

Odor makes crickets call

Not perfume manufacturers, but entomologists, have found a scent that will make a male sing. A song-releasing chemical stimulus has been demonstrated for male ground crickets, insects well known for their acoustic communication.

Robert Paul of the University of Florida found that the male cricket of four different species is likely to rub his forewings together, producing a calling song, when he is exposed to paper towels previously in the cages of females of the same species. More male crickets responded to paper conditioned by females than to paper previously exposed to male or juvenile crickets.

Paul suggests in the Sept. 30 *NATURE* that chemical communication is used in addition to sound to bring together the sexes. The substance excreted by the females could indicate their general location, where the soft song of the male is most likely to be appreciated.

Aspects of alcohol addiction separate

Physical dependence on addictive drugs and increasing tolerance to their effects have been considered tightly linked, probably resulting from the same biochemical mechanism. A recent study demonstrates this is not the case, at least for alcohol.

Ronald F. Ritzmann and Boris Tabakoff of the University of Illinois Medical Center report in the Sept. 30 *NATURE* that mice no longer became tolerant to alcohol after they were injected with the drug 6-hydroxydopamine that destroys one type of nerve cell connection in the brain. The mice drank a 7 percent alcohol diet for one week, followed by a nonalcoholic diet for a day. When they were then injected with ethanol, these mice showed the same decrease in body temperature and increase in sleep time as did control animals experiencing alcohol for the first time.

There was no effect, however, of 6-hydroxydopamine on the physical dependence of mice. Whether or not they received the drug, mice experienced similar withdrawal symptoms—tremors, spasms and drop in body temperature—after their alcoholic diet was ended.

“It will be a lot easier to work out the biochemical patterns of tolerance and withdrawal, now that we know they are separate entities,” Ritzmann says.

Bats suffer delayed pesticide effect

Flying may be hazardous to modern bats, after their present exposure to pesticides. Chemical residues already stored within young bats' bodies pose a hazard during the first migratory flight, biologists Kenneth N. Geluso, J. Scott Altenbach of the University of New Mexico and Don E. Wilson of the Smithsonian Institution report in the Oct. 8 *SCIENCE*.

Young, Mexican free-tailed bats, captured in Carlsbad Caverns, contained in their body fat measurable amounts of pesticide residues, especially DDE, a degradation product of DDT. Much less pesticide was measured in their brains. But as fat is used during the bats' 1,300-kilometer migration, the pesticide residues might be freed and move into the bats' brains.

The researchers simulated migratory flight in a laboratory by starving and exercising a second group of captured bats for 9 days. Concentrations of pesticide residues in these bats' brains rose to 40 to 160 times the level that had been measured in newly captured animals. Bats that died during the simulated migration showed symptoms characteristic of pesticide poisoning. They became hyperactive and had intermittent seizures.

Pesticides may be contributing to the drastic declines in populations of this bat in the southwestern United States, the researchers say.

From the Wildlife in America Conference in Washington

Endangered species: When to act

One of the chief problems in saving potentially endangered species is knowing how to identify them early enough. The number of individuals that make up a viable population clearly varies from one species to another. S. Dillon Ripley, Secretary of the Smithsonian Institution, and James B. Trefethen of the Wildlife Management Institute, propose an essentially genetic criterion: “Action should be taken before the natural [genetic] variation is substantially reduced.”

The basis of such a definition is that to survive, a species should not only have enough mating pairs to produce adequate numbers of offspring, but also have a large enough variety of individuals to ensure that the population will retain all necessary physical characteristics in its gene pool.

Determining when this criterion is met for some specific group, of course, is another matter. The authors conclude that ecology “greatly needs to become more predictive,” through such means as the computer modeling techniques developed by Richard S. Miller of Yale University and Daniel Botkin of the Marine Biological Laboratory. Using such techniques, ecologists were able to predict, for example, that hunting sandhill cranes at the then going rate would have resulted in extinction within 19 years.

The authors conclude that ecology must also become an applied science, ecological engineering. “There are very few situations left in which the best management is simply to protect by leaving the situation completely alone.”

Managing the tragedy of the commons

Some years ago University of California human ecologist Garrett Hardin coined the phrase “tragedy of the commons” to describe the inevitable fate of natural resources held as common, but unregulated, property. The phrase and the concept became a seminal idea in the development of ecological economics (*SN*: 4/19/75, p. 259). Now Hardin has returned to the subject, with a devastating analysis of pitfalls in trying to manage such natural resources.

Quickly neglecting altruism, he identifies three viable systems of management: private enterprise (property held by individuals, proceeds going to individuals), socialism (property held by a group, proceeds going to the group), and the traditional frontier system of the commons (property held by the group, but harvested by individuals).

Much of the history of this country has been spent under the last of these systems, as when Kit Carson harvested buffalo that theoretically were common property. This system, says Hardin, works only when the number of such individuals is small and the amount of the resource is large. Obviously, in the United States, that time has long past for most resources.

Unrestricted private enterprise also has its limitations, Hardin says, for under some circumstances it is more profitable for a person to “clear-cut and clear out” than to manage privately held land for long-term production. What restrictions a given society wishes to adopt will depend on “mutual coercion, mutually agreed upon. In a crowded world that is the closest we can get to freedom.”

But the threat of destroying global resources, shared among autonomous nations remains. Tropical rain forests, for example, are being decimated because “rich countries painlessly offer sums of money that are irresistible to the poor.” For this Hardin offers no ready solution: “It is not at all obvious what we must do if we are to preserve some small part of the remaining primeval biological wealth of the world.”