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## Tiny Damselfish May Destroy A Caribbean Reef

by Richard Harris



[Enlarge](#) Henry DeBey

A longfin damselfish patrols its algae garden off the coast of Bonaire. Damselfish kill a section of the coral, and then wait for algae to grow in the dead spot. On this coral, only a few live sections remain.

Scientists say the world's coral reefs could go extinct during our children's lifetimes. Human activities are putting this beautiful ecosystem at risk. Some risks are obvious — such as global warming, which results in overheated seas. Others are more subtle. Consider the case of the damselfish:

Looking off the coast from the Caribbean island of Bonaire, the glistening, aquamarine sea looks peaceful. But just under the waves, there's a war going on. It's between the fragile and colorful corals, and a creeping menace: algae.

It's a turf battle for precious real estate. And it's a fight to the death.



Enlarge Henry DeBey

This three-spot damselfish is one of several damselfish species that create algae farms on corals.

### **Algae Farmers, Coral Killers**

Both the corals and the algae have natural allies. Corals get help from parrot fish, which eat the intruding algae from the reef. And algae get help from certain species of damselfish.

"Damselfish are these little fish and what they do is they make little yards on the bottom of the reef," says marine biologist Mark Vermeij. These yards — or pastures, you could call them — are patches of algae that the fish actually farm right on the coral.

"And in order to make a place for one of these yards, they basically kill the coral," Vermeij says. "So they go to the coral, they start sucking on little polyps until they die. And then when that happens, little algae establish on that died-off patch."

Once the algae start growing, the damselfish becomes not just a farmer but a warrior.

"They're little feisty guys," Vermeij says. "There are rainbow parrot fish, almost a meter long, and this damselfish that's not much bigger than a goldfish just comes out. This parrotfish is aiming at feeding in that guy's little meadow. And the little damselfish just comes out and scares that thing away. They're aggressive as hell."



Enlarge Henry DeBey

Seen from above, a three-spot damselfish's algae garden covers much of this coral. The identification tag, top, allows researchers to track and monitor the site.

And the more successful they are, the more the coral is killed off and replaced by their algae gardens.

It's a drama that has been going on since time immemorial. But lately, the story includes hooks, lines and sinkers.

People don't eat these little damselfish, but Vermeij says people do eat bigger fish on the reef. And that's where the story takes a twist.

"Twenty years ago, life on these reefs for little fish was basically annoying. Because there were all these big fish around that would eat you if you weren't paying attention. And then because a lot of people took the big fish out, it's a much safer environment for these little fish," Vermeij says.

### **A Booming Damselfish Population**



Enlarge Henry DeBey

Graysbys, like this one, normally prey on damselfish and help keep their populations in check. But as graysby populations decline due to overfishing, damselfish numbers are increasing.

As a result, the damselfish population has boomed. As Vermeij tells the story, Henry DeBey listens in. He's a graduate student at Yale University. He's here on Bonaire to get a better handle on the damselfish story. And he says it turns out that one predatory fish in particular goes after the damselfish. It's called a graysby.

"Graysbys, which are a type of grouper, are a local favorite, a local specialty," DeBey says. "So Bonarians like to fish graysby."

As a result, graysby populations have been in severe decline along Bonaire's reef. DeBey and a fellow graduate student from Yale are here to quantify just how much graysby overfishing has led to a surge in damselfish and their algae gardens. They want to provide ironclad evidence that the marine park manager can use, to give local fishermen a Hobson's choice.

"Feel free to fish graysbys," the marine park manager could say, "but corals will decline as a result, indirectly. And everything else that depends on those corals, including the graysbys ultimately, will also go down."

And while algae form a natural ecosystem, it's not nearly as interesting and diverse as a coral reef. And it's the thriving coral reef that attracts divers to Bonaire from far and wide. They keep the local economy humming. So there's a lot at stake, in the story of the little damselfish.