Biology

Fungus: Ally of desert, wetland plants

Mycorrhizal fungi and plants practice the "you scratch my back, I'll scratch yours" approach to life. The fungi attach themselves to the roots of plants and feed on their hosts' store of carbohydrates. But they give back more than they take, as they tap hard-to-reach nutrients and water in the soil and share their finds with the plants.

Many mycorrhizal plants and fungi exist throughout the world, in salt marshes, deserts, and pine forests (SN: 9/23/95, p.198)—but not in wetlands, or so scientists had thought.

Now, Carl F. Friese of the University of Dayton in Ohio and his colleagues report that more than 50 percent of the plants growing in southwestern Ohio's large Beaver Creek watershed are mycorrhizal.

Other researchers may have missed mycorrhizal inhabitants of wetlands because they failed to look at the right species of plants or looked at the wrong time of year, he explains.

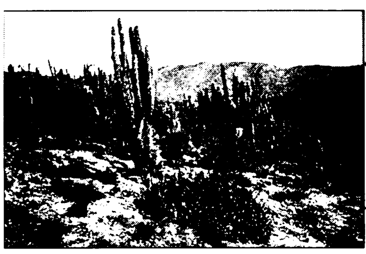
These results, which Friese and his colleagues are now preparing for publication, show that ecologists should protect existing mycorrhizal fungi or introduce new spores to ensure that wetlands function properly.

Protecting or introducing mycorrhizal fungi may also prove more important to preventing desertification than previously thought, Friese says.

Earlier investigations showed that almost 90 percent of the 61 plant families growing in arid regions worldwide have mycorrhizal members. However, none of those studies included South America, home of some unique plant species, Friese says. So he and his coworkers undertook two surveys of Chile.

They started with parkland near the northern Chilean town of La Serena, where they examined 38 common and rare plant species from 19 different families. More than 90 percent of the species formed symbiotic relationships with mycorrhizal fungi, report Friese, Shivcharn S. Dhillion, now at the University of Oslo in Norway, and their colleagues in the September/October MYCORRHIZA.

In another, not yet published study of northern Chile's Atacama desert, one of the driest regions in the world, Friese and his coworkers report that the area's dominant shrubs, members of the genus *Atriplex*, are mycorrhizal. *Atriplex* species growing elsewhere in the world are not mycorrhizal, other studies have shown.



S.H. Vigderson/ Univ. of Dayton

Chaparral and desert plants in northern Chile depend on mycorrhizal fungi for food and water.

Organic corn hardier than conventional

Once again, a field of grain corn grown organically has survived a summer drought much better than the same kind of corn grown nearby using conventional chemical fertilizers and pesticides, report researchers at the Rodale Institute Experimental Farm in Kutztown, Pa.

The drought that struck Pennsylvania and other East Coast states this summer stunted the conventionally grown corn but not the organic crop, says Rodale's Laurie Drinkwater. The soil enriched with animal manure and decaying plant material held water better than the soil treated with chemical fertilizers, she reports.

Rodale staff have not harvested the corn yet. But after examining the ears, Drinkwater fully expects the organic crop to outproduce the conventional crop. Both types have had similar average yields over the past 9 years, but after the 1988 drought, the organic corn produced more grain.

Earth Science

Steady temperatures: Greenhouse sign?

As a rule, warmer climes have more uniform temperatures than cooler ones do: The mercury doesn't rise and fall as much at the equator as it does at higher latitudes. So if greenhouse gases warm the entire globe, temperatures shouldn't vary as much as they once did, according to computer simulations.

Climatologists studying weather records for the United States, China, and the former Soviet Union have now discovered precisely that pattern. The weather data also hint that precipitation has turned more extreme, matching another prediction of the climate models.

In the Sept. 14 NATURE, Thomas R. Karl of the National Climatic Data Center in Asheville, N.C., and his colleagues reviewed 30 to 80 years' worth of weather records for the three regions. Across the Northern Hemisphere, temperatures currently do not swing as widely as they once did in a day-to-day, week-to-week, or month-to-month time frame, the researchers found.

However, precipitation in the United States now falls more often in extreme bursts (more than 50.8 millimeters, or 2 inches, per day) than it did earlier in the century. The change is subtle, though: Over the last 80 years, extreme precipitation days have increased by about 1 day every 2 years. Records from China and the former Soviet Union do not show a similar increase in extreme precipitation, but data for these countries reach back only half as far as U.S. records, perhaps obscuring any trend, the researchers suggest.

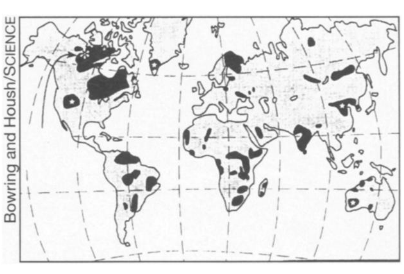
A different pattern emerged south of the equator. Data from Australia between 1961 and 1993 did not show any decrease in temperature variability. However, a recent study of records for northeastern Australia did find an increase in the strength of heavy precipitation during this century.

Recycling the continents

Through the tireless process of plate tectonics, Earth continually renews the ocean crust even as it disposes of ocean rock by drawing it into the planet's mantle. The continents are anomalies, however. According to textbooks, old continental rocks are too buoyant to be recycled inside the planet. They just remain at the surface, growing older.

Two geophysicists now challenge the prevailing theory, suggesting that plate tectonics has recycled significant amounts of continental crust over the last 4 billion years. Samuel A. Bowring of the Massachusetts Institute of Technology and Todd Housh of the University of Texas at Austin discuss their controversial idea in the Sept. 15 SCIENCE.

The scientists base their theory on measurements of the ratio between two elements—samarium and neodymium—in rocks. When mantle rock melts to form the buoyant crust, it takes away more neodymium than samarium, leaving less in the mantle. This enables scientists to estimate how much crust was present early on. According to Bowring and Housh, the ratio of neodymium to samarium found in fragments of old rocks suggests that large amounts of continental crust formed early in Earth's history. But much of that crust has since been destroyed and replaced with younger rock. That would explain why so little old continental rock remains. Other researchers say that the continents grew gradually, so the scarcity of old rock simply reflects the smaller size of continents on the early planet.



Bowring and Housh/SCIENCE

Black denotes rock older than 2.5 billion years. Star shows world's oldest rocks.