Abstractions

FIRST AUTHOR

To understand how biodiversity works in coral reefs, a team of Australian researchers surveyed reefs in different sites, islands and regions. When the team analysed the data, they found that coral-reef biodiversity doesn't follow the patterns predicted by one model, called neutral ecology, which argues that coral species colonize reefs in a random way. Instead, the team's studies show that location and environmental change determine what corals fail or thrive (see page 80). Maria Dornelas, a researcher with the Centre of Excellence for Coral Reef Studies in Townsville, explains the implications.

How did you feel when you saw that neutral ecology might not apply to reefs?

We were surprised by the patterns we found. But finding that neutral theory doesn't match is only the first step. How coral communities differ from the theory's predictions, and what that says about the processes that affect coral reefs, is really important.

What sort of reaction do you anticipate from neutral theory's proponents?

We hope it will stimulate comparisons with more data. It will be interesting to see whether other ecosystems show similar patterns and whether biodiversity theory can be modified to better explain our observations of coral communities.

Why do you think reefs turned out to be more variable than you expected?

We think the variability is due to the way that disturbance affects reefs. Reefs are disrupted by cyclones, coral bleaching, crown-of-thorns starfish, and so on. Such disturbances are patchy and unpredictable, and affect different species differently.

What do your samples say about biodiversity from reef to reef?

Several things seem to affect reef biodiversity. There's a strong regional influence, and nearby reefs are more similar than distant reefs. But nearby reefs also vary a lot. We think this variability is mostly due to different reefs being at different stages of recovery from a disturbance.

What implications do your findings have for biodiversity theories in general?

We believe our results suggest that biodiversity theory should place more emphasis on random environmental fluctuations. Disturbances to coral reefs have increased, as a result of global warming and overfishing, so it's important that we understand the consequences of the frequency, intensity and nature of disturbances to improve management and better protect the world's coral reefs.

MAKING THE PAPER

Linda Perry

Plant fossils reveal ancient trade and agriculture in South America.

Linda Perry spends her days at the Smithsonian National Museum of Natural History in Washington DC, gazing down a microscope at corn kernels and other grains. The grains — often thousands of years old — reveal information about both the farming and trading patterns of long-gone civilizations.

Perry began studying the role that plant foods had played in South American history while doing her doctoral work in the Orinoco valley of Venezuela. The work involved refining techniques for analysing the residues of starch grains on tools used to cut and scrape plant foods. In a study that appears on page 76 of this issue, Perry applied these techniques to identify the remains of ground-up corn in soil and tools collected from a 4,000-year-old house buried in the Andean mountains of Peru. This suggests that the Andean people were grinding the corn to make flour. Perry also found remnants of arrowroot, used today as a thickening agent. This plant does not grow at the altitude where the house was located, but would have flourished in the low-lying rainforest regions. "It provides an important link between the Andes and the tropical rainforests," says Perry.

Starch grains and silica phytoliths (microscopic chunks of mineral that form inside living plant tissues) are microfossils that are used to identify ancient plant remains. They are particularly useful in tropical climates, where macrofossils such as wood and carbonized charcoal are rarely well preserved. Archeologist Daniel Sandweiss of the University of Maine in Orono recruited Perry and her Smithsonian colleague Dolores Piperno to the Andean project due to their expertise with these residues. Sandweiss was following the trail of deposits of a volcanic rock called obsidian in Peru, near the modern-day town of Alca, in search of evidence that ancient peoples mined and used obsidian. He stumbled on the 4,000-year-old house during a test excavation. While he looked for obsidian and other artefacts, he sent specimens to Washington, where Perry and Piperno carried out starch and phytolith analyses, respectively.

Finding that goods and people moved between the Andes and the rainforest is not a surprise. A famous carving, the Tello obelisk, recovered from the archeological site of Chavín de Huántar, also in the Peruvian Andes, shows carvings of tropical forest plants. "The iconography tells us of a connection between these two areas, but until now there was no solid evidence," says Perry. She would like to continue to chart this connection by "following the arrowroot track down the mountain", she says.

Perry, who majored in biology at Tulane University in New Orleans, says that archaeobotany is perfect for her. "It is a combination of things that I love and that challenge me," she says. "Trying to put together the fossil record is like assembling a very difficult puzzle." ■

QUANTIFIED **MALTA**

A numerical perspective on *Nature* authors.

As a senior lecturer at the University of Malta in Msida, Rena Balzan spends a good part of each day teaching medical genetics. The rest of her time is spent doing research. Balzan has a small lab with one post-graduate student. She works on mitochondrial targeting, and is currently interested in apoptosis in yeast. "I do the kind of work I do out of love for the subject and scientific research," she says.

When Jerry Kaplan, a pathology professor at the University of Utah in Salt Lake City, came across Balzan's work, he invited her to work with his group on using yeast to study iron metabolism. The partnership — Balzan's first outside Europe — has been very successful. On page 96 of this week's issue, the group and their colleagues describe a new genetic tool for exploring disorders in iron metabolism.

1 is the number of authors working in Malta to publish original research in *Nature* over the past year.

201 is the number of visits to *Nature* online that have come from Malta in the past month (0.01% of all visits).

4 is the number of novels, in Maltese, that Rena Balzan has published in addition to her scientific publications.

11 is the number of countries in which authors publishing original research in this week's *Nature* live and work.