

Frogs that talk through their ears

The commanding croak of the North American bullfrog is broadcast mostly through its ears, says Alejandro P. Purgue of the University of California, Los Angeles. Purgue demonstrates his discovery by covering a croaking frog's ears with his fingers. The ribbets sound muffled, like someone trying to shout through a gag.

Like other frogs and toads, the North American bullfrog generates the basic sound of its call with its vocal cords. However, ear membranes on each side of its head resonate with several of the key frequencies, amplifying and broadcasting the call, Purgue reports in the November 1997 *JOURNAL OF COMPARATIVE PHYSIOLOGY A*. He calculates that ear power accounts for some 90 percent of the volume of a bullfrog croak.

"It's a mystery so far how they don't make themselves deaf," he says.

Six additional, closely related frog species have loudspeaker ears, the researcher reports, whereas western chorus frogs and California tree frogs use other body parts as resonators.

Purgue uncovered the ear phenomenon while investigating a long-standing puzzle about vocal sacs in frogs and toads. Scientists had once assumed that these pouches, which open into the mouth, acted as resonators, amplifying sound, but several experiments failed to demonstrate the effect.

A research team at the University of Texas at Austin had searched for resonance by tucking frogs into bags of helium to see whether their calls turned squeaky, much as gulps of helium from a birthday balloon change the resonant properties of the human vocal tract to produce a Mickey Mouse voice. The helium had no effect on frog calls, Robert Dudley and A. Stanley Rand concluded in 1993, so they dismissed the idea of vocal sacs as resonating cavities.

Purgue took a different approach, checking vibration in the walls of vocal sacs and other tissues when he played a range of frequencies. The patterns he found indicate that the sac walls of several species resonate, as do the big ears of the bullfrog. For a high-tech demonstration of how covering frogs' ears quiets their croaks, Purgue crafted bits of foam and a spring into frog earmuffs. —S.M.

Frog real estate: More than location

A study of Andean frogs has raised tough questions about strategies for coping with fragmented habitats.

Peter B. Pearman of Evergreen State College in Olympia, Wash., points out that species often dwindle when a habitat is chopped into small, separated patches. Bears and certain woodland birds shrink in number. Frogs suffer, too.

Pearman and David Marsh of the University of California, Davis warn that proposed fixes for tattered habitats may help one species but not another. They report their findings in the December 1997 *CONSERVATION BIOLOGY*.

Marsh studied two species of *Eleutherodactylus* frogs in snip-pets of forest in Ecuador. He also checked frogs in an intact, 500-acre forest. "We were looking for sledgehammer effects, and we seem to have found them," says Pearman.

The numbers of one species seemed to be affected primarily by shrinking fragment size, whereas those of the other responded more to distance between fragments. Pearman warns that protecting corridors of forest that connect fragments, often proposed as a remedy for butchered habitat, would not help the first species, but might benefit the second. In contrast, expanding the boundaries of fragments would help the first frog but not the second.

Population biologist Karen R. Lips of St. Lawrence University in Canton, N.Y., predicts that such analysis "is going to be really important for park design or selecting land for preserves." However, she adds, "It makes our job much more difficult." —S.M.

Mammograms get boost for women over 40

Scientists continue to debate whether women in their forties should get mammogram screenings for breast cancer. Some argue that regular tests aren't cost-effective, since breast cancer usually strikes later in life. Others say mammograms catch cancer early. A study in the Dec. 1, 1997 *CANCER* bolsters the case for more screenings. It indicates that mammograms given to women in their forties save lives.

In Gothenburg, Sweden, 11,724 women in that age group were selected at random to get mammograms every 18 months, starting in the mid-1980s. Another 14,217 women of the same age were identified at the time but weren't offered mammograms until the women in the first group had received their fifth screening—at least 6 years into the trial.

Through 1994, doctors had diagnosed breast cancer in 144 of the women getting regular screenings and in 195 of the controls—percentages that didn't diverge markedly.

Death rates from breast cancer differed sharply, however. Of the women getting regular mammograms, 18 died of breast cancer, whereas 40 of the controls died of the disease. Adjusted for group size, the mortality of the mammogram group was 55 percent of the controls' mortality.

Another study released last year, by researchers in Malmo, Sweden, found that the mortality rate among women receiving mammograms was only two-thirds that of an unscreened control group. In that study, women began screenings at age 45.

Although some of the breast cancers in the Gothenburg study were detected in women age 50 or over, 69 percent were not, which "proves screening works in women in their forties," says Stephen A. Feig, a radiologist at Thomas Jefferson University Hospital in Philadelphia. He notes that the American Cancer Society recommends that women in their forties get mammograms annually. —N.S.

Role of cancer mutation scrutinized

A genetic mutation thought to predispose some people to colorectal cancer may have a more enigmatic link to the disease than originally suspected.

The mutation seems to prevent the *APC* gene from encoding a protein that acts as a natural tumor suppressor in the body. Researchers reported recently that the mutation, called *11307K*, is found in 6 percent of Ashkenazi Jews but that more than 10 percent of Jewish colorectal cancer patients they studied carry the mutation (SN: 8/30/97, p. 133).

More recent genetic tests, of 264 Ashkenazi Jews from 158 families with a history of breast or ovarian cancer—but not colorectal cancer—uncovered the mutation in 12 people, researchers at the Fox Chase Cancer Center in Philadelphia report in the Dec. 15, 1997 *CANCER RESEARCH*. This 7 percent mutation rate is close to the 6 percent figure found in the earlier study; however, none of the 12 carriers had ever had colorectal cancer—nor had any of their relatives.

This research raises questions about the mutation's link to colorectal cancer, but it doesn't necessarily refute the earlier findings. It approached the puzzle from a different angle—whether people carrying the mutation have a family history of the disease—and it focused on a group with different cancer histories, says coauthor Andrew K. Godwin of Fox Chase.

The more recent study may have found no colorectal cancer because people at risk of the other cancers didn't live long enough to get it, Godwin says. Or the mutation may only work in concert with some other factor, he says.

"We need to look at [members of random] families in the Ashkenazi population who live long enough—and see who has the mutation, who gets colon cancer, and who doesn't," says Bert Vogelstein of Johns Hopkins Medical Institutions in Baltimore, a coauthor of the earlier study. —N.S.