this version of this guide.

Umbraculoidea (umbrella snails)
The sea slugs in this superfamily have an external limpet-like shell and a plume-like gill on the right side of the body beneath the shell. All live on hard substrates where they feed on sponges. Only one species occurs in New Zealand but it is not included in this guide because it is not commonly encountered.

Pleurobranchomorpha (side-gilled sea slugs)
The sea slugs in this order have an internal shell (the majority) or no shell at all. All have a plume-like gill on the right side of the body beneath the mantle. Most species live on hard substrates. Most feed on sponges, but a few also eat sea anemones, hard corals, sea squirts and even carrion. Only two species, of which one is endemic to New Zealand, are included in this version of this guide.

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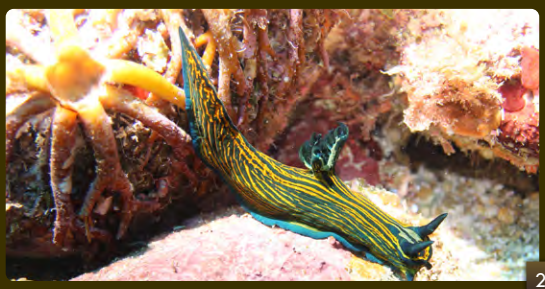

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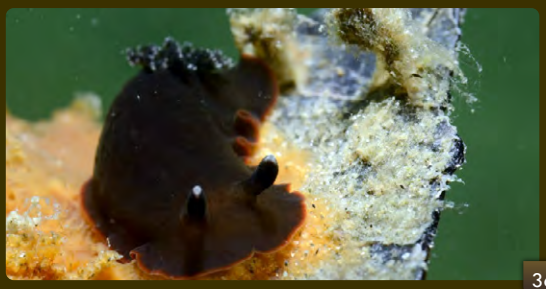
Tyrannodoris luteolineata



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species index

PHYLUM Mollusca
CLASS Gastropoda
SUBCLASS Heterobranchia
ORDER Nudibranchia

Papawera zelandiae (Gray, 1843)

white bubble shell

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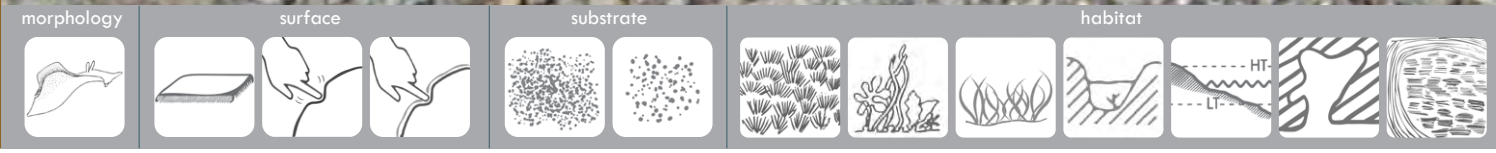

Bubble snail with large, fragile, white external shell that can nearly accommodate animal when retracted. Inner whorls of shell resorbed as animal grows. Head flattened, broad, with lobes projecting posteriorly. Eyes are at the surface of the head, widely separated. Foot short, sides extended into parapodia that cover neck and sides of shell; foot supplemented by extension at rear that acts as accessory foot. Animal dark greyish black, flecked with brown, vague darker stripes on front of head. Maximum size of adults 46 mm (25–30 mm is more common), shell length 17 mm.

Epifaunal; grazes filamentous algae, but probably only the epiphytic flora of diatoms. When disturbed on soft substrates, it immediately burrows just beneath surface. Endemic to New Zealand. Found around the North Island and northwest Nelson.

main image
Neil Wright

inset image
Richard Willan

Willan, R.C., Cook, S.deC, Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Marine Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Willan, R.C., Morton, J.E. (1984) Cape Rodney to Okakari Point Marine Reserve. Marine Molluscs Part 2 Opisthobranchia. Leigh Marine laboratory, Leigh, New Zealand, 106 p.

Melanochlamys cylindrica Cheeseman, 1881

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Elongate, cylindrical to lozenge-shaped slug with two, short 'tails' at the rear; body very soft and deforms easily. Parapodia quite small, tightly wrapping sides of body but not reaching the dorsal surface. A small, white, completely internal, ear-shaped shell is located at the hind end of the body. Body always uniformly velvet black in colour, with an iridescent sheen when examined closely. Maximum size of adults 30 mm (15–25 mm is more usual); shell length 6 mm.

Feeds on bristle worms (mobile polychaetes) and round worms (nemerteans), which are sucked into a huge pharynx and broken apart by a muscular gizzard. Probably frequently overlooked because of its black colouration and infaunal habit. Occurs in the mid-intertidal where it is most common, down to the shallow subtidal, around mainland New Zealand, but not at the Three Kings Islands because there is no suitable habitat. Endemic to New Zealand.

main image
Chris Woods

Rudman, W.B. (1972) Structure and functioning of the gut in the Bullomorpha (Opisthobranchia) Part 4. Aglajidae. Journal of Natural History 6, 547–560.
Williams, E.G. (1964) Molluscs from the Bay of Plenty. Whitcombe and Tombs Ltd, New Zealand, 41 p.

Aplysia parvula Mörch, 1863

sea hare

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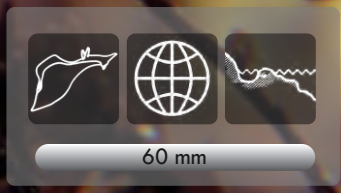

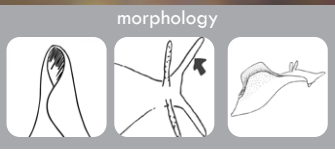

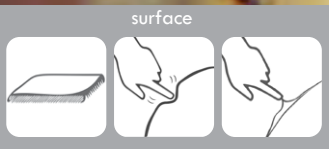

The smallest species of sea hare in New Zealand. Head and tail long, body plump, with centrally placed visceral mass. Parapodia thin, continuous posteriorly, forming a cup over the mantle, often raised into 'spouts' laterally. A cup-shaped shell is located beneath the mantle, the central section being visible dorsally through a small permanent opening in mantle. Background colour of body, kelp-brown or beef-red, depending on diet, always with white speckles. Edges of parapodia and mantle opening edged with a narrow black line; tips of the oral tentacles and rhinophores are black. Maximum size of adults 120 mm (45–60 mm is more usual), shell length up to 28 mm.

Grazes red and green algae; adults and (particularly) juveniles often hide inside red algal thickets. When attacked, this sea hare emits a reddish purple ink-like fluid for defence. Incapable of 'swimming'. Depth range mid-intertidal to 40 m (but most abundant in less than 10 m). Cosmopolitan in all tropical and warm temperate seas. Occurs around both mainland islands of New Zealand, also Three Kings Islands, not Chatham Islands.

main image
Crispin Middleton

inset image
Jennifer Howe

Willan, R.C. (1979) The ecology of two New Zealand opisthobranch molluscs. Unpubl. Ph.D. thesis, Department of Zoology, University of Auckland, New Zealand, 268 p.

Willan, R.C., Cook, S.deC, Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Marine Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Dolabrifera brazieri G.B. Sowerby II, 1870

sea hare

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Class Gastropoda Order Aplysiomorpha Family Aplysiidae

morphology

surface

substrate

habitat

Body ovate, greatly flattened, much wider at the end than the head. A broad foot allows the animal to adhere tightly to rocks, like a limpet, in rough water conditions. Parapodia small and thin, nearly fused, leaving only a narrow slit for respiration posterioraly. Entire dorsal surface has low conical pustules, each with a tiny branched papilla at the summit that can be extended or completely withdrawn. A small, triangular shell is permanently embedded beneath the mantle behind the midline. In life, green, dorsal surface marbled with brown, white and pink; foot sole uniformly bright bottle green. Does not emit purple fluid when attached. Maximum size of adults 150 mm (80–100 mm is more usual), shell length up to 8 mm.

Lives under ledges and beneath stones, from the low intertidal to about 11 m, emerging to feed on short green algae. Incapable of 'swimming'. Native to New Zealand, where it occurs along Northland's east coast to Leigh; also Three Kings Islands, Great Barrier Island, plus Kermadec Islands, Lord Howe Island, Norfolk Island, and temperate southeastern Australia. Note that the comment by Morley and Hayward (2016) and Valdés et al. (2017), that it first arrived in New Zealand in the 1960s, aided by humans is definitely incorrect; it has always been present in this country, but just not formally recorded until that time.

main image
Sadie Mills

Morley, M.S., Hayward, B.W. (2015) Intertidal records of 'sea slugs' (nudibranchs and allied opisthobranch gastropods) from northern North Island, New Zealand. Records of the Auckland Institute and Museum, 50, 51–93.

Valdés, A., Breslau, E., Padula, V., Schrödl, M., Camacho, Y., Malaquias, M.A.E., Alexander, J., Bottomley, M., Vital, X.G., Hooker, Y., Gosliner, T.M. (2017) Molecular and morphological systematics of *Dolabrifera* Gray, 1847 (Mollusca: Heterobranchia: Aplysiomorpha). Zoological Journal of the Linnean Society, 181: 31–65.

Bursatella leachii Blainville, 1817

woolly sea hare

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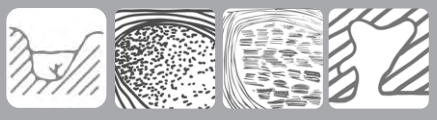

Medium-sized, soft-bodied sea hare. Body camouflaged to resemble a mass of seaweed; flask-shaped when at rest, capable of great elongation when crawling. Entire body covered with numerous branched papillae, those on the head being longest. Papillae become thicker and more branched as animal matures. Parapodia fused dorsally leaving only a slit for respiration. Shell absent. Body translucent brownish green with numerous brown speckles and a few large bright turquoise or emerald spots. Readily produces a vivid purple ink-like fluid when attacked. Can reach great densities in autumn; adults sometimes migrate en masse to deeper water for unexplained reasons; mass mortalities are common at end of life span. Maximum size of adults 120 mm (60–80 mm is more usual).

Lives in sheltered harbours, estuaries and tidal impoundments. Feeds on filamentous cyanobacteria (*Lyngbya majuscula*) and (rarely) filamentous green algae. Incapable of 'swimming'. Depth range is low-intertidal (where commonest) to 10 m. Cosmopolitan in tropical and warm temperate waters. In New Zealand occurs throughout the east coast of the North Island to Cape Kidnappers in Hawkes Bay.

main image
Crispin Middleton

inset image
Neil Wright

Willan, R.C. (1979) The ecology of two New Zealand opisthobranch molluscs. Unpubl. Ph.D. thesis, Department of Zoology, University of Auckland, New Zealand, 268 p.

Willan, R.C., Cook, S.deC, Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Marine Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Elysia maoria Powell, 1937

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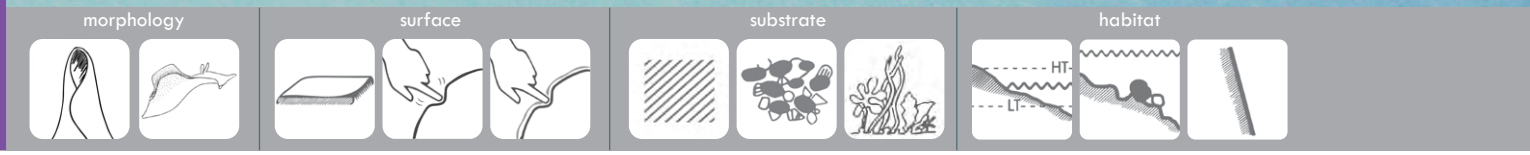
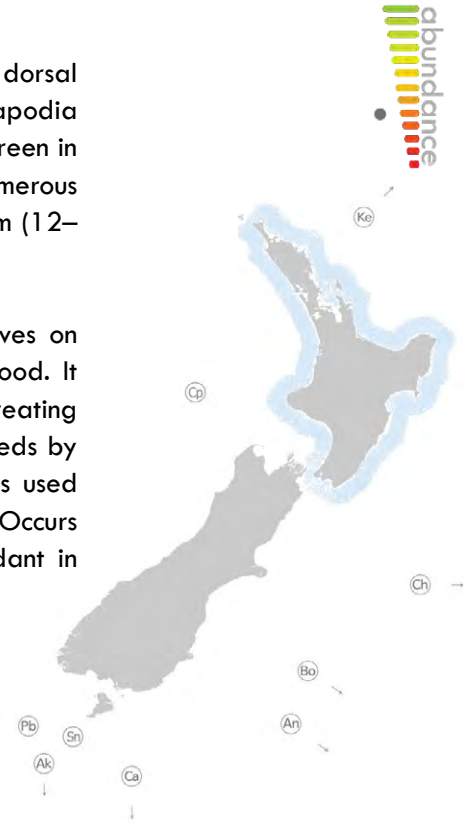


Body elongate and cylindrical, with tall, thick parapodia overarching dorsal surface to meet in dorsal midline. Body takes on a heart shape when parapodia are spread out. Rhinophores short. Oral tentacles absent. Dark, rich bottle green in colour, matching that of its host alga; when magnified body seen to have numerous brick-red dots and groups of white speckles. Maximum size of adults 25 mm (12–18 mm is more usual).

