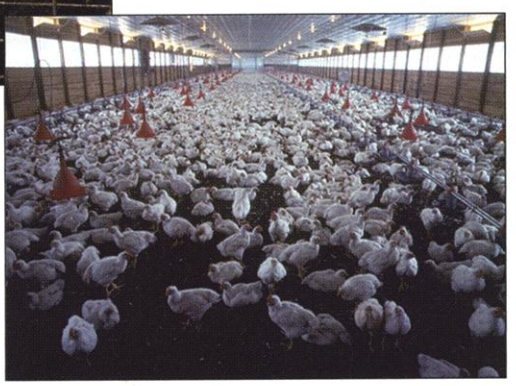
includes social advocacy and a national surveillance program to ascertain the extent of the resistance problem in human medicine. The results of the study revealed that the major resistance problems were associated with the cheaper "first-line" antibiotics such as penicillins, first-generation cephalosporins, gentamicin, and erythromycin, rather than the more expensive second- and third-generation cephalosporins, carbapenems, fluoroquinolines, and vancomycin (*1*). These latter were being regulated in hospital practice by requiring proof of indication or by consultation.



Our work attracted the attention of the Control Yuan, a governmental oversight body on the same level as the executive, legislative, and judiciary branches of government. The Control Yuan pointed out that regulations of the Department of Health and the Commission on Agriculture (COA) concerning the production, import, and use of antibiotics were inadequate, mutually contradictory, or not enforced. Both departments responded with major efforts that continue today to address the criticisms.

Although such corrective measures are laudable, they alone are not sufficient to reduce the problem of antibiotic resistance. Physicians and their patients must also be involved. On the basis of the experiences of other countries, it is clear that to reduce antibiotic resistance, the consumption of antibiotics must be substantially reduced (*2*). We identified two areas of substantial abuse: antibiotic prophylaxis for clean surgeries (*3*) and antibiotic use for upper respiratory infections in outpatient practice (unpublished data). If these abuses were corrected, the total consumption of first-line antibiotics could be lowered by as much as 25%. Taiwan's Department of Health and the National Health Insurance Bureau have now targeted these two areas of antibiotic abuse for correction: in February 2001, the latter announced that it will no longer pay for antibiotics prescribed for acute upper respiratory infections or the common cold.

The importance of transmission of antibiotic-resistant bacteria from food animals is also being addressed. In 2000, after action by the Control Yuan, the COA prohibited the use of seven antibiotics (including avoparcin) for growth purposes. We found in chickens a substantial number of vancomycin-resistant Enterococci, as well as *Escherichia coli* and Salmonella with reduced susceptibility or resistance to ciprofloxacin (*2*). In July 2000, the COA instituted, with the participation of NHRI, a national surveillance program to determine the extent of antibiotic use in chickens and pigs and the extent of antibiotic-resistant bacteria in their fecal flora, data which can then be used to assess the types of antibiotic resistance in animals that might be a threat to human health.

Thus, in the last 2 years, Taiwan has begun a significant national effort to address the issue of antibiotic resistance, which, if carried out conscientiously, should have a substantial impact on the problem.

MONTO HO*

National Health Research Institutes, 128, Section 2, Yen-Chiu-Yuan Road, Taipei 115, Taiwan. E-mail: monto@mail.nhri.org.tw

* Director of Clinical Research

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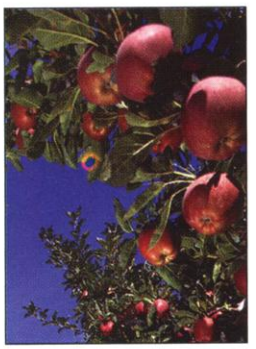
Antibiotic Resistance Affects Plant Pathogens

FALKOW AND KENNEDY'S EDITORIAL OUTLINES the current problems with selection for clinically relevant antimicrobial resistance in bacterial pathogens of animals, and presents a challenge for the development of novel antimicrobials specific for animal pathogens. The situation with antibiotics and plant bacterial disease management is similar. Resistance to streptomycin and tetracycline, antibiotics used mostly on fruit crops such as apple and peach in the United States, is widespread among plant-pathogenic and plant-associated bacteria in some nursery and orchard environments (*1*). The common resistance determinants encoded by these bacteria are very similar to those found in clinical pathogens (*2*), indicating that plants can also serve as a reservoir for antibiotic resistance in the environment.



The co-mingling of agricultural issues (for example, transgenic crops and animals, food safety, water use and quality) and human health issues will become increasingly apparent in the 21st century. Our ability to effectively manage crop diseases hinges on the availability of choices of antimicrobials or other alternatives that will have limited effects on clinical pathogens. Thus, genomics efforts must also be directed toward studying plant pathogens with the goal of improving the efficiency of agricultural production with minimal adverse effects on human and environmental health.

GEORGE W. SUNDIN

Department of Plant Pathology and Microbiology, Texas A&M University, College Station, TX 77843–2132, USA. E-mail: gsundin@acs.tamu.edu

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CORRECTIONS AND CLARIFICATIONS

NEWS FOCUS: "Patience yields secrets of seed longevity" by K. Brown (9 Mar., p. 1884). In column 3, paragraph 2, Flanders Field was incorrectly identified as being in The Netherlands instead of Belgium.

LETTERS: "Discovery of earliest hominid remains" by M. Pickford (9 Feb., p. 986). In both the text of the letter and in the caption of the accompanying figure, Brigitte Senut's first name was misspelled.

REPORTS: "Central role for the lens in cave fish eye degeneration" by Y. Yamamoto and W. R. Jeffery (28 Jul. 2000, p. 631). In the Abstract, the sentence beginning on line 5 should have read "Conversely, eye growth and development are retarded after transplantation of a cave fish lens into a surface fish optic cup or lens extirpation."