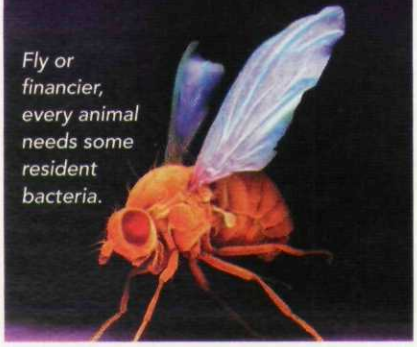

Fly or financier, every animal needs some resident bacteria.

Let the Germs In

If a pregnant woman could wave a magic wand to ensure that her soon-to-be-born child would never have contact with bacteria, should she do it? Probably not.

Ted Brummel, a biologist at Sam Houston State University in Huntsville, Texas, and several colleagues found that when fruit flies were raised in a permanently germ-free environment, and given only food that was irradiated or laced with antibiotics, their life spans were more than 30 percent shorter than the life spans of flies raised under nonsterile conditions. The investigators also discovered that the first four to seven days after metamorphosis are critical to longevity: exposure to bacteria for those few days alone is excellent insurance against an early death.

What the pregnant woman should consider is that resident bacteria are necessary for normal digestion in virtually all animals, including people. In addition, such bacteria help the immune system distinguish the benign from the dangerous. ("*Drosophila* lifespan enhancement by exogenous bacteria," *Proceedings of the National Academy of Sciences* 101: 12974–79, August 31, 2004) —*S.R.*

SAMPLINGS

Ups and Downs

It's amazing how much information you can get from the inside of an old tree. When porcupines eat the inner bark of jack pine trees during the harsh Quebec winter, they leave long-lasting, oval "feeding scars" in the trees' growth rings. Ilya Klvana, an ecologist at the University of Quebec at Rimouski, and his colleagues surveyed the feeding scars within a fifty-acre area, noting the year each scar was made and the variations in the number of scars for each year since 1868. Those data enabled the investigators to compile a 133-year record of porcupine populations in the forests of eastern Quebec, where porcupines are the dominant vertebrate plant-eaters.

Peeping porcupine

And guess what? Porcupine numbers have been following a regular pattern that closely tracks the cycles of solar activity. Every eleven years or so, while undergoing its periodic bout of severe magnetic turbulence, the Sun shoots out radiant energy and erupts in a bad case of sunspots. Given the Sun's starring role in Earth's climatic drama, and given the population fluctuations of many organisms, ecologists have long sought persuasive evidence of a correlation between the cycles of the Sun and those of terrestrial populations. Klvana and his colleagues seem to have come up with the goods.

The investigators propose that, as with the periodic climatic disturbance known as El Niño, solar activity might be acting as an "environmental pacemaker," giving rise to cyclic changes that ripple through seasonal precipitation and temperatures, herbivore populations, plants, and, ultimately, entire ecosystems. ("Porcupine feeding scars and climatic data show ecosystem effects of the solar cycle," *The American Naturalist* **164**:283–97, September 2004) —*Nick W. Atkinson*

Cold Fission

Zoologists of late have been debating whether many new vertebrate species evolved at the time of the last ice age—the Pleistocene epoch, between 2 million and 10,000 years ago. According to the standard view, the advances and retreats of the ice sheets, and the global cooling trends that accompanied them, caused habitats to become fragmented and populations to be isolated—conditions that typically foster the emergence of new species. Yet most studies, done on faunas that lived south of the ice itself, showed no proliferation of species. Now, by examining birds whose ancestors actually inhabited the icebound regions, Jason T. Weir and Dolph Schluter, both evolutionary biologists at the University of British Columbia in Vancouver, have gathered some strong new support for the old view.

The investigators selected pairs of closely related bird species from the Americas and measured how much the DNA of one species in each pair differed from the DNA of the other species. Those data enabled Weir and Schluter to calculate when each member of the pair branched off along its own path to specieshood. The calculations show that every one of the closely related species now living in boreal (northern coniferous) forests originated during the Pleistocene. By contrast, only about half the paired bird species now living in sub-boreal climes split from each other during that epoch (the other half have more ancient origins). Where glaciation was more intense, the authors suggest, selective pressures were greater and the populations more isolated: a surefire formula for speciation. ("Ice sheets promote speciation in boreal birds," *Proceedings of the Royal Society of London* B **271**:1881–87, September 22, 2004) —*S.R.*

Female Townsend's warbler