Very well camouflaged because of its colouration and cryptic habitat. Lives on the cushion- or crust-forming green alga *Codium convolutum*, which is its food. It hides beneath this alga where the cushion is detached from the substratum creating chambers that may offer protection from desiccation and/or predation. Feeds by piercing single cells of this alga and sucking out the contents. The penis is used as a hypodermic needle to inject the sperm into the body of the partner. Occurs throughout the North Island and temperate eastern Australia (most abundant in New South Wales); not the Three Kings Islands.



main image
Gary Batt

inset image
NIWA

Reid, J.D. (1964) The reproduction of the sacoglossan opisthobranch *Elysia maoria*. Proceedings of the Zoological Society of London, 143: 365–393.
Trowbridge, C.D. (1984) New Zealand opisthobranchs associated with the low intertidal crustose green alga *Codium convolutum*: ascoglossans "down under". The Veliger, 38: 116–125.

Berthella ornata (Cheeseman, 1878)

ornate side-gilled sea slug

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New Zealand's most distinctive side-gilled sea slug. Body ovate to elongate, soft and smooth, covered by a large mantle that hugs the head, tail and sides, including the right side where the single, large, feather-like, unbranched gill is located. Rhinophores in dorsal midline, rolled and fused at base. Oral veil large, trapezoidal in shape. Small, squarish, flattened shell located centrally, completely covered by mantle. Background colour even all over, but variable in hue – from white to pale orange, overlain with (usually large) dark red-brown blotches and spots. Rhinophores chocolate-brown with white tips. Maximum size of adults 70 mm (50–60 mm is more usual), shell length up to 20 mm.

Nocturnal, hiding under stones during the day. Feeds on siliceous sponges (including *Plakina monolopha*). When attacked, it emits a thick, milky-white fluid for defence. Lives in semi-exposed situations. Occurs from the low intertidal zone, through the subtidal fringe (where it is most common), to 6 m. Endemic to New Zealand, occurring around both main islands, also Three Kings Islands, Chatham Islands and Campbell Island.

main image
Richard Willan

Willan, R.C. (1983) New Zealand side-gilled sea slugs (Opisthobranchia: Notaspidea: Pleurobranchidae). Malacologia, 23: 221–270.
Willan, R.C. (1984) A review of diets in the Notaspidea (Mollusca: Opisthobranchia). Journal of the Malacological Society of Australia, 6: 125–142.

Pleurobranchaea maculata (Quoy & Gaimard, 1832)

grey side-gilled sea slug

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Very active sea slug. Body ovate to elongate, very soft, covered with minute puckers and folds. Mantle small and does not cover the tail or the single, large, feather-like, unbranched gill on the right side. Mantle is continuous anteriorly with a trapezoidal oral veil. Row of small, unbranched papillae along front edge of oral veil. Rhinophores at sides of head, rolled. No shell present, even in freshly metamorphosed individuals. Body translucent grey to almost black, with dark, wavy, anastomosing lines. Maximum size of adults 100 mm (60–80 mm is more usual).

Occurs in an enormous range of habitats, from sheltered mud and sand flats in sheltered bays and harbours, to semi-open bays and shallow coastal waters (intertidal to subtidal), and deep continental shelf waters down to 250 m. Active day and night, whenever hungry. Extensive diet consisting of many marine animals, prefering sea anemones, and carrion. Mass mortalities are common at the end of life span. Occurs around New Zealand and Three Kings Islands, and southeastern Australia.

In 2009, this species was implicated in the deaths of dogs that had eaten dead *Pleurobranchaea maculata* on some Waitemata Harbour beaches. When analysed, all parts of the body of those slugs contained tetrodotoxin, but it is likely that, instead of this poison being present in all individuals all the time, these particular individuals had ingested this poison when feeding on dead fishes. This poisoning has not reoccurred.

main image
Chris Woods

Willan, R.C. (1983) New Zealand side-gilled sea slugs (Opisthobranchia: Notaspidea: Pleurobranchidae). Malacologia, 23: 221–270.
Willan, R.C. (1984) A review of diets in the Notaspidea (Mollusca: Opisthobranchia). Journal of the Malacological Society of Australia, 6: 125–142.

Plocamopherus imperialis Angas, 1864

imperial nudibranch

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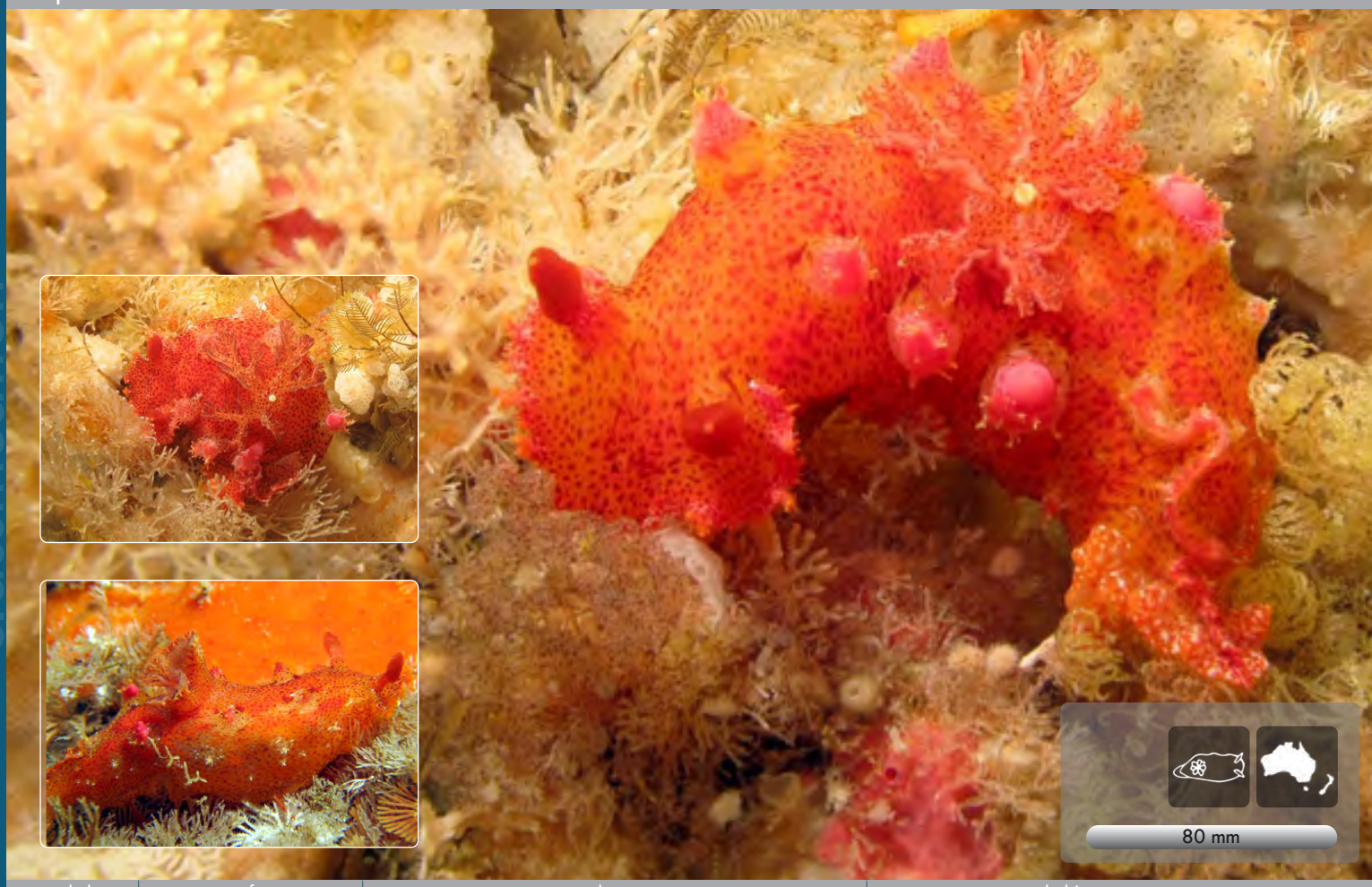
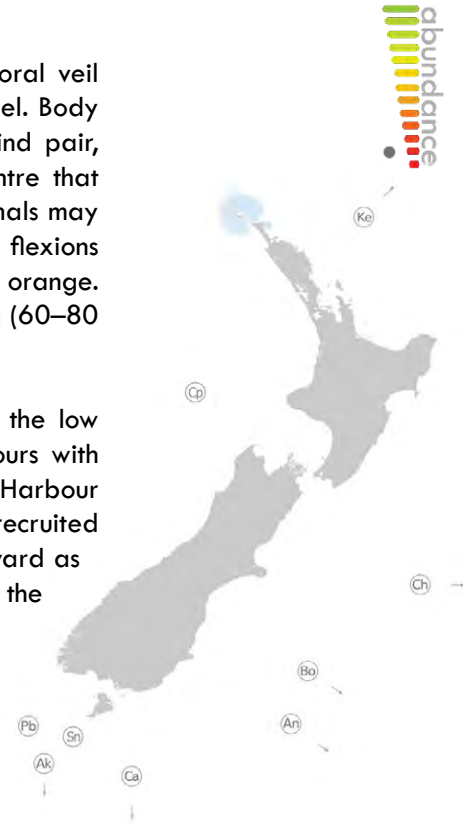


morphology | surface | substrate | habitat

Large, elongate dorid nudibranch, front of head enlarged into a broad oral veil with eight compound papillae on the margin. Tail elongate with a dorsal keel. Body has three pairs of large, branched gills on a narrow lateral ridge; the hind pair, located immediately behind the gills, have globe-like structures in the centre that emit a brief flash of blue light when an animal is attacked. The largest animals may have missing 'globes' suggesting predation. Able to swim by side-to-side flexions of body. Body scarlet, mottled with vivid orange and black, gills pale orange. Rhinophores bright orange with purple tips. Maximum size of adults 100 mm (60–80 mm is more usual).

Feeds on the erect, branching bryozoan *Caberea dichotoma*. Occurs from the low intertidal zone to 15 m in semi-exposed locations; also channels of harbours with little suspended silt. In New Zealand, recorded only from Parengarenga Harbour and Three Kings Islands, but these may be only temporary populations recruited during warm summers; also Lord Howe Island, southeastern Australia (northward as far as southernmost Great Barrier Reef) and Tasmania. Records elsewhere in the western Pacific probably relate to different species.



main image
Crispin Middleton

inset images
Crispin Middleton

Valles, Y., Gosliner, T.M. (2006) Shedding light onto the genera (Mollusca: Nudibranchia) *Kaloplocamus* and *Plocamopherus* with description of new species belonging to these unique bioluminescent dorids. The Veliger, 48: 178–205.

Coleman, N. (2008) Nudibranchs Encyclopedia Catalogue of Asia/Indo-Pacific Sea Slugs. Neville Coleman's Underwater Geographic, Springwood, Australia, 416 p.

