

Photos: David Cavagnaro



Giant swallowtails pollinate zinnias.

suggest that they increase the insects' vulnerability to disease and early death.

In another 10 years, U.S. honeybees may become resistant to the mites, Morse predicts, just as their kin in Europe and South America have. For now, he says, "we're just squeaking through."

Indeed, bee nurseries weren't able to supply beekeepers with all the stock they requested this year, Collins notes. "So if we get a big kill like this next year," she says, "Lord knows what will happen."

The honeybee crisis "is part of a larger pattern of pollinator declines," Nabhan notes. A report he prepared last month lists more than 180 species of vertebrate pollinators—including geckos, hummingbirds, warblers, parrots, bats, weasels, and lemurs—that are threatened with extinction.

In *The Forgotten Pollinators* (Island Press, Washington, D.C.), to be published next month, Nabhan and pollination ecologist Stephen L. Buchmann of the Carl Hayden Bee Research Center in Tucson link falling numbers of these vertebrates, as well as insect pollinators other than bees, to two major phenomena: inadvertent poisoning with pesticides and human activities that fragment an animal's habitat.

At a press conference this week, the pair stated that funding is urgently needed to develop pollinators that can substitute in the near term for honeybees. They say that most of the pollination scientists whom they have surveyed agree.

Buchmann and Nabhan also suggest that national programs extend the protection given the habitats of endangered plants to the habitats of the plants' pollinators and that farmland retired under the conservation reserve program be planted with forages attractive to important pollinators.

— J. Raloff



Popular foods and flowers requiring insect pollination.

Giant lake hides beneath Antarctica's ice

The Age of Discovery may have ended long ago, but somebody forgot to tell the cadre of researchers studying Antarctica. So little is known about the frozen continent that it appears as a featureless white splotch on most maps. Now, Russian and British glaciologists are filling in the void with the news that Antarctica harbors one of the world's largest and deepest freshwater lakes, concealed under 4 kilometers of ice.

"Lake Vostok is enormous. It's 200 km long and 50 km wide. It's the size of Lake Ontario," says Martin J. Siegert of the University of Wales in Aberystwyth.

The announcement has excited biologists because the lake probably contains ancient forms of microbes that have lived undisturbed for a half million years or more under the ice.

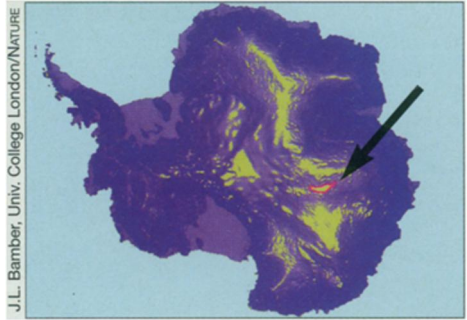
Gordon de Q. Robin of the University of Cambridge in England and his colleagues first discovered the lake in the 1970s while conducting airborne surveys near Russia's Vostok Station, about 1,200 km from the South Pole. Radiowaves penetrating the ice revealed a body of water beneath Vostok, but the size of the lake remained unknown. Using data collected recently by the ERS-1 satellite, A.P. Kapitsa of Moscow State University, Robin, Siegert, and their colleagues have now mapped it.

The satellite-borne radar, which measures the topography of the surface of the Antarctic ice sheet, detected an extremely flat region surrounding Vostok Station. The ice remains level there because it is floating, whereas most of the ice sheet rests on uneven bedrock, the researchers report in the June 20 *NATURE*.

By charting the area of flat ice, the scientists found that Lake Vostok covers 14,000 square km, an area 50 percent bigger than previous estimates. They also determined that the lake contains fresh water, judging from the thickness of the ice and the height at which it floats.

To measure the depth of the lake, the team examined 30-year-old seismic soundings made originally by Kapitsa before the lake was discovered. In reanalyzing these data, the group found faint echoes from the bottom of the lake, which measures 510 meters at its greatest depth, placing it among the world's 10 deepest lakes.

Although Vostok Station boasts the coldest recorded temperatures on Earth, the lake exists because the bottom of the ice sheet is warm enough to melt. The thick glacial blanket serves as insulation, protecting the base of the ice sheet from the frigid conditions at the surface. Meanwhile, geothermal heat from Earth warms the lowermost ice, says glaciologist Charles Bentley of the University



A satellite image of Antarctica shows Lake Vostok outlined in red (arrow).

of Wisconsin-Madison.

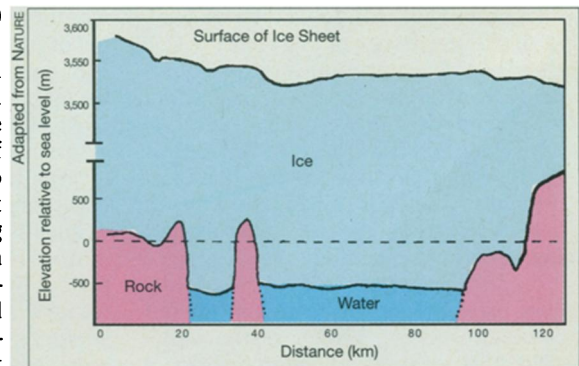
The southern end of the lake lies directly under the spot where Russian and French scientists have drilled the world's deepest ice hole, which currently extends some 3,348 m. The Vostok crew plans to continue drilling later this year but has agreed to stop about 50 m above the lake surface to keep from polluting the water (SN: 6/1/96, p. 341).

Scientists studying the ice drilled at Vostok have found species of living bacteria, yeast, and other microbes with ages ranging from 3,000 to 200,000 years old. Some of these organisms probably also exist in the sediments of the lake below the ice sheet, where they could be 500,000 to 1 million years old, says David Wynn-Williams, a microbiologist at the British Antarctic Survey in Cambridge.

"The organisms down there have not been affected by PCBs, by heavy metals, by nuclear bomb fallout, by elevated ultraviolet light, and all that sort of thing," says Wynn-Williams. "There could be genes that have been lost over the years with the changing climate and pollution. So there's a potential for new enzymes, new antibiotics, new metabolites of one sort or another."

Before they search for these hoary microbes, scientists must first develop techniques for tapping the water without spoiling it. Given the expense of working in Antarctica and concerns about pollution, the Russian researchers have no immediate plans to probe Lake Vostok.

— R. Monastersky.



A cross section of the ice sheet and the lake beneath.