

The Home Forum.

Beauty of the Beast

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BIZARRE AND COLORFUL,
SEA SLUGS FASCINATE
DIVERS AND RESEARCHERS

SLITHERING RAINBOWS? Tie-dyed gummy worms? If you can imagine those, you can imagine nudibranchs (NU-dee-branks). And not just their colors are eye-popping. Nudibranchs (also called sea slugs) have some of the weirdest lifestyles and most bizarre weapons in all nature.

The underwater cavern off Kauai, in the Hawaiian Islands, is a perfect slug spot. I'm 40 feet underwater when I spot it: a black, thumb-sized blob with rows of blue-white bumps topped with bright yellow. It's Hawaii's fried-egg nudibranch, sunny-side up. I touch it gently. It feels like an old wad of gum.

Nearby, a delicate burgundy rosette gently flutters on a rock. These are the eggs of a Spanish dancer (*Hexabranchus sanguineus*). Spanish dancers look like the ruffle on a Flamenco dancer's dress. They are the largest of the nudibranchs, growing up to 16 inches long. That's a lot of slug!

Nudibranchs are mollusks. All mollusks have soft bodies. Some, like snails and clams, have shells. Others, like octopuses and nudibranchs, do not. Nudibranch means "naked gills." Gills



PHOTOS BY JEFF JEFFORDS

BRILLIANT, YES - BUT SLUGGISH: This nudibranch (*Chromodoris annae*), photographed off Luzon in the Philippines, can retract its feathery yellow gills into its body. Its bright colors proclaim to predators: 'Don't eat me - I'm poisonous!'

take oxygen from the water, just as lungs take oxygen from the air. Many nudibranchs have feathery gills on the outside of their bodies.

There are about 3,000 kinds of sea slugs. Most live on coral reefs, but some live in the Arctic and Antarctica. Some nudibranchs live in shallow tide pools, and others live deeper than 3,000 feet (1,000 meters).

What they eat varies widely, too. Researchers have identified at least 100 species of sea-slug food sources, including algae, seagrass, worms, other mollusks, crustaceans, soft corals, sea squirts, and sponges. Many feed on a single species - a particular sponge, for instance.

Sea slugs aren't

speedy, but they do get around. When the Spanish dancer's eggs hatch, the larvae will float on ocean currents until they find a good spot. They may travel for hundreds of miles before landing on a suitable coral reef.

Eating poison - and recycling it

Nudibranchs may look soft and helpless, but few animals snack on slugs. Nudibranchs manufacture poisonous and nasty-tasting slime. Fish that nibble a nudibranch spit it out quickly. A sea slug's wild colors help keep predators away, too. They are a warning and a reminder to hungry fish: "Don't eat me, you'll regret it!"

Nudibranchs are the ultimate recyclers. Many of their poisons and bad-tasting chemicals come from the sponges, anemones, and stinging corals they eat. Nudibranchs can slurp up these chemicals and make them part of their own body without harming themselves.

Some nudibranchs eat the stinging cells of anemones and fire corals. How can a sea slug eat stinging cells without getting stung? They eat "baby" cells that are not yet ready to sting. The baby stinging cells pass through special tubes in the nudibranch's body and are stored on the nudibranch's back.

When the stinging cells mature, the slug becomes a crawling weapon, bristling with missiles ready to fire. It's as if you could swallow a slingshot and then shoot stones from your back!

Some are solar-powered
Among land animals,

carnivores like lions eat meat, and grazers like zebras eat grass. Humans eat meat, but they also farm. Nudibranchs are carnivorous grazers that sometimes "farm," as well!

Sea slugs don't have eyes, only simple sensors that detect light and dark. They also have small organs (rhinophores) that "smell" the water and help them find prey.

Sponges, anemones, and stinging corals look like plants, but they are really animals that stay in one place. When a nudibranch finds a sponge, anemone, or coral, it scrapes off bits with its rough radula (tongue).

Some nudibranchs farm by eating tiny plants (algae). Instead of digesting the algae, the nudibranch keeps them alive under its skin. These "solar-powered" sea slugs can absorb energy from their own portable greenhouses.

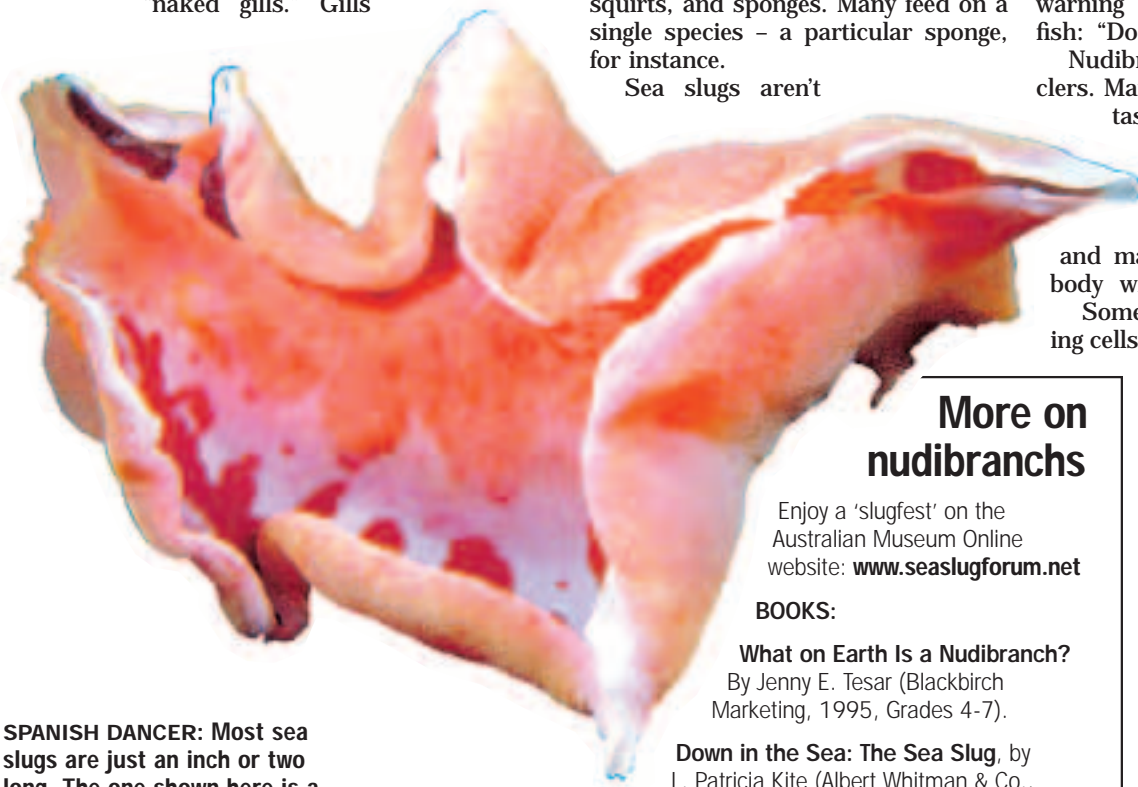
Why aren't they in aquariums?