Polycera hedgpethi Er. Marcus, 1964

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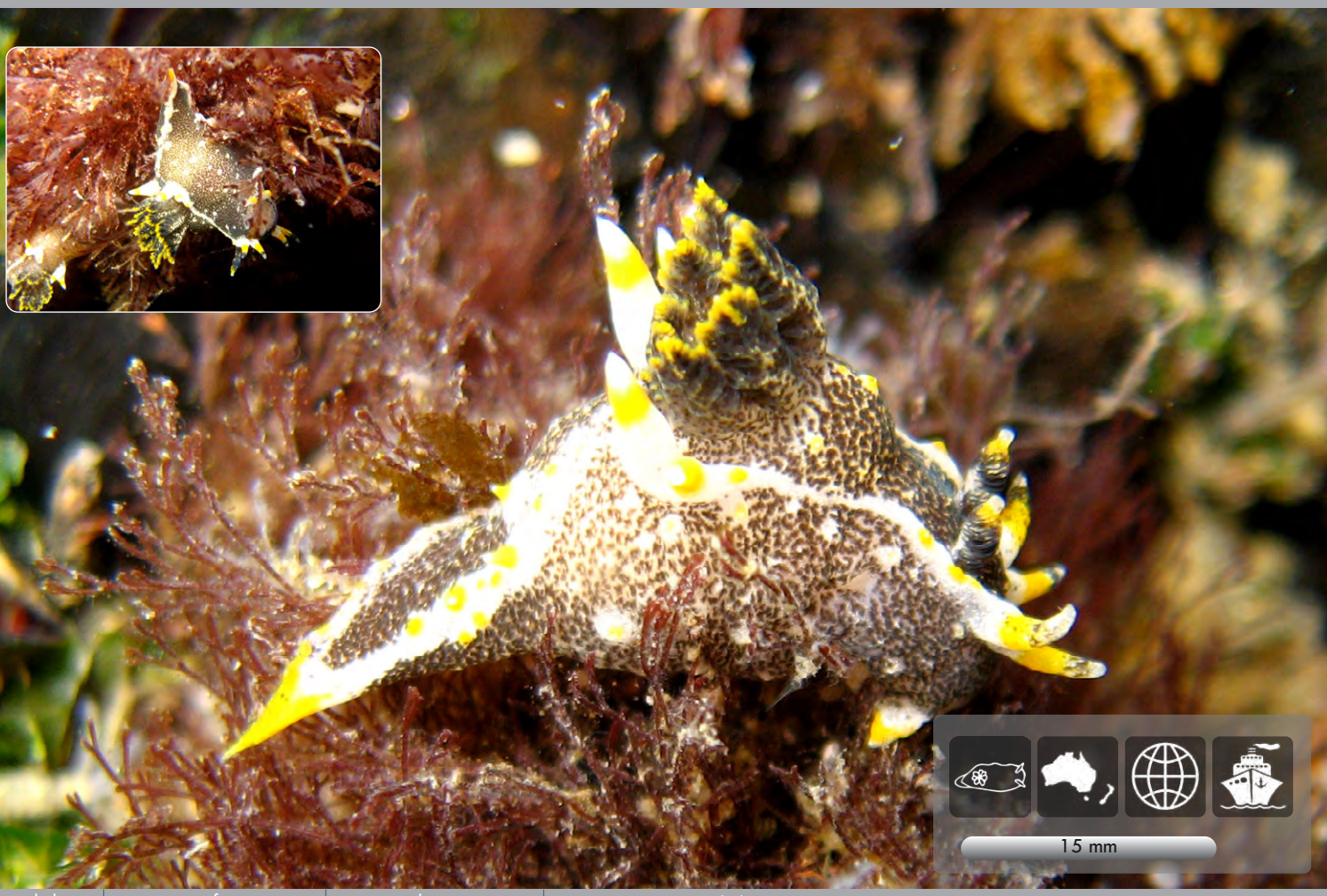
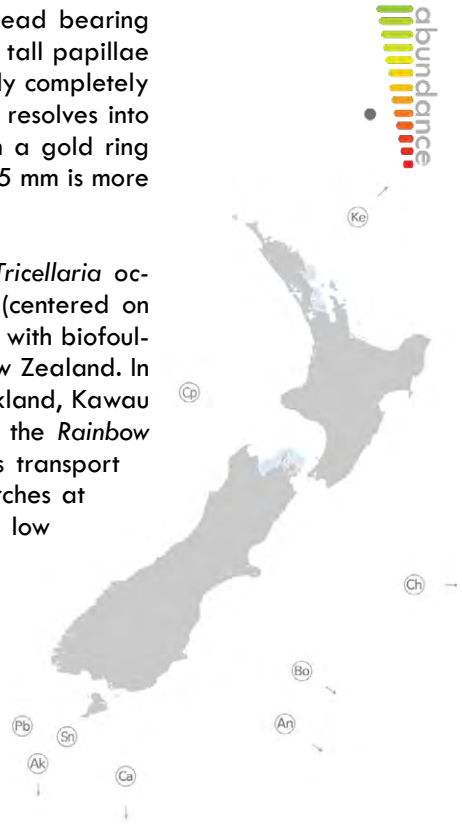
Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Polyceridae



Small, elongate dorid nudibranch that is widest just in front of gills. Front of head bearing four tentacles on the oral veil, two on either side of the midline. Cluster of similar tall papillae (called extra-branchial processes) present besides branched gills. Surface of body completely smooth. Body looks black at first glance, but when magnified the black pigment resolves into dense, dark speckles, and the tentacles and papillae are translucent white with a gold ring towards the centre. Tip of tail also gold. Maximum size of adults is 40 mm (10–15 mm is more usual).

Feeds on erect, branching bryozoans *Bugula neritina*, *Bugulina flabellata* and *Tricellaria occidentalis*. From its presumed original range in the northeastern Pacific Ocean (centered on Japan and the Korean Peninsula, but never accurately delineated), it has spread, with biofouling on ships, to California, South Africa, Spain, Italy, temperate Australia and New Zealand. In New Zealand, permanent populations now occur in harbours at Whangarei, Auckland, Kawau Island, Marlborough Sounds and Nelson. A population was also discovered on the *Rainbow Warrior* shipwreck at the Cavalli Islands off Matauri Bay immediately after its transport from the Waitemata Harbour, but it is unlikely to have persisted. Probably searches at other harbours in the North Island will also reveal its presence. Occurs from the low intertidal zone to 10 m. Most abundant in harbour channels.

Sometimes mistaken for *Polycera fujitai*; but that species has up to ten short tentacles on its oral veil, and the background colour is pale orange with black spots on low pustules all over the mantle and sides of foot.



It could also be.....
Polycera fujitai

main image
Chris Woods

inset image
Chris Woods

Miller, M.C. (2001) Description of the dorid nudibranchs *Polycera hedgpethi* Marcus, 1964 and *P. fujitai* Baba, 1937 in New Zealand. Journal of Molluscan Studies, 67: 489–497.

Wilson, N. (2006) New record of the nudibranch *Polycera hedgpethi* Er. Marcus, 1964, in South Australia, with a discussion on is occurrence in Australia. Records of the Western Australian Museum, Supplement 69: 137–140.

Polycera fujitai Baba, 1937

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Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Polyceridae

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Small, elongate dorid nudibranch with a soft, long and narrow body. The front of the head bears up to ten tiny tentacles on the oral veil, five on either side of the midline. Similar, but shorter papillae occur all along edge of the mantle. Entire surface of body covered with numerous papillae and pustules. Background colour cream-orange with black spots on pustules. Maximum size of adults 25 mm (15–20 mm is more usual).

Feeds on erect, branching bryozoan *Tricellaria occidentalis*. From its presumed original range in the northeastern Pacific Ocean (centered on Japan and the Korean Peninsula, but never accurately delineated), it has spread with biofouling on ships to New Zealand since the late 1990s. In New Zealand, populations are now known from Auckland and Nelson harbours, but it is not certain that they are permanent. Known only from the immediate subtidal.

Sometimes mistaken for *Polycera hedgpethi*, but that species has four large tentacles on its oral veil, the body is smooth and the background colour is black.

It could also be.....
Polycera hedgpethi

main image
Chris Woods

inset image
Chris Woods

Hamatani, I. (2000) Family Polyceridae. PP. 781–783 In: Okutani, T. (ed.) Marine Mollusks in Japan. Tokai University Press, Tokyo, Japan, 1173 p.
Miller, M.C. (2001) Description of the dorid nudibranchs *Polycera hedgpethi* Marcus, 1964 and *P. fujitai* Baba, 1937 in New Zealand. Journal of Molluscan Studies, 67: 489–497.

Tambja verconis (Basedow & Hedley, 1905)

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Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Polyceridae

morphology | surface | substrate | habitat

Large, conspicuous and distinctive, soft-bodied dorid nudibranch that is widest and highest at the level of the gills. Front of head slightly enlarged, but without any tentacles or papillae. There is a pair of slit-like organs of unknown function on sides of head in front of rhinophores. Body surface noticeably wrinkled, with low pustules on back and sides. Colouration striking – background bright yellow with large sky-blue spots and streaks. Oral veil and foot with blue band. Rhinophores black. Gills have yellow bases, blue leading edges and black pinnae. Maximum size of adults 130 mm (70–90 mm is more usual).

As far as is known, this sea slug feeds exclusively on the erect, branching bryozoan *Viridentula dentata* (previously universally known as *Bugula dentata*). In New Zealand, a permanent population probably exists only at the Poor Knights Islands, with temporary populations in other localities directly bathed by the East Australian Current such as Cape Karikari and the Mokohinau Islands; also throughout southern Australia and Tasmania. Occurs from 4–40 m (commonest in 8–15 m).

main image
Rachel Boschen

inset image
Crispin Middleton

Pola, M., Cervera, J.L., Gosliner, T.M. (2006) Taxonomic revision and phylogenetic analysis of the genus *Tambja* Burn, 1962 (Mollusca, Nudibranchia, Polyceridae). Zoologica Scripta 35: 491–530.

Willan, R.V., Chang, Y.-W. (2017) Description of three new species of *Tambja* (Gastropoda, Nudibranchia, Polyceridae) from the western Pacific Ocean reveals morphological characters with taxonomic and phylogenetic significance for traditional Polyceridae and related 'phanerobranch' nudibranchs. Basteria 81: 1–23.

Tyrannodoris luteolineata (Baba, 1936)

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Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Polyceridae

morphology | surface | substrate | habitat

Previously known in New Zealand under the incorrect names of *Nembrotha affinis*, *Tambja affinis*, *Nembrotha kubaryana* and *Roboastra luteolineata*.

Large, conspicuous and distinctive, soft-bodied dorid nudibranch that is highest at the level of the gills. Front of head enlarged, but without any papillae. Oral tentacles large, tube-like because of a dorso-lateral groove. Body surface smooth. Background colour bright yellow with longitudinal black lines, rhinophores black, two pale green patches on top of head between rhinophores, gill axis cream or pale green on outside, pinnae black. Maximum size of adults 70 mm (50–60 mm is more usual).

Rapacious predator of other large polycerid nudibranchs (sometimes even larger than itself!), particularly *Tambja verconis* in New Zealand, which it tracks down and ingests whole. In New Zealand waters, a permanent population probably exists only at the Poor Knights Islands; elsewhere widespread throughout the (tropical and warm temperate) Western Pacific Ocean. Occurs from 7–20 m.

main image
Rachel Boschen

inset image
Crispin Middleton

Pola, M., Cervera, J.L., Gosliner, T.M. (2006) Taxonomic revision and phylogenetic analysis of the genus *Tambja* Burn, 1962 (Mollusca, Nudibranchia, Polyceridae). Zoologica Scripta 35: 491–530.

Willan, R.V., Chang, Y.-W. (2017) Description of three new species of *Tambja* (Gastropoda, Nudibranchia, Polyceridae) from the western Pacific Ocean reveals morphological characters with taxonomic and phylogenetic significance for traditional Polyceridae and related 'phanerobranch' nudibranchs. Basteria 81: 1–23.

Trapania rudmani Miller, 1981

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Slender, active nudibranch. Body smooth and no mantle brim, widest at level of gills, tapering gradually to a long tail. Foot corners expanded and tapered. When examined closely, two pairs of slender, finger-like processes are observed – one each besides the rhinophores and gills. Gills can be contracted but not retracted below body surface. Body translucent milk-white with a vivid yellow line up the outside of each process. Maximum size of adults 24 mm (12–18 mm is more usual).

Feeds suctorially on kamptozoans (popularly called 'nodding heads'). Most often encountered amongst assemblages of encrusting organisms, particularly sponges, that are developed prolifically on deep rocky reefs where clear water conditions persist. Occurs throughout both islands of mainland New Zealand; also Three Kings Islands. Endemic to New Zealand. Occurs from the low intertidal (very rare) to 20 m (commonest in 5–10 m).

main image
Chris Woods

inset image
Chris Woods

Miller, M.C. (1981) *Trapania rudmani*, a new dorid nudibranch (Gastropoda: Opisthobranchia) from New Zealand. New Zealand Journal of Zoology 8: 5–9.
Willan, R.C., Coleman, N. (1984) Nudibranchs of Australasia. Australasian Marine Photographic Index, Caringbah, Australia, 56 p.

