

Rabbits to the rescue of the reef

While rabbits continue to ravage Australia's native landscapes, rabbit fish may help save large areas of the Great Barrier Reef from destruction.

The reason, say scientists, is the same in both cases – both rabbits and rabbit fish are efficient herbivores, capable of stripping an area of vegetation. However, in the case of the Reef, it is the vegetation that is the problem – and the rabbit fish, the answer.

“When a coral reef is weakened or damaged through human activity such as climate change or pollution or by a natural disaster like a cyclone, the coral will usually recover provided it is not choked by fast-growing marine algae,” explains Professor David Bellwood of the ARC Centre of Excellence for Coral Reef Studies and James Cook University.

“The problem is that over the years we have fished down the populations of fish that normally feed on the young weed to such a degree that the weed is no longer kept in check, it can now smother the young corals and take over. This is called a phase-shift, and the chances of corals re-establishing afterwards are usually poor. If the weed takes over, you've lost your reef.”

Prof. Bellwood and fellow researcher Rebecca Fox have spent recent years running live experiments to see what happens when a reef turns to weed – and which fish, if any, are of help in restoring the coral.

“To our surprise and disappointment, the fish that usually ‘mow’ the reef – parrot fishes and surgeon fish - were of little help when it came to suppressing well established weedy growth. Most herbivores simply avoided the big weeds.

“Then, to our even greater surprise a fish we had never seen in this area before was observed grazing on the weed. The rabbit fish (*Siganus canaliculatus*), came out of nowhere and began to clear-fell the weed placed on the reef crest.”

The rabbit fish were caught on underwater videocams, in schools of up to 15 fish, grazing the crest, slopes and outer flats of the reef, and chomping away at more than ten times the rate of other weed-eaters.

“The rabbit fish is not a fish you tend to take a lot of notice of,” Prof. Bellwood explains. “Like its terrestrial counterpart, it is brown, bland and easily overlooked – but it could be very important when it comes to protecting the GBR.”

“We hadn't seen it previously at this site despite conducting over 100 visual censuses. This made its appearance in numbers sufficient to check the weedy growth all the more remarkable.”

However the team noticed the rabbit fish concentrated their weed-removal efforts on the crest of the reef and were less effective on the slopes and flats – a feeding preference that is yet to be explained.

In a previous study, an overgrown reef had been cleaned up by another unexpected intruder, a striped batfish.

Ms. Fox explained that the recovery of damaged reefs may depend on several different ‘guilds’ of fishes, with different feeding preferences, that will focus on particular parts of the reef and stages of the weed infestation.

For such an approach to work, however, all the various species have to be kept intact in the reef environment, ready to play their part in a salvage operation when it becomes necessary.

“In Australia these herbivore fish populations are still in fairly good shape, but around the world as the big predators are fished out, local fishermen are targetting the herbivores. In Hawaii, the Caribbean, Indonesia, Micronesia and French Polynesia there are reports of serious declines in herbivore numbers of up to 90 per cent.

“By killing them, we may be unwittingly eliminating the very thing which enables coral reefs to bounce back from the sort of shocks which human activity exposes them to.”

Prof. Bellwood says that one of the lessons from the video study is that obscure fish species may play a critical role in the survival and maintenance of coral ecosystems, and should not be overlooked. They are a key part of the resilience of the whole reef system.

“On land the rabbit is a major headache, but in the sea the rabbit fish may be an important factor in helping to keep the world’s number one tourist attraction in good shape,” he says.

Source: ARC Centre of Excellence in Coral Reef Studies

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