Botany

Symbiosis: Change from without

Some plant roots and some species of soil microbes have learned to live in peaceful symbiosis. Legumes are able to fix nitrogen because their root nodes are inhabited by industrious nitrifying bacteria. Both parties profit; the plants get raw materials for making protein and the microbes get room and board.

The legume system is the best known example of nutritional symbiosis in plants, but other systems do exist, such as the mycorrhizas, root-fungi combinations. Two Australian botanists, N. Malajczuk and G. D. Bowen from the Commonwealth Scientific and Industrial Research Organization's soil division in Glen Osmond, South Australia, now report another such system in the Sept. 27 NATURE.

They studied nutrition in proteaceous plants, a large group including many woody shrubs indigenous to southern South America, Africa and Australia, but cultivated all over the world. When the plants are grown in nutritionally poor soil, they develop strange, dense clusters of short lateral roots (called proteoid roots) among the other, more vertical roots. The team grew seeds from the Greatcone banksia (a shrub with large, bright flower clusters) in sterile sand and in nutritionally poor soil inoculated with the soil and proteoid roots of other Greatcone plants. They found that no proteoid roots were formed in the sterile sand, but dense clusters formed in the inoculated pots.

Soil microbes (the species still unknown) apparently are causing the dense clusters to form, and these, in turn, enhance the uptake of certain soil nutrients. Unlike the microbes and fungi that inhabit other plants, however, these microbes trigger proteoid root formation from the outside. This is the first report, they state, of structural root changes caused by noninfecting microbes.

Stalking the wild lambsquarters

Although it is fashionable now to eat (or talk about eating) wild plants, rural Americans have always gathered berries, nuts and greens. These foods have one indisputable quality—they're free. But reasonable people differ on whether or not they are nutritionally superior to market vegetables.

Four instructors and several dozen students from the Federal City College in Washington, D.C., attempted to clarify this dispute. They analyzed the mineral contents of several wild vegetables and several "store bought" ones, and project head James R. Preer presented the findings at the American Chemical Society meeting in Atlantic City.

They measured the vegetables for vitamins A and C, thiamine, riboflavin, niacin, calcium, phosphorous and iron, and assigned them average nutritional values on a scale from one (highest) to 10 (lowest). Lambsquarters and parsley scored respectable 3.0's. Dandelions scored 3.3, amaranth 4.4 and poke shoots 4.6. Asparagus and spinach drooped with 5.4's and celery absolutely wilted with an 8.8.

The group also analyzed pairs of food plants chosen for chemical similarity, a more valid comparison than assigning average nutrient values, Preer says. Comparing wild onions with scallions, the group found about twice as much vitamin C, 20 percent more iron and 8 percent more magnesium in the wild vegetables, but 6 percent more calcium in the scallions. The higher calcium level probably is due to the application of fertilizer to the cultivated onions, Preer says.

Complete resolution of the "wild vs. store-bought" dispute won't come until more such comparisons are made of related plants, he says, but at least for onions, wild is better. Bon appetite.

Science and Society

Confidence in science (cont'd)

The popular assertion that public confidence in science is diminishing has recently been attacked by Columbia University sociologist Amitai Etzioni and Center for Policy Research associate Clyde Nunn (SN: 8/10/74, p. 92). Now, in a letter to SCIENCE (Oct. 4, p. 9), Nunn cites figures just released by the National Opinion Research Center as confirming the view that the public still respects science, but doesn't understand it.

The proportion of the public with "great confidence" in science rose from 37 percent of those questioned in 1973 to 45 percent this year. At the same time, great confidence in the executive branch of Government dropped from 29 percent to 14 percent; and in Congress, from 23 percent to 17 percent. But 10 percent of the respondents answered "don't know" to questions about science—four times more frequently than for other institutions, on the average. "Clearly the job of public education is largely yet to be done," concludes Nunn.

The food safety dilemma

In a recent policy study from the Hoover Institution, senior fellow Rita R. Campbell concludes that with increasingly sophisticated methods of detecting minute quantities of carcinogens and other harmful substances in foods, "almost all foods may be shown to have some degree of health risk." Deciding which risks can be tolerated and which cannot is likely to become an increasingly difficult proposition.

The problem is complicated by trade-offs, as when many people gain a small benefit from a food additive while a few people suffer great risk. With each new wave of safety regulations, food prices rise, resulting in worse nutrition for the very poor. Finally, elimination of a food product because of suspected hazard or poor nutritional quality can have far reaching consequence unforeseen by the regulator.

As a general guideline, Campbell concludes that the consumer is best protected when granted wide freedom of choice. Therefore, the approach to follow, she says, is to provide better information about foods and involve the consumer directly in the risk/benefit decision.

Footnote on Copernicus

In response to the scholarly hoopla surrounding the 500th anniversary of the birth of Nicholaus Copernicus (SN: 4/14/73, p. 237 and 5/5/73, p. 284), historian Krishnan D. Mathur of Washington, D.C.'s Federal City College gently reminds readers of NATURE (vol. 251, p. 283) that Copernicus's heliocentric theory caused such a stir only because Western astronomy at the time was 900 years behind the Oriental.

"By the seventh century," he writes, "the Indian astronomers had discussed astronomical constants and sine tables, explained motions of the sun, the moon, and the planets, charted eclipses, and explained the theory of rotation of the earth." By constructing large instruments in specially fitted observatories, they had made some of the most precise measurements of star positions prior to invention of the telescope. During Copernicus's lifetime, Indian astronomical methods had been adopted by several observatories in Europe.

The East was not free from the religious intolerance that for so long stymied development of science in the West. The great Indian astronomical observatory in Benares was sacked in 1194, but was again thriving by Copernicus's time.