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LETTERS

Biopesticides

The article "Research community swats grasshopper control trial" by Billy Goodman (News & Comment, 14 May, p. 887) illustrates a flaw in the evaluations of microbial insecticides as alternatives to synthetic chemical pesticides. Although biological pesticides do not create problems such as ground-water contamination and vertebrate toxicity, the ability of biopesticides to replicate and disperse throughout an ecosystem mandates that their potential interactions with nontarget organisms be carefully evaluated.

We feel that Jerry Onsager's remark that "you either grit your teeth and take chances or spend the rest of your career doing cage studies . . ." is an overstatement of the problem of making such evaluations. Clearly, host range studies of representative nontarget organisms, particularly beneficial invertebrates, could be conducted in reasonable time frames. Their results could then be evaluated by teams of experts in the fields of invertebrate and ecological sciences. Such studies would require far less time and resources than are required currently for the registration of chemical pesticides.

The potential problems of interactions between microbial insecticides and nontarget organisms are particularly important in considering the development of genetically enhanced microbial insecticides such as recombinant baculoviruses. In virtually all invertebrate host range studies with baculoviruses, symptomology has been the basis of assessment. Symptomless infections would have gone undetected. Accordingly, baculovirus infections of nontarget hosts may not have been properly assessed and the ecological consequences of their release not correctly evaluated. With genetically enhanced viral insecticides, inapparent virus infections could become lethal, depending on the properties of the toxins or hormones inserted into the virus to achieve enhanced pesticidal activity.

Whether naturally occurring or recombinant in origin, careful attention should be paid to the potential effects microbial pesticides may have on nontarget hosts. However, even if host ranges include several nontarget hosts, the benefits of use as compared with alternative control strategies might outweigh the ecological costs.

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Tuberculosis Mortality Decline

Marcia Barinaga's statement that, "when an antibiotic treatment for tuberculosis (TB) was found in the 1940s, the disease was transformed in the developed world from a lethal plague to a vanquished and vanishing illness" (News & Comment, 7 May, p. 750), does not stand up to scrutiny. Deaths from TB were in substantial decline in the West by the latter half of the 19th century, a decline that continued unabated throughout the current century virtually unaffected by the development of chemotherapy in the 1940s or application of the bacille Calmette-Guérin (BCG) vaccine in the 1950s (*1*). That other infectious diseases were undergoing parallel decreases in deadliness implies that the improved TB survival rate was independent of specific advances in treatment. While a decreased incidence of infection probably contributed to the general decline in infectious disease death rates, other factors were involved as well. Tuberculosis is a case in point. As late as 1940, more than 95% of the population over the age of 45 had a positive tuberculin skin reaction despite an already low TB death rate in that age group (*1*). The affected population had thus become resistant to the most severe consequences of TB infection. It was this latter development, not the availability of drugs and vaccines, that played the major role in the decline in TB mortality.

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Primate Brain Measurements

Many so-called "new" ideas are well-forgotten old ones. We write to comment on Ann Gibbons' article "Empathy and brain evolution" (News & Comment, 26 Feb., p. 1250) regarding Terrence Deacon's "bold theory" about how the human brain evolved the unique capability to represent such complex symbols as other people's

thoughts and actions—a capability he terms representational empathy.

According to the map of functional areas that accompanys the article, Deacon's theory is that a quantitative reorganization of the cerebral cortex took place in the human brain, but not in the brain of other primates. This reorganization is said to have involved a 102% increase of the prefrontal area, a 17% increase of the secondary auditory area, a 9% decrease of the primary auditory area, a 65% decrease of the primary motor area, and a 40% decrease of the primary visual area. In other words, the sizes of the primary areas of sensory and motor analyses have been relatively decreasing, while those of the secondary and tertiary areas have been increasing in primate evolution. The underlying pressure for these evolutionary changes is linked by Deacon to unusual cognitive demands related to symbolic communication.

One should keep in mind that investigators at the Moscow Brain Institute worked for more than 60 years measuring the cytoarchitectonic areas and subareas of primate brains and published these data in a series of papers. They showed that the relative sizes of the primary sensory and motor areas were decreasing, while so-called "specific human," that is, secondary and, especially, tertiary, cortical sensory areas were dramatically increasing in the comparative primate series (*1*). In particular, G. I. Polyakov and I. N. Filimonoff attributed these changes to the development of specific human features such as speech and symbolic thinking (*2*).

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Breast Cancer Incidence

Eliot Marshall, in his article "Search for a killer: Focus shifts from fat to hormones" (Breast Cancer Research, 29 Jan., p. 618), quotes a National Cancer Institute (NCI) biostatistician as concluding that "about