Biology

Carol Ezzell reports from Honolulu at the annual meeting of the Ecological Society of America

Midnight: Time to plow the north 40

Wise farmers aiming for healthy, weed-free crops should ignore the adage "early to bed, early to rise," according to a ground-breaking study of a new weed-control strategy. Instead, the study suggests, farmers should consider cultivating their fields after dusk in order to prevent weed seeds that are briefly churned up during plowing from soaking up the sun they need to sprout.

A team led by Ana L. Scopel of Oregon State University in Corvallis reports that test plots plowed only at night grew roughly half as many weeds as plots plowed only during daylight hours. But this doesn't mean farmers should plow completely in the dark. Plots plowed at night by tractors with up to eight headlights had similar reductions in weed growth, the researchers found.

Scopel estimates that daytime plowing exposes buried weed seeds to sunlight for roughly one-quarter of a second before recovering them with freshly turned earth. This is just long enough, she reports, to activate photoreceptors in the seeds that normally prompt germination. Burial for a few weeks makes these receptors, called phytochromes, especially sensitive to light, she says.

"Cultivation during the night has a dramatic effect" in reducing weed growth, says Scopel, because it prevents the activation of phytochromes in weed seeds. She predicts that some farmers could drastically reduce or even eliminate their need for herbicides by plowing at night.

Simply placing a tarpaulin or a cardboard box over a tractor's plowshares during daytime plowing can reduce the sprouting of broad-leaf weeds by 40 percent, Scopel reports. However, she cautions, such sunshades would have no effect on weedy grasses.

Bear evidence of omega-3's benefits

Polar bears' eating habits make even the fat-soaked typical American diet look healthful. During winter, these chubby creatures eat only seal skin and blubber, leaving behind the lean portions of their catch for foxes and other animals. And in summer, when no seals are to be had, the bears simply go without eating.

Yet a new study indicates that polar bears have more healthful concentrations of artery-clogging cholesterol and fats in their blood during the winter – while eating nearly 100 percent fat – than during their summer fasts.

G. Edgar Folk Jr., an environmental physiologist at the University of Iowa in Iowa City, reports that fasting bears have nearly 25 percent higher total cholesterol concentrations and 50 percent higher triglycerides than their blubber-gobbling counterparts.

Folk attributes the difference to seal blubber's high concentrations of omega-3 fatty acids, which seals acquire from their diet of oily fish. Clinical trials in humans have shown that omega-3 fatty acids help reduce high concentrations of cholesterol in the blood, which can lead to heart disease.

Blubber-eating polar bears have 10 times more omega-3 fatty acid in their bloodstreams than fasting bears, says Folk. "Apparently, our fasting bears have higher blood [cholesterol and triglyceride] levels because of their very low levels of omega-3s," he concludes.

Folk suggests that the correlation might also hold true for people. A study of the causes of death among 8,000 Canadian Inuits (also known as Eskimos), published in the July ARCTIC MEDICAL RESEARCH, shows that the incidence of heart disease in this indigenous population is one-fourth that among Canadians as a whole – despite the much higher fat content of the Inuit diet. Most of the fat eaten by Inuits comes from omega-3-rich fish or blubber.

Science & Society

Where there's smoke . . .

Airborne cigarette smoke should be designated a "known human carcinogen," according to an Environmental Protection Agency report now undergoing review by the agency's Science Advisory Board. The draft report attributes some 3,000 lung cancer deaths among U.S. nonsmokers each year to the breathing of air contaminated with smoke from other people's cigarettes.

Though many companies have restricted where their employees may smoke, in an effort to safeguard the health of nonsmoking co-workers, that may not be sufficient, suggests a study reported in the Aug. 12 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. The study indicates that among the 7,162 nonsmoking Californians surveyed, those employed by companies with a work-area ban on smoking were almost three times as likely to be exposed to workplace tobacco smoke as those whose companies banned indoor smoking altogether.

Companies with limited policies on workplace smoking – such as regional bans on smoking that do not include the work area – provided little more protection to nonsmokers than companies having no smoking policy at all. In both settings, nonsmokers were about eight times as likely to inhale tobacco smoke as those in companies maintaining a smoke-free policy.

Among nonsmokers, it appears that Hispanics, employees 18 to 24 years old, and adults lacking a high school diploma face an especially high risk of encountering workplace tobacco smoke. For companies "in which the employees are likely to be in these [elevated-risk] groups, high priority should be given to establishing ordinances mandating smoke-free work sites," conclude Ron Borland of the Center for Behavioral Research in Cancer in Melbourne, Australia, and his colleagues.

. . . and how to get rid of it

Within just one decade, Canada lowered its smoking rate among persons 16 and older by one-third – from an average annual consumption of 3,800 cigarettes per person in 1980 to just over 2,500 per person in 1990. Taxes deserve most of the credit, assert Lester R. Brown and Hal Kane of the Worldwatch Institute in Washington, D.C. Canada's federal and provincial taxes on cigarettes have climbed steadily since 1980, they note – from 38 cents a pack in 1980 to $3.25 a pack today.

Nor is Canada alone in taxing its smokers heavily. At $4.06 and $3.95 per pack, respectively, Denmark and Norway lead. The United Kingdom and Ireland follow close behind Canada, with per-pack taxes of more than $3. Spain levies the industrial world's lowest cigarette tax – 46 cents a pack; the United States taxes its cigarettes at just a nickel more per pack.

Because cigarette smokers incur more sick leave, higher disability benefits, and higher public health costs, they tend to be less productive workers, Brown and Kane observe. "Tobacco taxes correct for those costs by discouraging consumption of products whose costs to society are not reflected in their retail price," the Worldwatch researchers maintain in a report released last week.

Those taxes also discourage consumption. Governments have noted that each 4 percent increase in cigarette taxes reduces smoking by 4 percent overall – and by 10 percent among teens, Brown and Kane point out. In the United States at least, those youths have proven a tough market to reach with anti-smoking campaigns. In an editorial in the Aug. 12 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, National Cancer Institute Director Samuel Broder notes that smoking rates among 12- to 18-year-olds have not changed appreciably since 1979. "The lack of any significant change in smoking habits among teens stands in sharp contrast to the substantial drop in smoking rates among adults over this same time period," he writes.

Broder concludes that "smoking is a 'social carcinogen' requiring the dedication and involvement of us all."