ECOLOGY

The toughness of species

Research in the Everglades discloses aquatic species surviving despite drought

Two long-puzzling biological mysteries of the basic food chain of the Everglades have been solved by unrelated discoveries that show the toughness of the wildlife.

However, this has not greatly relieved fears that severe droughts have had serious, long range effects on the ecology of the unique region which covers the southern end of Florida including the 2,200 square miles of Everglades National Park. Three-fifths of it is normally a swampy, aquatic terrain.

Wildlife mortality has been high during recent rainless periods, and there is growing evidence that the arid spells may have destroyed such sizeable segments of the region's basic food chain that the wildlife decline, already noticeable, may be accelerated.

Dr. and Mrs. Richard Harrington, mosquito control research biologists at the Vero Beach laboratory of the Florida State Health Board, made one of the discoveries. They obtained a small quantity of dry algal mat (Periphyton) material from the dried bed of an Everglades pond, knowing that it contains algae, desmids, diatoms and several types of animals. This was placed in one of their fish aquariums, mainly as vegetative matter for the bottom of the tank.

Several days later they were amazed to see several new fish swimming around that had not before been in the tank. The Harringtons recognized the new residents as killifish, the tiny species comprising one of the prime links in the region's aquatic food chain.

It was evident the killifish had been hatched out of eggs deposited in the dry algal mat well before the drought.

This indicates, biologists say, that even with searing drought drying up shallow alligator waterholes, ponds, sloughs and even small lakes, there are always killifish eggs—and possibly others—that retain the life spark, ready to help in re-starting the food cycle when the water returns.

The second discovery resulted from an experiment conducted by Dr. Milton Kolipinski, an aquatic biologist, and two associates, hydrologists Aaron Higer and James Hartwell, all with the U.S. Geological Survey.

Dr. Kolipinski and his associates had previously noted that shortly after rain ends a severe drought, there's an unexplainable, seemingly spontaneous reappearance of not only killifish, but other aquatic species like crayfish, gambusia (mosquito fish), Jordanella (flag fish), and small frogs. These were assumed to be simply population remnants that somehow had lived through the searing weather. But the mystery of how such creatures managed to survive remained unsolved.

The scientists were aware that beneath the varying but generally shallow Everglades surface of soil, peat or muck, the limestone is sponge-like, with many small crevices and narrow tunnels. In the dried bed of a pond they had especially noticed small cone-like openings that clearly led underground.

When Everglades water levels fell to three feet below ground level late this spring, the researchers built an impoundment 65 by 65 feet on the dried bed of the pond. They encircled it with heavy plastic sheeting supported by a wood framework and held firm by a heavy earth mound around the base.

A few days after heavy rains arrived they checked the impoundment. It held several inches of water and, as expected, they once again found numbers of the same small creatures moving about as though there had never been a drought.

"They could not have reached the inside of the barrier from the outside area," Dr. Kolipinski says. "There were no tunnels apparent that led from outside or anywhere nearby. It is now certain that as drought dries up these ponds, sloughs or small lakes, numbers of these small aquatic forms enter the cone-like openings and secrete themselves in the damp or water-filled crevices to await the return of water above.

"What we still don't understand is exactly what happens in those burrows when several different species are packed together to wait out a drought that may extend for months. Do they exist by feeding upon one another? Does their metabolism just slow down to some degree? Or do they enter an actual state of hibernation?"

Much of this smaller life so vital in the Everglades food chain is, of course, lost as drought severity increases. There's probably a limit to the numbers from any given water area that can find haven in the crevices and tunnels underground. And it's this loss of the population that gets caught above which affects larger species, dependent upon aquatic foods.

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