# BIOLOGY

## Under the spreading beech bark disease

European and Oriental imports often bring pleasure and status. But not always. The fungus *Eridothia parasitica*, brought accidentally to the United States on a cargo ship from the Orient in 1904, caused within 50 years the virtual elimination of the chestnut tree from U.S. forests. The spores and mycelia of the European fungus *Ceratocystis ulmi*, stowed away on a cargo of logs from Holland in the 1930's, quickly initiated the Dutch Elm disease epidemic.

Now, it seems, the importation of the European beech scale (an insect) and species of the fungal genera *Nectria* may be slowly wiping out a large number, perhaps half, of American beech trees. Beeches are one of three dominant hardwoods in northeastern forests along with sugar maples and yellow birch. Beech bark disease has been spreading westward from Nova Scotia since the European pathogens were first introduced in the late 1800's, but it is just now becoming extensive enough to cause concern. Surveys by the U.S. Forest Service, commercial foresters and academic plant pathologists are now showing that the disease has spread halfway from Nova Scotia to Indiana, the western limit of the beech's natural range. Although similar to the chestnut blight, the disease is considered less severe because it spreads and destroys trees more slowly.

Unfortunately for beech trees, there has been little research on the disease and almost no large-scale prevention or treatment efforts. There are two reasons for this: 1) Beech trees are relatively unimportant economically. The wood is used for tool handles, barrels and other limited purposes, but it is hard to process and is often defective. Therefore, the economic loss to foresters would not offset expensive treatments. 2) Beech bark disease affects the trunk of the tree and cannot be treated with aerial sprays. Spraying the trunks of forest trees individually would be prohibitively expensive.

The situation is better for the occasional ornamental beech, however. Cornell plant pathologist Wayne A. Sinclair advises individuals to watch for a gradual color change—gray to white—on beech trunks. Dormant oil sprays, he says, effectively kill the beech scales, which drill holes and expose the trees to the pathogenic *Nectria* fungi.

## Flashlight fish: Fantasy on fins

Life forms have, out of necessity, evolved some fantastic adaptations to living in difficult niches. Consider, for example, the flashlight fish, *Photoblepharon*. Although it is not, like the angler fish, a creature of the dark abyss, this 6.5-centimeter long shoreline darter spends much of its time hunting (and being hunted) at night. It has, accordingly, evolved two strange little headlamps, organs just below the eyes that are packed with luminescent bacteria and that emit a glow visible for meters.

A team of Americans working at Hebrew University's Marine Biological Laboratory at Elat, on the Red Sea, report a study on *Photoblepharon* in the Oct. 3 SCIENCE. The team, headed by James G. Morin of the University of California at Los Angeles found that the flashlight fish uses its bioluminescent organs with more versatility than any other organism yet described.

Other organisms use their "lights" either to assist predation (e.g., the angler fish), to aid in escape from predators (e.g., the deep sea squid *Heteroteuthis dispar* that squirts a luminescent substance at his attackers) or for interspecies communication (e.g., firefly courtship signals). The flashlight fish, it seems, uses its headlamps for all three types of bioluminescent behavior—offensive, defensive and communicative. The organ's versatility, the team writes, "suggests a flashlight whose owner can exercise options in its use."

# BIOMEDICINE

## When tired eggs and sperm meet

During the 24 or 48 hours in which fertilization can take place, three things can happen. A freshly ovulated egg can meet with a newly arrived sperm. A sperm that arrived a day or two earlier can meet with a freshly ovulated egg. Or a newly arrived sperm can meet with an egg that was ovulated a day or two earlier.

The first event is ideal. The latter two can spell trouble, according to a report in the Sept. 18 NEW ENGLAND JOURNAL OF MEDICINE.

Rodrigo Guerrero and Oscar I. Rojas of Universidad del Valle in Cali, Colombia, suspected that fertilization of aged sperm or eggs in the female genital tract can lead to miscarriage. They tested the hypothesis by measuring the probabilities of miscarriage after intercourse on a given day of the menstrual cycle in relation to the day of the shift in body temperature in 965 patients. (The day of the shift indicates the day of ovulation.) Cases came from family planning clinics where body temperatures and intercourse records are kept.

They found that the probability of miscarriage diminished significantly as the shift in temperature ovulation was approached and then increased to its highest point three days later. In other words, fertilization by an old sperm increases the chance of miscarriage, but fertilization of an old egg increases the chance even more.

## A stomach-juice switch

Back in the 1930's, a chemical was found in urine which depresses gastric acid secretion and which has a beneficial effect on ulcers in dogs. Before the chemical, named urogastrone, could be developed into an ulcer drug for people, though, it had to be isolated and its structure delineated. These feats have now at last been achieved by H. Gregory of Imperial Chemical Industries in Britain.

Urogastrone is actually two peptides, Gregory reports in the Sept. 25 NATURE. The peptides have identical amino acid sequences except for one amino acid. These sequences are different from any known gastrointestinal hormones. However, their amino acid compositions "show remarkable structural similarities" to epidermal growth factor. This factor, isolated in 1972, stimulates the growth of skin cells. Such structural similarities, Gregory believes, is not accidental. Urogastrone may well turn off gastric secretions and heal ulcers by promoting skin cell growth in the stomach lining.

## Hormones and sexual encounters

Encounters with the opposite sex can lead to obvious physiological changes—flushed cheeks, sweaty palms, weak knees and so on. Less obvious changes, such as a rise in one's sex hormone levels, can also take place, according to a report in the Sept. 26 SCIENCE.

A group at the Worcester Foundation for Experimental Biology in Shrewsbury, Mass., headed by F. Macrides, paired male mice with a female for a week. The males' testosterone levels remained the same as those of males in all-male groups. Then the males' resident female was replaced by a strange new female. Their testosterone levels shot up 30 to 60 minutes later. The strange female was subsequently replaced by a strange male. The males' testosterone levels did not shoot up this time. So their testosterone elevation appeared to be a specific hormonal response to an encounter with a strange female.

"The results along with previous findings suggesting that strange males affect endocrine function in females," the investigators conclude, "indicate that bisexual encounters are likely to produce endocrine changes in members of both sexes."