environment

Matching plants and animals

Different ruminant animals have different needs for plant food. The food needs are determined not only by nutritional requirements but also by the needs of essential bacteria in the animals' rumens. For instance, deer will sometimes avoid otherwise nutritious plants because the plants contain "rumen inhibitors," chemicals that harm the bacteria.

W. M. Longhurst, a wildlife biologist at the University of California at Davis, reports that by matching animals to plants it may be possible for scientists to increase the grazing and browsing capacity of California lands and also to create more diverse populations of plants and animals. In effect, his technique is to make available new ecological niches.

A team headed by Longhurst first identified the rumen inhibitors and the plants that contained them, then matched them to various animal species. For instance, deer thrive on a diet heavy in oak leaves, while cattle tolerate only small amounts of oak leaves. But cattle and sheep seem to manage well on certain bunch grasses that are less palatable to deer. In both cases, the rumen inhibitors supplied the explanation.

Such research could eventually lead to introduction of non-native species that would consume plants that are abundant but not now eaten by existing ruminants, and possible relocation or expansion of existing species to take advantage of available plants.

Pollutants and antibody production

Certain air pollutants reduce resistance to infection in humans. Arian Zarkower of Pennsylvania State University's College of Agriculture says his work shows that pollutants can interfere with formation of antibodies.

Working under a National Institutes of Health grant, Zarkower says the pollutants appear to interfere with macrophages, cells which normally initiate processes leading to antibody production.

Zarkower exposed mice to long-term doses of carbon, sulfur dioxide and nitrous oxide and then administered infectious bacteria to the animals. The pollutants first caused an enhancement of antibody production in local areas such as lymph nodes. But the ultimate effect of all three pollutants was to reduce over-all antibody production. Allergic sensitivity was also increased.

Sterility gene for mosquito control

Scientists are working hard to find a substitute for DDT in the control of malaria vector mosquitoes. Karamjit S. Rai, Notre Dame University biologist, reports that two experiments with mosquitoes breeding in old tires in New Delhi point to an answer: a gene for sterility that would be passed to offspring.

In the first series of tests, Rai introduced a dominant gene in *Aedes aegypti* mosquitoes, the gene producing a silver abdomen rather than the usual black one. The gene became common in the mosquito population of the area in two or three months—thus proving the feasibility of dissemination of genes.

Then a new mutant developed at Notre Dame for sterility was tested by releasing the mutant mosquitoes in another tire dump. Tests indicated a slight decline in fertility. Further tests will be conducted next summer.

natural sciences

Making miniflies

Fruit flies are normally much smaller than the average housefly, usually measuring only an eighth of an inch long. Herschel Mitchell of the California Institute of Technology has found a way to make them even smaller.

While investigating biological effects of bee venom, Mitchell discovered and isolated a toxic polypeptide called minimine. When minimine is injected into the larva of a fruit fly, the fly matures normally in every way except that it grows to only one-quarter normal size. The individual cells of the flies are also miniature. Miniflies live a normal life-span and produce regular-sized offspring.

Mitchell and Peter Lowy, also of Caltech, are now trying to find out how minimine induces miniaturization. Part of the answer, says Mitchell, is that, after injection, the normally voracious larva stops eating and becomes lethargic. There is some evidence that the fruit fly itself produces minimine-like substances that may function in determining its size.

Locating lobsters

Successful harvesting of lobsters, as with other sea life, depends in large part on knowing where to look. A recent study by National Marine Fisheries Service biologists demonstrated that less is known about lobster habits than previously believed.

In a series of 33 dives in a two-man submersible, observers led by Richard A. Cooper found a large population of lobsters in muddy estuarine channels where none were expected. But they found no lobsters in parts of the Gulf of Maine where previous theories had predicted many.

A commercial-sized lobster population was found at the bottom of canyons near the Sheepscot and Boothbay estuaries along the central coast of Maine at depths of 150 to 250 feet. Many of the lobsters were shedding their skins in colder waters—48 degrees F.—than had heretofore been observed.

The lobsters also seemed very sensitive to depth. No juvenile lobsters were observed at depths greater than about 150 feet and only one adult was seen at a depth greater than 250 feet.

Leech repellent

Medical patients in bygone times must often have wished for some kind of leech repellent. It appears that a certain type of newt has such a natural repellent. It has long been known that skin secretions of some salamanders are highly toxic, but most study has concentrated on effects of these poisons on vertebrate predators.

F. Harvey Pough of Cornell University exposed several species of newt and salamander to leeches. Of these, the leeches left one species, the eastern red-spotted newt *(Notophthalmus viridescens)* strictly alone. *Notophthalmus* secretes tetrodotoxin, one of the most toxic nonprotein substances known. But California newts, which contain five to ten times as much tetrodotoxin, were attacked. Leeches placed in a solution of the poison seemed to develop a resistance to it. Pough concludes in the Dec. 10 SCIENCE that the poison is not the reason leeches avoid spotted newts, and that some other skin secretion may be responsible.