Cadlina willani Miller, 1980

Willan's nudibranch

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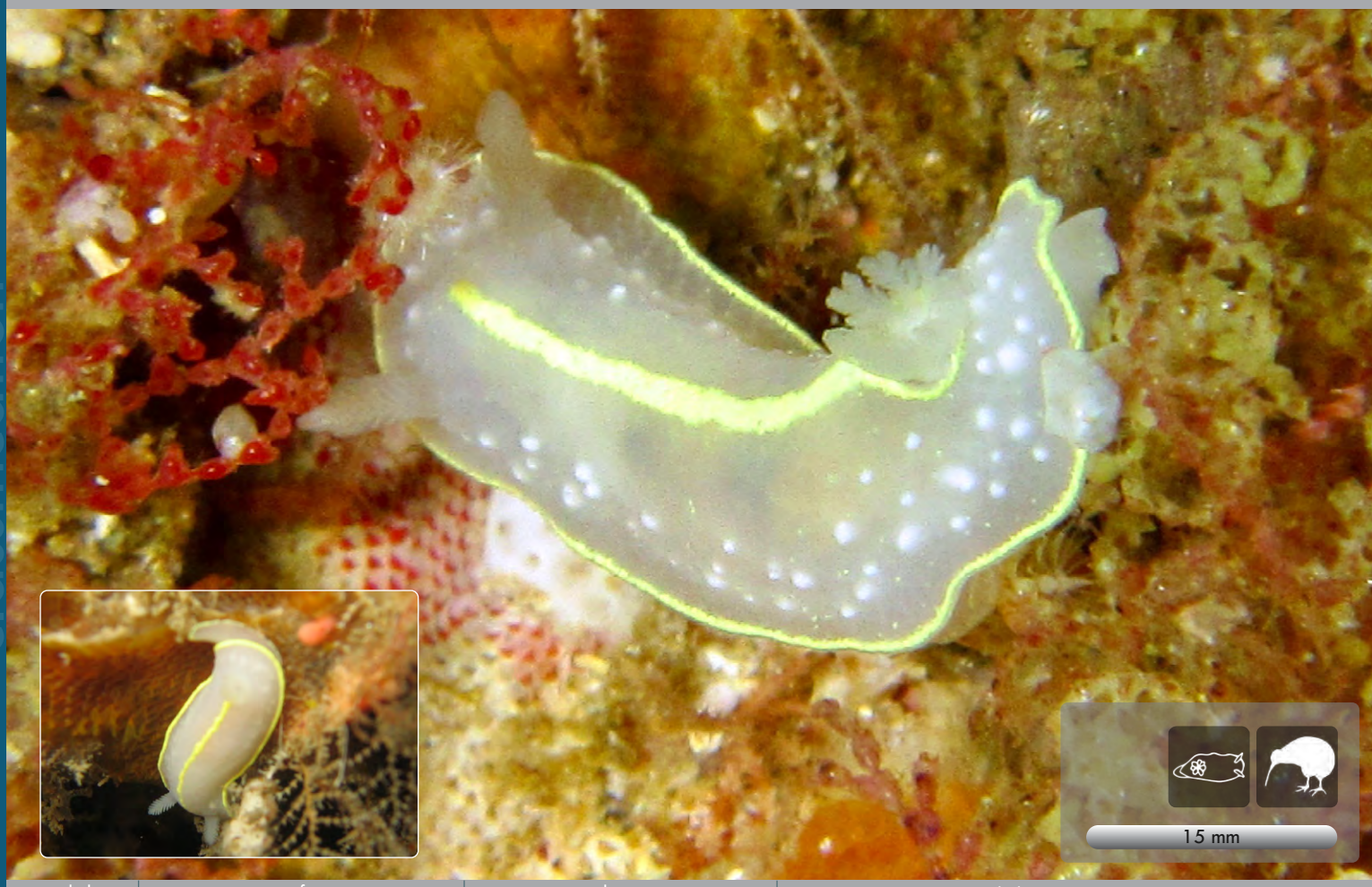
Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Cadlinidae



morphology | surface | substrate | habitat

Small, firm-bodied dorid nudibranch. Mantle with small, rounded pustules when examined closely. Oral tentacles small and triangular, grooved along outer edge. Easily identifiable by the distinctive colouration - mantle translucent white with a bright lemon-yellow longitudinal stripe that forks into two short branches just in front of the gills (only one individual has ever been recorded that lacks this stripe); pustules opaque white. Both mantle and foot have a narrow, pale yellow marginal band. Rhinophores and branched gills are uniformly white. Maximum size of adults 21 mm (12–15 mm is more usual).

Feeds on siliceous sponges. Lives amongst assemblages of encrusting organisms on rocky reefs. Probably the commonest nudibranch, subtidally, in New Zealand. The usual depth range is from the lowest intertidal to 25 m (commonest in 10–18 m); it is more frequent intertidally in the South Island. Endemic to New Zealand. Occurs from the Three Kings Islands to Banks Peninsula on the east coast and to New Plymouth on the west coast.

It could be mistaken for *Goniobranchus aureomarginatus*; but that species is more elongate and narrow, its mantle is completely smooth, and it has narrow, gold and opaque white bands at the mantle margin.

It could also be.....

Goniobranchus aureomarginatus

main image
Herbert Segmuller

inset image
Rachel Boschen

Miller, M.C. (1980) *Cadlina willani*, a new dorid nudibranch from New Zealand (Gastropod: Opisthobranchia) from New Zealand. New Zealand Journal of Zoology 7: 165–171.

Willan, R.C., Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Ceratosoma amoenum (Cheeseman, 1886)

clown nudibranch

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Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Chromodoridae

classification

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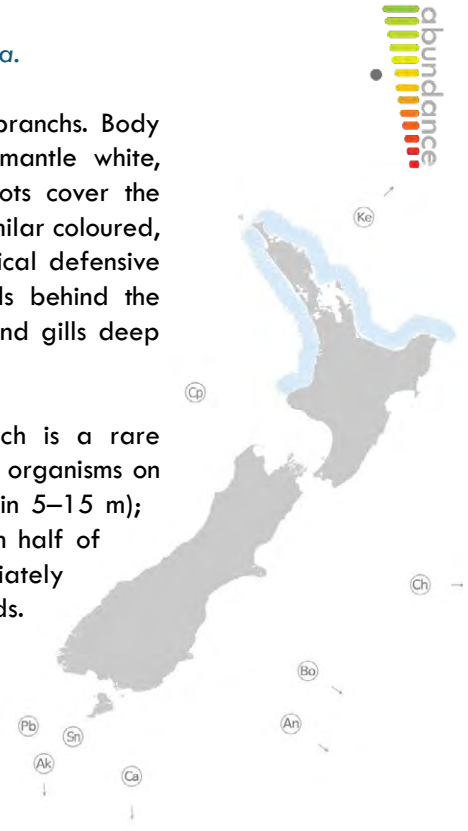
Widely known in New Zealand under the former name of *Chromodoris amoena*.

Probably the most conspicuous and best known of all New Zealand's nudibranchs. Body elongate and smooth, soft and easily deformed. Background colour of mantle white, tending to creamy yellow near margin; large, irregular, vivid orange spots cover the mantle; size and number of spots varies considerably between individuals. Similar coloured, but smaller, spots occur on sides of body and top of foot. A row of spherical defensive glands occurs all around the mantle edge, aggregated into large glands behind the gills and small, single glands, around the rest of the mantle. Rhinophores and gills deep magenta-red. Maximum size of adults 60 mm (25–30 mm is more usual).

Feeds on siliceous sponges; sometimes aggregates on food sponge, which is a rare behaviour for sea slugs in general. Lives amongst assemblages of encrusting organisms on rocky reefs. Depth range is from the lowest intertidal to 40 m (commonest in 5–15 m); more frequent intertidally. In New Zealand, occurs only around the northern half of the North Island – to East Cape on the east coast and to Tataraimaka (immediately south of New Plymouth) on the west coast; absent from the Three Kings Islands. Occurs around temperate southeast Australia, Lord Howe Island and Norfolk Island, though the colour patterns in these localities are consistently different to those in New Zealand.



main image
Crispin Middleton

inset images
Peter Marriott
Crispin Middleton

Rudman, W.B. (1988) The Chromodorididae (Opisthobranchia: Mollusca) of the Indo-West Pacific: the genus *Ceratosoma* J. E. Gray. Zoological Journal of the Linnean Society 93: 133–185.

Willan, R.C., Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Goniobranchus aureomarginatus (Cheeseman, 1881)

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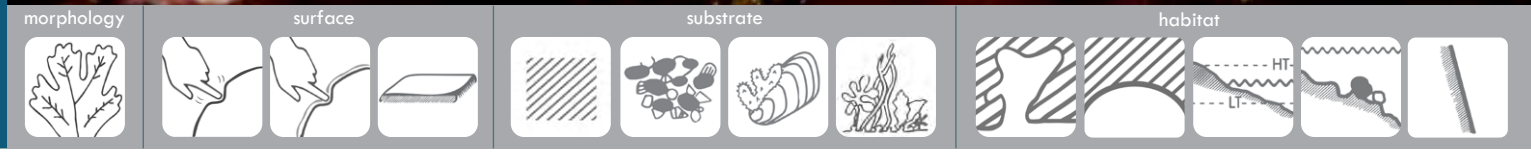
Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Chromodoridae

classification



Widely known in New Zealand under the former name of *Chromodoris aureomarginata*.

Moderately large, narrow-bodied dorid nudibranch. Mantle very soft and completely smooth, expanded slightly in front of the rhinophores. The tail extends behind the rear of the mantle when animal is crawling actively. Mantle uniformly opaque white, with a thin golden or orange-yellow band submarginally and a thin white band marginally. The foot is translucent white with a thin white marginal band. Rhinophores and gills are plain white. Maximum size of adults 45 mm (25–30 mm is more usual).

Feeds on siliceous sponges. Lives amongst assemblages of encrusting organisms on rocky reefs. Depth range is from the lowest intertidal to 24 m (commonest in 5–10 m). Endemic to New Zealand. Occurs around both main islands of New Zealand, also Three Kings Islands and Chatham Islands.

Sometimes mistaken for *Cadlina willani*, but that species is smaller, firmer-bodied and more rounded in outline, its mantle is covered with low pustules, it has a vivid yellow median stripe on the mantle, and there is a pale lemon-yellow band at the mantle margin.

It could also be.....
Cadlina willani

main image
Crispin Middleton

inset images
Chris Woods
Crispin Middleton

Rudman, W.B. (1985) The Chromodorididae (Opisthobranchia: Mollusca) of the Indo-West Pacific: *Chromodoris aureomarginata*, *C. verrieri* and *C. fidelis* colour groups. Zoological Journal of the Linnean Society 83: 241–299.
Willan, R.C., Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Aphelodoris luctuosa (Cheeseman, 1882)

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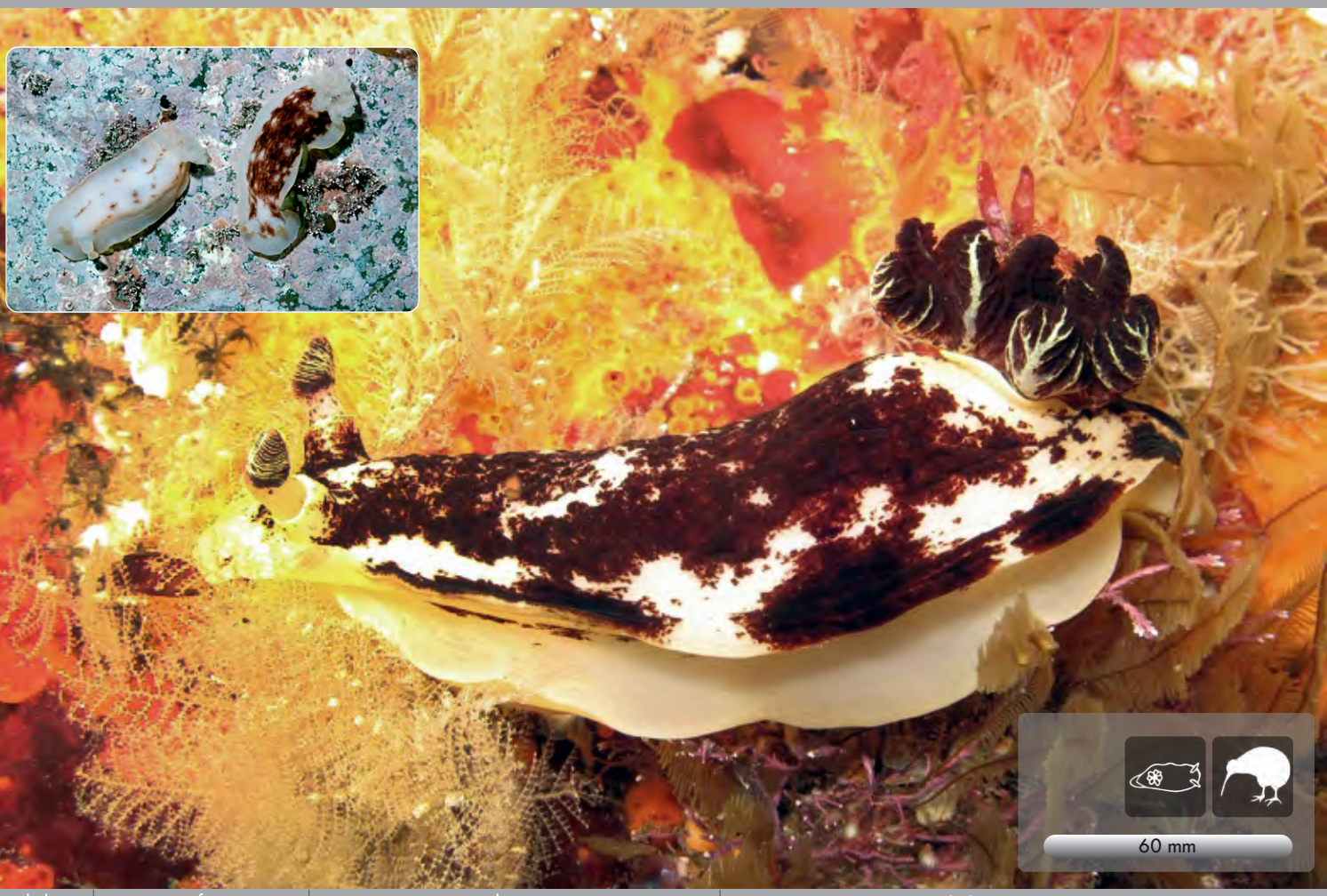

morphology | surface | substrate | habitat

Although treated as a single species, *Aphelodoris luctuosa* is almost certainly a group of species endemic to New Zealand.

