Animal Science

Take bison risk seriously

The danger that bison and elk from Yellowstone National Park might spread brucellosis to neighboring cattle is tiny but worth worrying about, concludes a draft report from the National Research Council.

The disease causes abortions in bison, elk, and cattle; in people, it can lead to debilitating cycles of chills and fever. The Department of Agriculture has adopted a program to rid U.S. cattle and domestic bison of the disease by the end of 1998.

The battle over brucellosis turned ugly in the harsh winter of 1996–1997, when starving bison strayed outside the park to forage. Officials feared that infected bison might transmit the disease to cattle and thus ruin Montana's brucellosisfree cattle certification, so they ordered the strays killed. Critics claimed the disease risk was too small to justify the bison slaughter.

The risk of transmission is "very low, but should it occur, it's very serious," says report coauthor Norman F. Cheville, a veterinary pathologist at Iowa State University in Ames.

The report makes no comment on whether the shootings were justified. The authors recommend tightly monitored quarantine zones around the park and more research on vaccines. —*S.M.*

The trouble with teenage tadpoles

Shortly before reaching full froghood, tadpoles go deaf for 2 to 4 days—and it's not from playing their stereos too loudly.

Seth S. Boatright-Horowitz and Andrea M. Simmons of Brown University in Providence, R.I., discovered the hearing loss during the first study of tadpoles' underwater sound detection. Tadpoles hear far better than expected, the researchers report in the Dec. 23, 1997 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, except during a brief stretch in adolescence.

Other researchers studying the emergence of adult characteristics in tadpoles missed these aspects of sound detection because they had made measurements only in air, says Boatright-Horowitz. His and Simmons' work documents hearing loss in water just before the onset of the metamorphic climax, when forelimbs and other adult features emerge. He suggests that a growing bit of cartilage important to adult hearing disables the tadpole's hearing before the system matures. —*S.M.*

On the trail of ants' fancy footwork

Dogs track a scent with their noses to the ground. It's less obvious how ants unfailingly find the food at a picnic, although their waving antennae are known to play a part.

Entomologist Nancy E. Cohen of the University of Kansas in Lawrence wondered whether ants also use chemical sensors on the ends of their legs, as flies and some other insects do. At the Nashville meeting of the Entomological Society of America last month, she presented preliminary evidence that they do smell with their feet.

Cohen found that several species of carpenter ants have two tiny hairs, called sensilla, on each segment of their tarsi, the insect equivalent of feet. At 5 to 10 micrometers long, these hairs are barely visible, even when magnified 500 times. Neurons in the hairs react when the tip of a hair is touched with an electrode loaded with a chemical such as sugar. The activity suggests that the hairs may indeed detect chemicals and that the ants "have taste organs on their feet that tell them they are on the trail," says collaborator Gerrit de Boer in Lawrence.

"It makes a lot of sense," says insect chemist James H. Tumlinson of the U.S. Department of Agriculture in Gainesville, Fla.

Cohen is now working on the tricky challenge of connecting the hairs' physiological function with the ants' behavior. One strategy is to use a drop of wax to tether ants on a treadmill and record how they react to a drop of sugar. —*C.M.*

Biology

Obese birds make good athletes

Bar-tailed godwits, a species of shorebirds, may be the fattest birds still able to get their lardy rumps into the air, but they could also be the avian marathon champs.

Before fall migration, they blimp out in Alaska until fat accounts for up to 55 percent of their body weight—the highest proportion of fat he's heard of in birds, says Theunis Piersma of the University of Groningen and the Netherlands Institute for Sea Research. He and Robert E. Gill Jr. of the U.S. Fish and Wildlife Service in Anchorage, Alaska, published their findings in the January issue of THE AUK.

Other researchers report only 3 to 5 percent body fat in small birds that don't migrate. Short-range migrants build up fat percentages in the low twenties, while a few long-distance fliers have been found to have body fat percentages in the forties.

Piersma and Gill suggest that bar-tailed godwits rank among the most extreme of the long-range fliers, traveling 11,000 kilometers across the Pacific nonstop.

By the time the birds begin the trip, not only has fat built up to record levels, but their livers, stomachs, and some other organs have shrunk to half of their normal size or smaller. "Everything you don't really need for the flight is thrown overboard," Piersma says.

He describes his and Gill's research as part of a rebellion against the idea that birds, like cars, do nothing more than fuel up before a trip. He argues that more profound changes precede migration and that new realms of physiology lie waiting for discovery. "Animals are able to adjust the size of functional organs as they need to," he says. —*S.M.*

What if fighting fish cheated?

Anyone soured by human news can take comfort in the clashes of Siamese fighting fish. Among these creatures, a fighter who cheats tends to lose.

A Siamese fighting fish struts its stuff in the early stages of ritualized combat, in which fish can be induced to bluff.

The ritualized battles might seem the perfect place for fish to bluff, posturing like supertough fighters, says Janet R.P. Halperin of the University of Toronto. However, such bluffs often backfire, she and colleagues report in the January ANIMAL BEHAVIOUR.

Their thrash-by-thrash analyses of fish fights support a theory of animal communication proposed in the 1970s by Amotz Zahavi of Tel Aviv University. The handicap theory predicts that cheaters must suffer some disadvantage in order for a stable system of ritualized communication to evolve.

To test the idea, Halperin, David W. Dunham, and their colleagues provoked Siamese fighting fish into unusually aggressive states. The researchers isolated individual fish for weeks, then primed them for the fight by dangling fish models or mirrors in front of them for 5-minute sessions over several days.

When a live opponent appeared, the overexcited fish surged into combat, showing aggression far out of proportion to their size and strength. In essence, they bluffed.

Their rivals did not respond in the usual way. In a normal fish fight, says Halperin, combatants match each other's intensity, from showy but stately displays to tail whooshing and ritualized, fin-fraying bites. However, opponents of hyperaggressive fish held back, reminding Halperin of boxers who let attackers exhaust themselves.

Then, after 10 or 15 minutes of restrained behavior, the normal fish started fighting more fiercely. Researchers had matched the combatants for size and strength, but in 11 out of 13 battles, the honest opponent beat the bluffer. —*S.M.*