Diving in the cavern off Kauai, I come across two small nudibranchs huddled on a ledge. The pale, inch-long slugs are crisscrossed with gold lines and seem to glow from within.

It's not easy to find a tiny mate on a big reef - especially if you are slow and only see light and dark. Most nudibranchs increase their chances of finding a mate by not having an opposite sex. Because every nudibranch is both male and female, a nudibranch has only to find another slug of the same species. (On land, worms follow this pattern as well.)

Nudibranchs are a favorite of underwater photographers. They are colorful and fascinating - and they can't sprint away from a camera. Mary Jane Adams, a physician from California, spends her free time diving and photographing nudibranchs. "There is still

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SPANISH DANCER: Most sea slugs are just an inch or two long. The one shown here is a foot long, but it can grow to 16 inches. It is shown swimming.

More on nudibranchs

Enjoy a 'slugfest' on the Australian Museum Online website: www.seaslugforum.net

BOOKS:

What on Earth Is a Nudibranch?
By Jenny E. Tesar (Blackbirch Marketing, 1995, Grades 4-7).

Down in the Sea: The Sea Slug, by L. Patricia Kite (Albert Whitman & Co., 1994, Grades K-3).

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so little known about them, even the common ones," Ms. Adams says. "My favorite is one I call 'The Alien.'"

Adams was diving at night off Papua New Guinea in the South Pacific. Her flashlight caught a small, silvery nudibranch with strange red feelers creeping over the sand. She was the first to photograph a live *Kalinga ornata*. "It really does look like a creature from outer space!" she says.

You might expect to find colorful nudibranchs in an aquarium. However, sea slugs don't live long in captivity. If you want to see a living "alien," you'll need to explore tide pools, or put on a face mask and flippers. Come on in - the water's fine!

How one diver said 'I love you'

And if you're a diver and a nudibranch fan, how do you say "I love you" on Valentine's Day? If you're biologist Dave Behrens, you "say it with slugs."

Mr. Behrens writes books about nudibranchs. He's discovered more than 40 new species of them. When a scientist finds a new plant or animal, he or she can give it a unique name to go with its group (genus) name.

One Valentine's Day, Behrens surprised his wife, Diana, by naming a sea

slug after her. *Chromodoris diana* (which means "colorful sea goddess Diana" in Latin) is a lovely bluish-purple nudibranch with black racing stripes and stylish yellow highlights.

"I thought I was doing a great thing," Behrens says, laughing. "But she said she would have preferred diamonds!"

Mystery of the black sea slug

The oddest Odd Couple of the ocean may be the snapping shrimp and the shrimp goby. The nearsighted shrimp is the builder and housekeeper. It digs a place for the pair to hide. The sharp-eyed goby provides food, hunting and watching for danger. The two stay together for life.

Enter a black nudibranch whose name (*Gymnodoris nigricolor*) is longer than it is. This pesky nudibranch is sometimes found hanging onto the shrimp goby's fins.

"This little nudibranch is dragged around on the back of a bucking bronco, as the goby goes in and out of its hole," Behrens says.

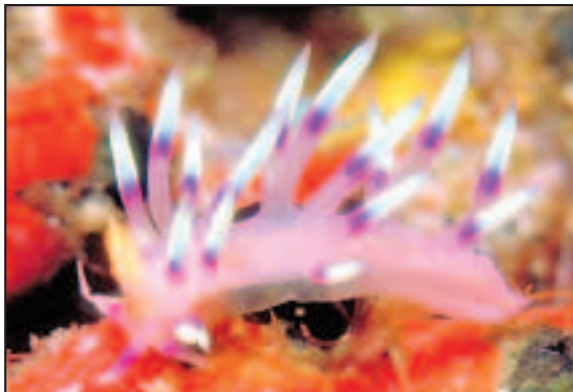
Is the slug a Freddie freeloader? Or a budding buddy? "Nobody knows," the scientist says.

Pamela S. Turner

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SOME NUDIBRANCHS 'FARM' ALGAE UNDER THEIR SKIN; OTHERS RECYCLE POISON FROM THEIR PREY.

A BORROWED DEFENSE: The Aeolid sea slug (right) has long fingerlike digestive glands, called cerata, on its back. The cerata store poisons collected from animals the slug has eaten. It uses the poison to defend itself. The unidentified nudibranch below was found on a coral reef in the Fiji Islands. Note its feathery gills.



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