Medium-sized, soft-bodied dorid nudibranch. Body narrow, elongate, smooth. Upper lip of the mucous gland, at the front of the foot, lacks a philtrum. Rhinophores and gill pockets have elevated rims. There is extensive variation in the colouration of the mantle between individuals and locations. The commonest colour form in northern New Zealand has a cream background with a pattern of chocolate reticulations, radial bands and mid-dorsal blotches. The commonest colour form in southern New Zealand has a uniformly creamy mantle with a faint yellow marginal band. Maximum size of adults 75 mm (45–60 mm is more usual).

Feeds on siliceous sponges. Lives amongst assemblages of encrusting organisms on rocky reefs. The depth range is from low intertidal to 40 m (commonest in 10–20 m). Endemic to New Zealand. Occurs throughout both main islands; also Three Kings Islands and Chatham Islands.

main image
Crispin Middleton

inset image
Richard Willan

Coleman, N. (2008) Nudibranchs Encyclopedia Catalogue of Asia/Indo-Pacific Sea Slugs. Neville Coleman's Underwater Geographic, Springwood, Australia, 416 p.
Willan, R.C., Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Doris wellingtonensis Abraham, 1877

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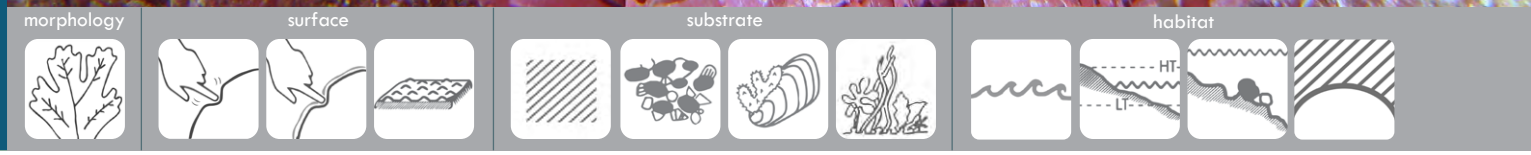

Growing to the size of a rugby ball, this is easily New Zealand's largest nudibranch. Body firm, fleshy, and very convex or domed in profile. Mantle covered with large, close-set, soft, dome-shaped pustules, the biggest in the middle. Unlike the mantle, the foot's upper surface is completely smooth. Upper lip of mucous gland, at the front of the foot, without a philtrum. Gills are particularly large, being almost pressed flat onto the mantle when fully extended. The dorsal surface is uniformly khaki brown to pale yellowish; gills are paler than the body; foot sole bright orange. Maximum size of adults 300 mm (70–100 mm is more usual).

Feeds on siliceous sponges of the genera *Halichondria* and *Hymeniacidon*. It is not uncommon to find groups of 3–5 individuals aggregated together, but not feeding. Lives amongst assemblages of encrusting organisms on rocky reefs, often where kelp provides shelter. Depth range is from the low intertidal to 20 m (commonest in 0–3 m). Occurs around both main islands of New Zealand and Chatham Islands. Also central and eastern Victoria and Tasmania.

main image
Chris Woods

Debelius, H., Kuiter, R.H. (2007). Nudibranchs of the World. IKAN-Unterwasserarchiv, Frankfurt, Germany, 361 p.
Willan, R.C., Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Carminodoris nodulosa (Angas, 1864)

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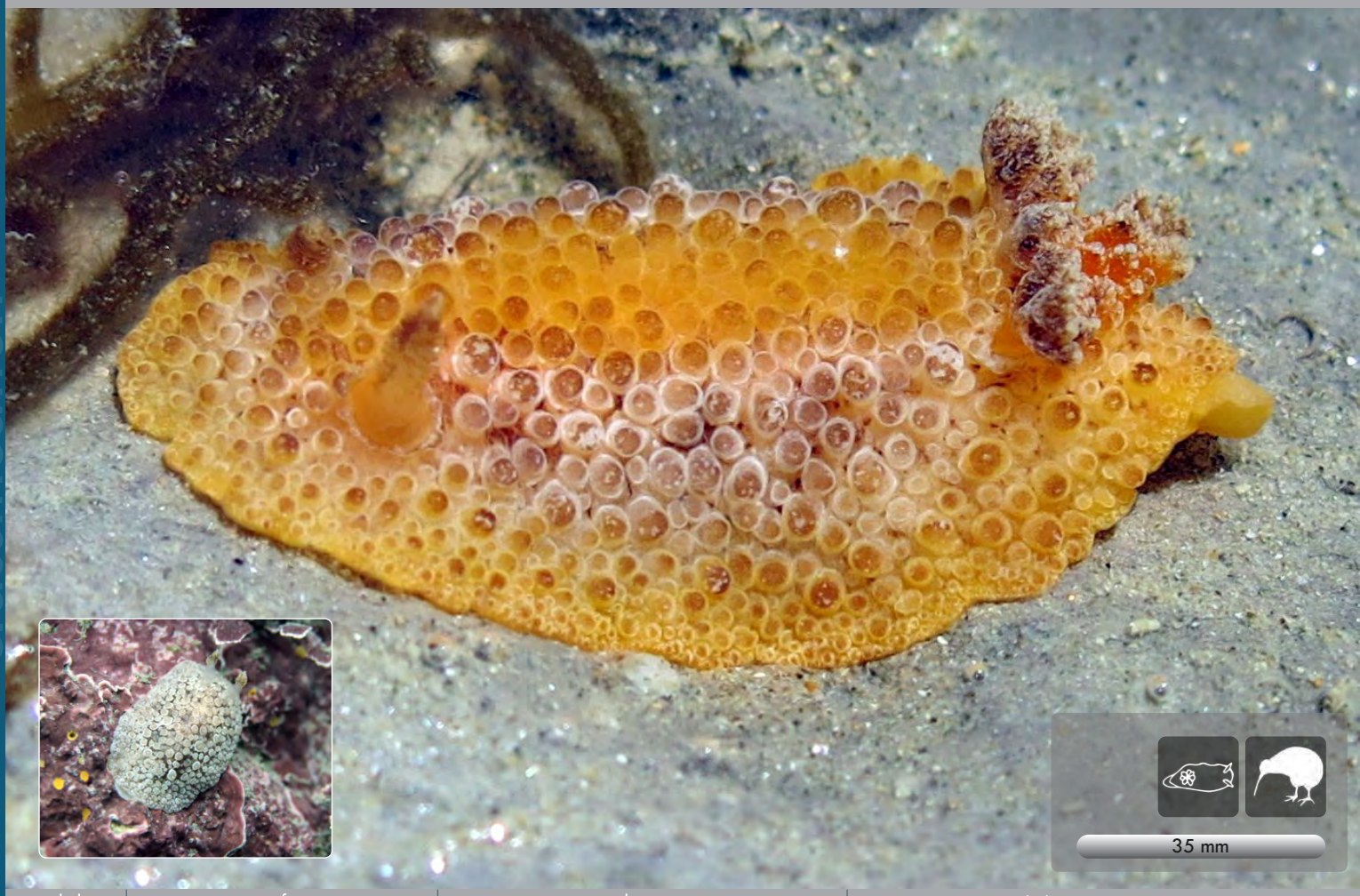
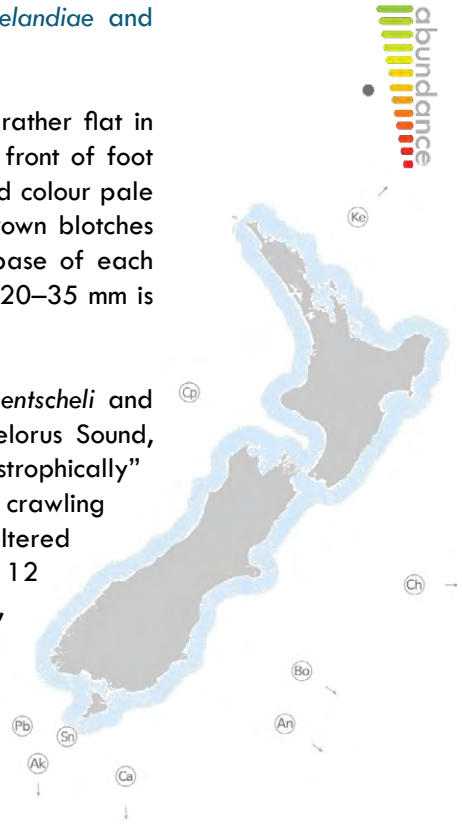
Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Discodoridae



Previously known in New Zealand under the names of *Homoiodoris novaezelandiae* and *Hoplodoris nodulosa*.

Medium-sized, soft-bodied dorid nudibranch. Body broadly ovate in outline, rather flat in profile. Mantle covered with rounded pustules. Upper lip of mucous gland at front of foot without a philtrum. Rim of rhinophoral pocket low, irregularly wavy. Background colour pale and translucent, darker centrally, variable – yellow, brown or grey – with brown blotches and radial markings laterally; an unpigmented zone that is present at the base of each pustule appears as a conspicuous white ring. Maximum size of adults 52 mm (20–35 mm is more usual).

Feeds on siliceous sponges; two of which have been identified as *Mycale hentscheli* and *Plakina monolopha*. Trial commercial aquaculture of the former species in Pelorus Sound, Marlborough Sounds, for the supply of pharmacological compounds was "catastrophically" affected by predation of this nudibranch. Individuals are sometimes observed crawling head-to-tail in pairs. Lives amongst assemblages of encrusting organisms on sheltered rocky reefs and muddy shell rubble. Depth range is from the low intertidal to 12 m (commonest intertidally). Occurs around both main islands of New Zealand, more common in the South Island; not Three Kings Islands or Chatham Islands. Also southern Australia.



It could also be.....
juvenile *Doris wellingtonensis*

main image
Chris Woods

inset image
Rachel Boschen

Thompson, T.E. (1975) Dorid nudibranchs from eastern Australia (Gastropoda, Opisthobranchia). Journal of Zoology, London 176: 477–515.
Page, M.J., Handley, S.J., Northcote, P.T., Cairney, D., Willan, R.C. (2011) Successes and pitfalls of the aquaculture of the sponge *Mycale hentscheli*. Aquaculture 312: 52–61.

Alloiodoris lanuginata (Abraham, 1877)

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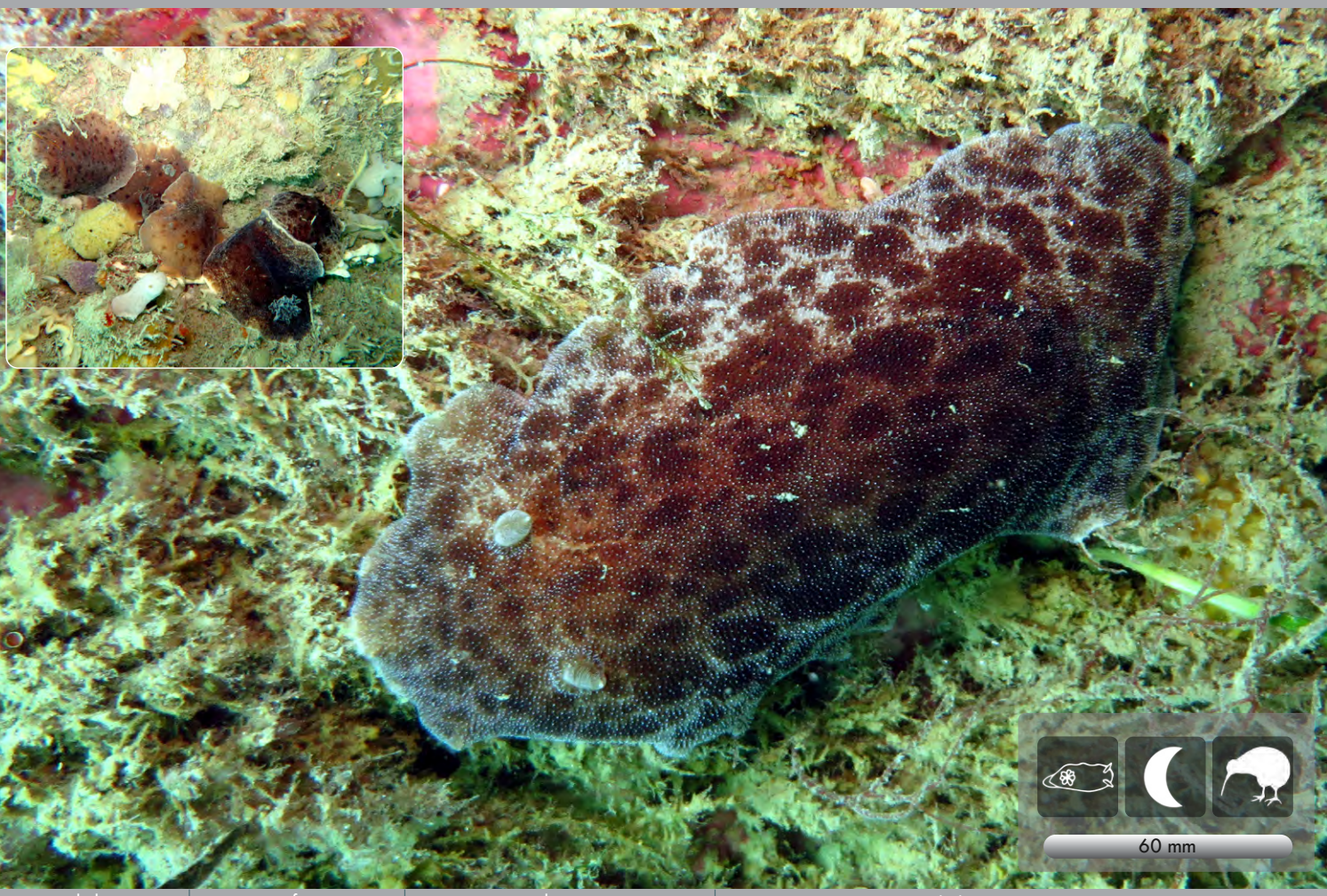
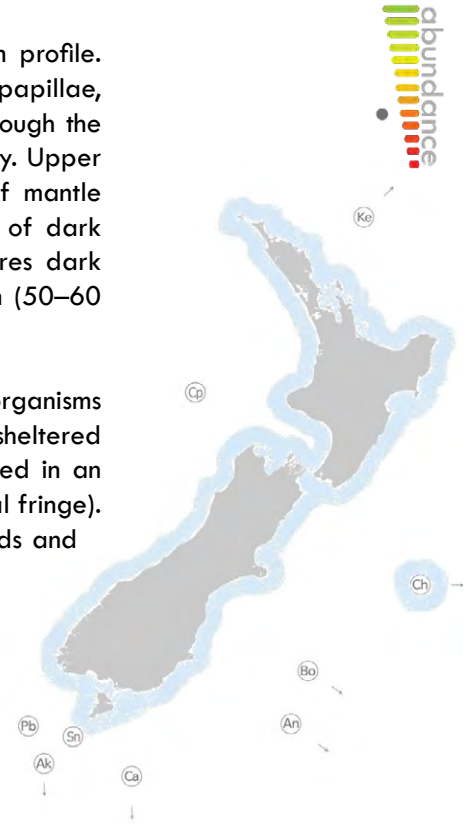
Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Discodoridae



morphology | surface | substrate | habitat

Large, firm-bodied dorid nudibranch. Body broadly ovate in outline, flat in profile. Mantle feels like sandpaper because of numerous, microscopic spicule-laden papillae, but they are not true caryophyllidia because the spicules do not emerge through the skin. Some people can detect a faint aroma when the mantle is rubbed lightly. Upper lip of mucous gland at front of foot with a philtrum. Background colour of mantle variable – dull reddish brown to grey – darker centrally, with an overlay of dark brown spots and white speckles that produce a mottled pattern. Rhinophores dark orange to black. Gills speckled, dark grey. Maximum size of adults 80 mm (50–60 mm is more usual).

Feeds on siliceous sponges. Lives amongst assemblages of encrusting organisms in rocky habitats. Occurs in exposed, through semi-exposed, to semi-sheltered situations. Nocturnal; retreats under stones during the day, rarely encountered in an aggregation. Occurs from the low intertidal to 17 m (commonest in the subtidal fringe). Endemic to New Zealand, occurs around both main islands, Three Kings Islands and Chatham Islands.



main image
Chris Woods

inset image
Rachel Boschen

Morton, J.E., Miller, M.C. (1968) The New Zealand Sea Shore. Collins, Auckland, New Zealand, 638 p.
Willan, R.C., Morton, J.E. (1984) Cape Rodney to Okakari Point Marine Reserve Marine Molluscs Part 2 Opisthobranchia. Leigh Marine Laboratory, Leigh, New Zealand, 106 p.

Rostanga muscula (Abraham, 1877)

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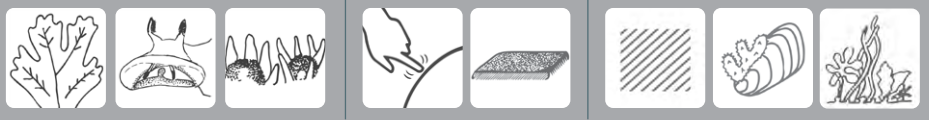

Widely known under the former name of *Rostanga rubicunda*.

Small, firm-bodied dorid nudibranch. Body elongate in outline, highly rounded in profile. When removed from its substrate, the sides of the mantle curve round to touch each other ventrally, thus completely enclosing the foot. Mantle smooth, feels like sandpaper because of numerous, microscopic caryophyllidia. Upper lip of mucous gland at front of foot with a philtrum. Gills directed upwards when extended, forming a vertical cylinder. Background colour of mantle uniformly bright scarlet red, with the central area somewhat darker; scattered black or very dark brown spots produce a mottled effect. Maximum size of adults 22 mm (12–18 mm is more usual).

Feeds on siliceous sponges in the family Microcionidae, all of which are reddish in colour and on which it is well camouflaged. There is a clear order of preference, with *Clathria coccinea* most preferred, then an unidentified species of *Ophlitaspongia*, then *Antho novizelanica*. Lives amongst assemblages of encrusting organisms in rocky habitats, often in groups under stones. Occurs throughout the entire range of situations – from exposed, through semi-exposed, to sheltered. Almost exclusively intertidal; from mid-tidal (where commonest) to sublittoral fringe. Endemic to New Zealand, occurs around the North Island but only Marlborough Sounds in the South Island.

main image
Neil Wright

inset image
Richard Willan

Ayling, A.M. (1968) The feeding behaviour of *Rostanga rubicunda* (Mollusca, Nudibranchia). Tane 14: 25–42.
Rudman, W.B., Avern, G.J. (1989) The genus *Rostanga* (Nudibranchia: Doridiidae) in the Indo-West Pacific. Zoogical Journal of the Linnean Society 96: 281–338.

Dendrodoris citrina (Cheeseman, 1881)

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Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Dendrodoridae

classification

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Medium-sized, soft-bodied dorid nudibranch. Body elongate in outline; mantle broad, wider than foot, slightly rounded in profile, almost smooth apart from a few low pustules, soft and gelatinous. No oral tentacles. Background colour of mantle highly variable – lemon yellow (most often), apricot, dark orange, rust-red, brownish white – invariably with white spots and a scatter of tiny white dots around the margin, but never white lines. Maximum size of adults 75 mm (45–65 mm is more usual).

Feeds on siliceous sponges by digesting material with enzymes in expelled saliva and then sucks in the liquefied food. Often in groups under stones. Common across multiple exposures and habitats; present in all situations, but rarest on the most exposed coasts. Occurs from mid-tidal zone, to low-tidal zone (where commonest), to sublittoral fringe, to 11 m subtidally. Tolerates drying out when stranded by the receding tide. Endemic to New Zealand, occurs around both main islands, also Three Kings Islands. Not Chatham Islands.

Red and brown colour forms of *Dendrodoris citrina* could be mistaken for *Alloiodoris lanuginata*; but that species has a rougher mantle and it posesses oral tentacles.

It could also be.....

Alloiodoris lanuginata

main image
Richard Willan

inset images
Chris Woods

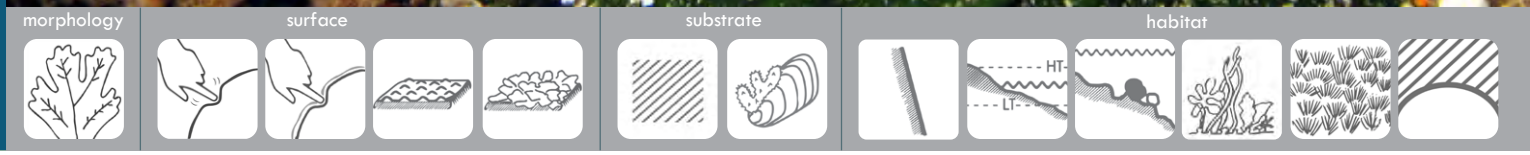
Willan, R.C., Coleman, N. (1984) Nudibranchs of Australasia. Australasian Marine Photographic Index, Caringbah, Australia, 56 p.
Willan, R.C., Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Dendrodoris krusensternii (Gray, 1850)

Return to Index

Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Dendrodoridae

classification



Formerly known in New Zealand as *Doridopsis mammosa*, *Doridopsis gemmcea* and *Dendrodoris denisoni*.

One of the most conspicuous and strikingly coloured of all New Zealand's nudibranchs, it is claimed to be New Zealand's "loveliest nudibranch". Medium-sized, soft-bodied dorid nudibranch. Body elongate in outline, mantle broad, wider than foot, ornamented with high, rounded, soft and gelatinous pustules of different sizes, border very wavy. No oral tentacles. Gills very large and spreading. Background colour of mantle light fawn to grey, pustules pale with white spots and streaks, smooth areas between pustules (particularly those closest to the centre of the body) chocolate brown and containing several vivid peacock blue spots, border with prominent concentric white lines. Foot pale pink. Maximum size of adults 80 mm (60–70 mm is more usual).

Feeds on siliceous sponges by digesting material with enzymes in expelled saliva and then sucks in the liquefied food. Occurs only in semi-sheltered situations, frequently crawling in the open during the day, from the low-tidal zone to 20 m. Occurs along North Island's east coast to the Bay of Plenty, also Three Kings Islands. Also found at Lord Howe and Norfolk Islands, and temperate southeastern Australia. Elsewhere wide-ranging in tropical and warm temperate waters of the Indo-Pacific Ocean.

main image
Crispin Middleton

Willan, R.C., Coleman, N. (1984) Nudibranchs of Australasia. Australasian Marine Photographic Index, Caringbah, Australia, 56 p.
Willan, R.C., Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Dendrodoris nigra (Stimpson, 1885)

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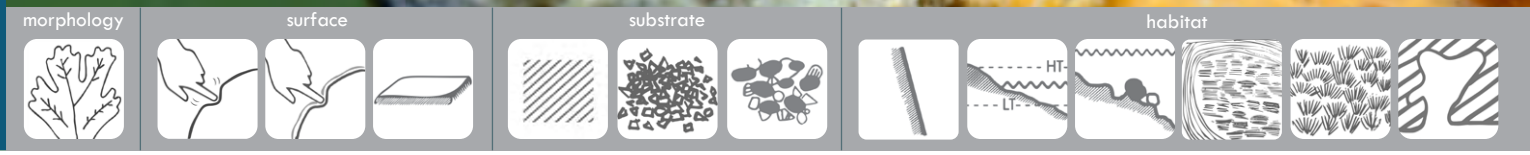

Formerly known in New Zealand as *Doriopsilla australis*.

Medium-sized, soft-bodied dorid nudibranch. Body elongate. Mantle broad, wider than foot, slightly rounded in profile, completely smooth, soft and gelatinous, margin frilly. No oral tentacles. Highly polymorphic; background colour of mantle ranges from velvet black to dark grey, sometimes with white spots and/or a red marginal band. Rhinophores black, with white tips. Juveniles are completely orange-red and they change to black when 10–15 mm long. Maximum size of adults 65 mm (30–50 mm is more usual).

Feeds on siliceous sponges by digesting material with enzymes in expelled saliva and then sucks in the liquefied food. Occurs on sheltered shores (where commonest) and semi-open situations; never exposed coasts. Occurs from mid-tidal zone to low-tidal zone (where commonest), to 5 m. In New Zealand occurs around the North Island and to Banks Peninsula on the east coast of the South Island; also Three Kings Islands. Not Chatham Islands. Elsewhere widespread in the tropical and warm temperate Indo-Pacific Ocean.

main image
Crispin Middleton

inset image
Crispin Middleton

Brodie, G.D, Willan, R.C., Collins, J.D. (1997) Taxonomy and occurrence of *Dendrodoris nigra* and *Dendrodoris fumata* (Nudibranchia: Dendrodoridae) in the Indo-West Pacific Region. Journal of Molluscan Studies 63: 407–423.
Willan, R.C., Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Phyllidiella pustulosa Cuvier, 1804

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Although treated as a single species in this guide, *Phyllidiella pustulosa* is actually a numerically large group of similar-looking species. This account relates only to the single species occurring within the New Zealand EEZ, i.e., at the Kermadec Islands.

Medium-sized, very firm nudibranch. Body elongate-ovate, narrow when crawling. Mantle broad, wider than foot, slightly rounded in profile, rough to touch. Gills located ventrally, as a series of leaflets, between mantle and foot. Background black or grey with irregular clusters of compound pink pustules. Sole of foot pale grey. Maximum size of adults 74 mm (30–60 mm is more usual).

Feeds on siliceous sponges by digesting material with enzymes in expelled saliva and then sucks in the liquefied food. Readily produces a white fluid from the mantle when attacked. Occurs on semi-exposed and exposed situations; never sheltered situations. Strictly subtidal, from 2–27 m (most common in 6–15 m). In New Zealand EEZ only recorded from the Kermadec Islands, where it is common. Elsewhere assumed to be widespread in the tropical and warm temperate Indo-Pacific Ocean.

main image
Peter Chapman-Smith

Brunckhorst, D.J. (1993) The systematics and phylogeny of phyllidiid nudibranchs. Records of the Australian Museum Supplement 16: 1–107.
Willan, R.C., Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Tritonia incerta Bergh, 1904

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Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Tritoniidae

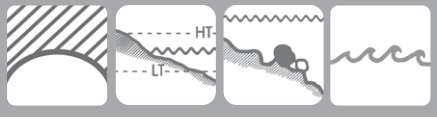
120 mm

morphology

surface

substrate

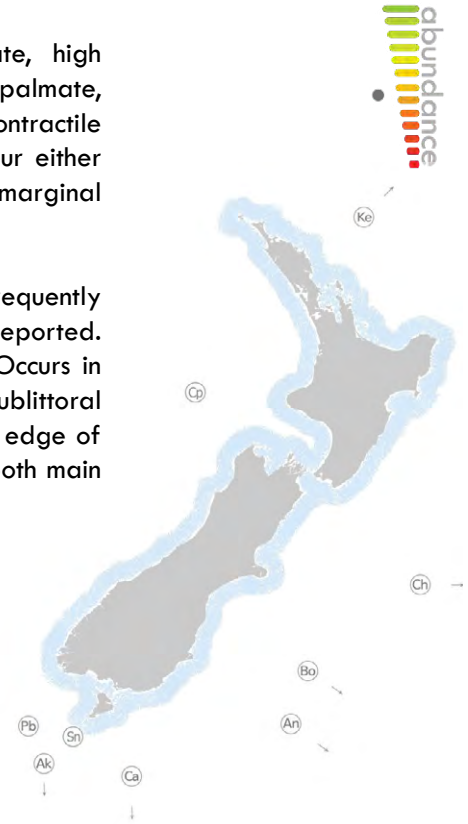
habitat



to 250 m

Spectacular, large-sized, soft-bodied tritoniid nudibranch. Body elongate, high when crawling. Oral veil with 10 or 12 finger-like tentacles. Rhinophores palmate, surrounded by high tubular sheaths. Gills consisting of about 24 non-contractile tufts arranged evenly along either side of mantle margin. Background colour either apricot-orange, or pale rose-pink, or (rarely) red. Foot always with white marginal band. Maximum size of adults 130 mm (80–120 mm is more usual).

Feeds on several species of soft coral of the family Alcyoniidae, most frequently *Alcyonium* cf. *aurantiacum*. Usually solitary, but groups occasionally reported. Lives on a wide variety of substrates – from rocky reefs to muddy sands. Occurs in open to semi-protected situations; never sheltered situations. Occurs from sublittoral fringe, through shallow subtidal (most often encountered in 10–20 m), out to edge of continental shelf (approx. 250 m). Endemic to New Zealand; occurs around both main islands; also Three Kings Islands. Not Chatham Islands.



main image
Mike Page

inset image
Rob Stewart

Powell, A.W.B. (1937) New species of nudibranchiate Mollusca from Auckland waters. Records of the Auckland Institute and Museum 2(2), 119–124.

Willan, R.C., Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Phylliroe lichtensteinii Eschscholtz, 1825

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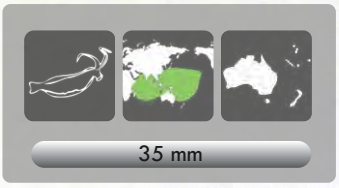

morphology | surface | substrate | habitat

Formerly known in New Zealand as *Phylliroe bucephala*.

Body so modified that it is almost unrecognisable as a nudibranch; shaped more like a fish – even with a forked tail fin, greatly compressed sideways (shrinks to just 1–2 mm thick between meals). Foot completely lacking. Long head tentacles (rhinophores) are the only external appendages. Completely transparent – brownish (as here) or pinkish, with hundreds of tiny light organs appearing as tiny purplish speckles. Luminesces brightly at night. Maximum size of adults 35 mm.

Planktonic; lives permanently in mid-water where it swims with graceful undulations of the whole body. Adults feed on a range of planktonic cnidarians including true jellyfish, hydromedusae and larvaceans. Juveniles feed almost exclusively on the hydromedusan *Zanclea* sp., attaching parasitically to the interior of the bell, where they remain until adulthood. A planktonic existence means the distribution around New Zealand is not well known, but has been caught in surface waters in the Hauraki Gulf and at the Kermadec Islands. Probably distributed throughout all tropical and warm temperate waters of the Pacific and Atlantic Oceans.

main image
Rob Stewart

inset images
Rob Stewart

Lalli, C.M., Gilmer, R.W. (1989) The biology of holoplanktonic gastropod mollusks. Stanford University Press, Stanford, 259 p.
Powell, A.W.B. (1937) New species of nudibranchiate Mollusca from Auckland waters. Records of the Auckland Institute and Museum 2(2), 119–124.

Janolus ignis Miller & Willan, 1986

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Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Janolidae

35 mm

morphology

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Medium-sized proctonotid nudibranch that has a superficial resemblance to an aeolid. However the cerata extend all around the front of the head and there is a caruncle between the rhinophores. Foot broad, slightly wider than body when crawling actively. Cerata smooth and tapering to a sharp point. Upper part of body apricot-orange or red with vivid lilac-blue (almost fluorescent) streaks at base of cerata. Lilac blue band at margin of foot. Rhinophores orange. Maximum size of adults 50 mm (25–35 mm is more usual).

Feeds on the orange bush-forming bryozoan *Orthoscuticella* sp. Animals hide inside its bushes during the day and emerge at night to feed on branch tips. Readily produces a golden-yellow fluid from all over the body and cerata when attacked. Occurs only in open-water habitats. Strictly subtidal; occurs from 8–25 m. Endemic to New Zealand. Arguably New Zealand's most widespread nudibranch species; occurs around both main islands, also Three Kings Islands, Auckland Islands and Bounty Islands. Not Chatham Islands.

main image
Crispin Middleton

inset images
Crispin Middleton

Miller, M.C., Willan, R.C. (1986) A review of the New Zealand arminacean nudibranchs (Opisthobranchia: Arminacea). New Zealand Journal of Zoology 13: 377–408.

Willan, R.C., Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Janolus mokohinau Miller & Willan, 1986

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Medium-sized proctonotid nudibranch that has a superficial resemblance to an aeolid nudibranch. However the cerata extend all around the front of the head and there is a high caruncle between the rhinophores. Foot broad, slightly wider than body when crawling actively, tail short. Cerata smooth and tapering to a sharp point. Body and cerata translucent, pale green. A vividly contrasting golden line, or series of streaks, runs down the midline of the back and is outlined in reddish brown; gold dots and dashes also present on either side of the median streak. Maximum size of adults 32 mm (18–20 mm is more usual).

Feeds, as far as is known, exclusively on the erect, branching, green bryozoan *Viridentula dentata* (previously universally known as *Bugula dentata*). Animals well camouflaged on this host, hiding inside its bushes during the day and emerging at night to feed on branch tips. Readily sheds cerata when attacked. Occurs in open and semi-sheltered situations. Strictly subtidal; occurs from 8–25 m, most abundant in 12–18 m. Endemic to New Zealand. Occurs along North Island's east coast to Cape Colville, also Three Kings Islands.

main image
Crispin Middleton

inset image
Crispin Middleton

Miller, M.C., Willan, R.C. (1986) A review of the New Zealand arminacean nudibranchs (Opisthobranchia: Arminacea). New Zealand Journal of Zoology 13: 377–408.

Willan, R.C., Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D. (2010) Class Gastropoda. In: Cook, S.deC. (Ed.). New Zealand Coastal Invertebrates, Volume One, 316–468. Canterbury University Press, Christchurch, New Zealand.

Coryphellina albomarginata (Miller, 1971)

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Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Flabellinidae

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Slender aeolid nudibranch with a narrow, high body. Anterior foot corners enlarged, extended into scythe-like processes; the tail is about one-fifth of the body length. Rhinophores are narrow with numerous papillae confined to the posterior face; cerata arranged in 4–5 clusters. Body transparent whitish or faintly yellowish; cerata brick red (occasionally deep orange or carmine), with a white tip; rhinophores tinged with orange basally and opaque white towards tip. Characterised by a conspicuous, fairly wide, opaque white band running all round edge of foot. Maximum size of adults 25 mm (18–22 mm is more usual).

Feeds on hydroids *Tubularia* sp. and *Syncoryne* sp., which it never leaves. Lives on these hydroids on rocky reefs, beneath stones, on ships hulls or on ropes for mooring buoys. Matures in about 3 weeks. Open and semi-sheltered localities. Depth range 0–25 m. Endemic to NZ. Occurs throughout both mainland islands, also Three Kings Islands. Not Chatham Islands or subantarctic islands.

main image
Chris Woods

Miller, M.C. (1971) Aeolid nudibranchs (Gastropoda, Opisthobranchia) of the families Flabellinidae and Eubranchidae from New Zealand waters. Zoological Journal of the Linnean Society 50, 315–321.
Willan, R.C., Coleman, N. (1984) Nudibranchs of Australasia. Australasian Marine Photographic Index, Caringbah, Australia, 56 p.

Aeolidiella drusilla Bergh, 1900

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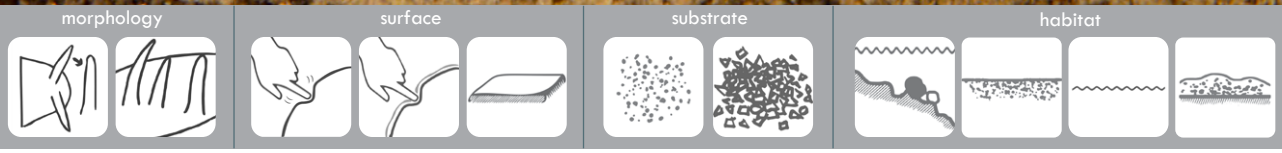

Flat and broad aeolid sea slug with a wide head and very short tail. Anterior foot corners extended into long, flattened tentacles. Rhinophores are simple. Cerata in numerous (up to 27), oblique rows, cylindrical, with a short bulbous basal region and tall conial apex. Body drab, transparent pale cream or brown, with white blotches and purple specks; a white band runs from base of oral tentacles across the front of head; cerata have white tips, contents of cerata apricot-coloured. Animals from the northern North Island have relatively shorter, grey cerata – perhaps representing a distinct species. Maximum size of adults 37 mm.

Often buries in coarse sand. As with all members of the family Aeolidiidae, *Aeolidiella drusilla* feeds on sea anemones. Endemic to New Zealand. Occurs around both mainland islands and also Three Kings and Chatham Islands. Also found in southern Australia.

main image
Ken Grange

Miller, M.C. (2001) Aeolid nudibranchs (Gastropoda: Opisthobranchia) of the family Aeolidiidae from New Zealand waters. Journal of Natural History 35, 654–659.
Morley, M.S., Hayward, B.W. (2015) Intertidal records of 'sea slugs' (nudibranchs and allied opisthobranch gastropods) from northern North Island, New Zealand. Records of the Auckland Institute and Museum, 50, 51–93.

Baeolidia australis (Rudman, 1982)

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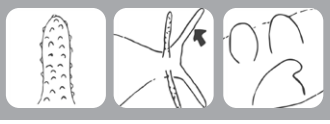
Class Gastropoda Subclass Heterobranchia Order Nudibranchia Family Aeolidiidae

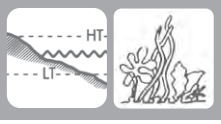
morphology



surface

substrate

habitat



Cerata arranged in oblique rows, flattened and bulbous, with sharp tips; containing symbiotic zooxanthellae in fine branches of the digestive gland. Zooxanthellae also occur in the body wall and rhinophores. Rhinophores are large and completely papillate. Foot corners tentaculate. Colour pattern distinctive; most notable feature is a hexagonal white ring on top of the head between the oral tentacles; cerata translucent brown with numerous white spots, banded with gold and blue. Maximum size of adults 34 mm (15–20 mm is more usual).

Lives on fronds of large brown kelp on rocky reefs, and can be easily overlooked due to its colouration that camouflages it. Major food source is the sea anemone *Cricophorus nutrix* that lives only on kelp. Occurs in northern New Zealand on the northeastern coast, and temperate southeastern Australia.

main image
Crispin Middleton

inset image
Crispin Middleton

Morley, M.S., Hayward, B.W. (2015) Intertidal records of 'sea slugs' (nudibranchs and allied opisthobranch gastropods) from northern North Island, New Zealand. Records of the Auckland Institute and Museum, 50, 51–93.

Rudman, W.B. (1982) The taxonomy and biology of further aeolidacean and arminacean nudibranch molluscs with symbiotic zooxanthellae. Zoological Journal of the Linnean Society 74, 147–196.

Jason mirabilis Miller, 1974

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Spectacular, endemic New Zealand nudibranch; one of the largest aeolid sea slugs in the world. Body high, rather heavily built for an aeolid. Oral tentacles long, about one-quarter body length. Rhinophores club-shaped, lamellate, irregularly subdivided posteriorly giving a wrinkled appearance. Cerata numerous, arranged in arches. Body delicate, uniformly translucent pink or lavender (appears grey underwater), slightly darker on the head; cerata completely milk-white, thus presenting a startling contrast to body colouration. Spawn crinkled and pale pink, laid directly on food hydroid. Maximum size of adults 60 mm.

Lives only on the tall, tree-like hydroid *Solanderia ericopsis*, on which it is highly visible. Forms groups of up to 15 individuals on this hydroid, and such groups can completely denude a host hydroid. Endemic to New Zealand, found around North and South and Three Kings Islands.

main image
Crispin Middleton

inset images
Crispin Middleton

Miller, M.C. (1974) Aeolid nudibranchs (Gastropoda: Opisthobranchia) of the family Glaucidae from New Zealand waters. Zoological Journal of the Linnean Society 54, 31–61.
Willan, R.C., Coleman, N. (1984) Nudibranchs of Australasia. Australasian Marine Photographic Index, Caringbah, Australia, 56 p.

Glaucus atlanticus Forster, 1777

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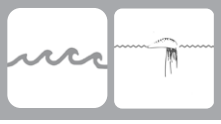


Greatly modified aeolid nudibranch. Head short, with very small, simple oral tentacles and rhinophores. Three lobes on sides of body, each supporting a single row of cerata arranged in a low arch. Cerata very long, flattened laterally. Penis very long. Body silvery, iridescent, with dark blue stripes on the foot. Maximum size of adults 43 mm (20–25 mm is more usual).

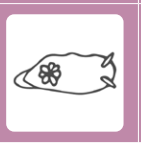
Floats upside-down at ocean's surface (pleustonic). Swallows air into stomach to maintain buoyancy. Very active, swims by 'rowing' movement of anterior clusters of cerata. Feeds voraciously on floating colonial hydrozoans *Physalia* sp., *Porpita* sp. and *Velella* sp. Maintains live nematocysts at tips of cerata for its own defense and it can sting swimmers who accidentally contact it.

Circum-tropical. Found generally in the summer around the upper half of the North Island and north of New Zealand in the summer, extending south to Muriwai on the west coast and Whangarei Heads on the east coast.

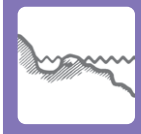
main image
Rob Stewart

Miller, M.C. (1974) Aeolid nudibranchs (Gastropoda: Opisthobranchia) of the family Glaucidae from New Zealand waters. Zoological Journal of the Linnean Society 54, 31–61.
Thompson, T.E., Bennett, I. (1969) *Physalia* nematocysts used by mollusks for defense. Science 166: 1532–1533.

body plan

	cephalaspid sea slug (head-shield slug)	Order Cephalaspidea, with a shield-shaped head used to burrow into sediment and a shell (external or internal) posteriorly
	anaspidean sea slug (sea hare)	Order Anaspidea, with rhinophores that resemble rabbit's ears, upraised flaps from the foot covering the back, and a small shell buried in the mantle
	sacoglossan sea slug	Order Sacoglossa, with a muscular pharynx used to suck fluid from algae
	side-gilled sea slug	Order Pleurobranchomorpha, with a feather-like gill located on the right side of the mantle
	dorid nudibranch	Order Nudibranchia (suborder Doridina), with a circle of posterior naked gills on the back
	phylliroid dendronotacean nudibranch	Order Nudibranchia (family Phylliroidae), dendronotacean nudibranch greatly modified for a permanently planktonic existence. Body laterally compressed and extremely thin. mouth at end of downward-pointed snout, rhinophores long and thin
	tritoniid dendronotacean nudibranch	Order Nudibranchia (superfamily Dendronotoidea) with an oral veil on the head, palmate rhinophores, lateral anus and row of gill tufts along mantle margin
	proctonotid nudibranch	Order Nudibranchia (superfamily Proctonotoidea), aeolid-like nudibranch with cerata on mantle and also extending around front of head, dorsal anus, inter-rhinophoral crest
	aeolid nudibranch	Order Nudibranchia (suborder Cladobranchia), with appendages other than posterior naked gills on the back

life history

	native	naturally occuring around New Zealand, endemic
	antipodean	naturally occuring around New Zealand and Australia only
	southwest Pacific	naturally occuring around New Zealand, Australia and other Pacific locations
	introduced	species naturally ocurring outside of New Zealand waters and has been introduced into New Zealand, invasive
	western Pacific	
	Indo-Pacific	
	circumtropical	surrounding or distributed throughout the tropics, i.e. between the tropics of Cancer and Capricorn
	widespread	species recorded globally
	nocturnal species	hides during the day, is active and feeding during the night
	intertidal species	only found in the intertidal zone

morphology

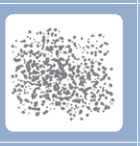
	unbranched simple gill	gill which has no side branches coming off the main axis
	branched gill	dendritic or branching from middle of each gill, with a minimum of 5 gills
	simple rhinophore	smooth to laminate, simple to tapering or club-like
	rolled rhinophore	resembles a rabbit ear
	papillate rhinophore	bumps on part or all of rhinophore
	lamellate rhinophore	a type of ornamentation in which there is a series of closely arranged, alternating, horizontal leaflets on the posterior face of the upper half of the rhinophore; some authors use perfoliate to describe the same structure
	palmate rhinophore	rhinophore which resembles an upraised hand with the fingers outstretched
	oral veil	a flap of skin stretching between the oral tentacles immediately above the mouth
	bulbous cerata	positioned on mantle, either scattered or arranged. Can be rounded to spindle-topped or clubbed
	tapering cerata	positioned on mantle either numerous scattered or arranged. Can be elongate or short with a rounded or sharp taper
	oral tentacles	visible from top of animal only. Other species may have these but are not visible
	parapodia	lateral extensions of the foot of head-shield slugs, sea hares and sap-sucking sea slugs
	philtrum	a vertical notch in the upper lip of the anterior foot's transverse groove of dorid nudibranchs belonging to all genera of the family Discodorididae
	caryophyllidia	microscopic structures consisting of a central knob surrounded by a crown of spicules that emerge from the skin and point upwards. Sensory function is indicated by dense cilia on upper surface and ganglion immediately beneath centre of knob. Present in some genera of the family Discodorididae; singular caryophyllidium
	caruncle	raised, fan-like crest between the rhinophores present only in the family Janolidae

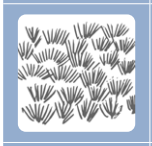
surface

	soft	soft to the touch, easily compressible, elastic
	slimy	surface film slippery to touch, as in all sea slugs except sea hares
	sticky	residue attaching to fingers when touched, as in the purple 'ink' of sea hares
	hard	hard to the touch, not compressible, rigid
	smooth	even, hairless, silky, can be slightly undulating

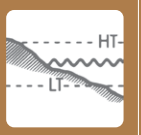
	granular	surface feels like fine sandpaper
	bumpy	bearing small, rounded bumps
	warty	bearing small flattened bumps or tubercles
	papillae	bearing short finger-shaped projections
	deeply wrinkled, corrugated	bearing irregularly parallel ribs and grooves along the body wall

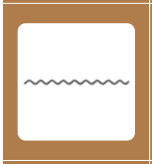
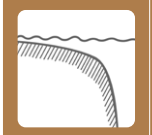
substrate

	rock	hard substratum such as mudstone, sandstone, basalt, compressed carbonates
	rubble	shell, stone, and pebble rubble
	coarse gravel	non-mixed stone rubble
	sand	small coarse grains of worn silica, rock, and shell
	mud	very fine muddy and silty sediments derived from terrigenous rocks, soils and clays
	living organism	living or growing on the external surface of an animal (epizoic) or seaweed, (epiphytic)

	artificial substratum	anything man-made such as mooring blocks, mussel lines, wharf piles
	seagrass beds	living on marine seagrass as a substrate
	algal beds	living on mixed marine plants as a substrate
	coralline turf	living on coralline algae as a substrate
	sea water	
	coral rubble	dead broken coral

habitat

	sand flat	
	mud flat	
	coralline turf	
	algal beds	coralline algae, seagrass or algal beds
	seagrass beds	meadows of marine plants growing on a sandy substrate
	sheltered bays, harbours and channels	bays and harbours, wind and water currents transport organisms into them where they can remain stuck or stranded
	semi-sheltered coast	semi-sheltered bays and coasts (semi-sheltered waters)
	semi-open coast	semi-open/exposed bays and coasts (semi-open/exposed waters)
	subtidal rocky reef	zone below the low tide, including rock flats, slopes, walls, crevices, overhangs, boulder fields, organisms exposed to wave surge and currents, and subdued illumination
	intertidal	exposed shoreline zone between high and low tides, including rock flats, pools, overhangs, crevices, organisms exposed to wave action, temperature extremes, full illumination, and desiccation
	rockpool	indentation in rock filled with water, intertidal

	seabed	composed of a variety of sedimentary substrates including coarse gravels, shell hash and sands to finer sand, mud, and silts, organisms susceptible to inundation and scouring from wave surge and currents
	covered rock	sand and rubble spread over underlying hard substrate, organisms attached to basement rock susceptible to inundation and scouring from wave surge and currents, and subdued illumination
	wall	underwater cliffs and slopes, organisms exposed to wave surge and currents, and subdued illumination
	indents	underwater caves, shelves and overhangs, organisms may experience wave surge, subdued illumination, or near darkness
	sea surface	living at the sea surface
	sheltered water	sheltered water habitats, little wind or wave action
	exposed water	exposed habitats with wind and wave action
	lagoon reef	reefs within a shallow to deep body of water behind the outer barrier reef
	outer barrier reef	outer barrier coral reef separating land or lagoon from the open ocean
	continental shelf	

glossary

caruncle	raised, fan-like crest between the rhinophores present only in the family Janolidae
caryophyllidia	microscopic structures consisting of a central knob surrounded by a crown of spicules that emerge from the skin and point upwards. A sensory function is indicated by the dense cilia on the upper surface and the ganglion immediately beneath the centre of the knob. Present in some genera of the family Discodorididae. Singular *caryophyllidium*
cerata	finger-like processes on the back of heterobranch sea slugs that are the main sites of respiration for species of sea slugs lacking gills, and in aeolid nudibranchs, that contain extensions of the digestive gland with groups of stinging cells at the tip
cerata, bulbous	refers to the particular shape of some cerata that are swollen in the middle like bowling pins
cerata, tapering	refers to the particular shape of some cerata that are widest at the base and taper gradually towards the tip like a church spire
gill, branched	refers to a type of gill which has side branches coming off the main axis
gill, unbranched	refers to a type of gill which has no side branches coming off the main axis
lamellate rhinophore	a type of ornamentation in which there is a series of closely arranged, alternating, horizontal leaflets on the posterior face of the upper half of the rhinophore. Some authors use the term perfoliate to describe the same structure
oral tentacles	a pair of tentacles located either side of the mouth
oral veil	a flap of skin stretching between the oral tentacles immediately above the mouth
papillae	surface projections or numerous, regular, tall, extensions like fingers that ornament the outside of the cerata. adjective *papillate*
parapodia	fleshy lateral extensions of the sides of the foot in head-shield sea slugs and sap-sucking sea slugs
philtrum	a vertical notch in the upper lip of the anterior foot's transverse groove of dorid nudibranchs belonging to all genera of the family Discodorididae
rhinophores	the pair of sensory processes on top of the head in heterobranch sea slugs
rhinophore, palmate	refers to a type of rhinophore which resembles an upraised hand with the fingers outstretched
rhinophore, papillate	refers to a type of rhinophore which has extensions resembling fingers on its surface
rhinophore, rolled	refers to a type of rhinophore which is thin and rolled up like a sheet of paper. The centre is hollow
rhinophore, simple	refers to a type of rhinophore which has no ornamentation or extensions on its surface
tentaculate foot corner	instead of rounded as in most sea slugs, a few species have the front edge of the foot enlarged and the corners extended into short, finger-like tentacles
trapezoidal	refers to the particular shape of the oral veil of side-gilled sea slugs and arminid slugs
zooxanthellae	microscopic, single-celled, yellowish brown dinoflagellates capable of photosynthesis that live symbiotically inside the bodies of marine invertebrates including corals, jellyfish and molluscs

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further reading

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