

Editorial on Technology Draws Negative Response

As a scientist and environmentalist, I object to Clarence I. Kado's editorial, "Why Develop Technology That Cannot Be Used?" (*PLANT DISEASE*, Vol. 68, No. 5, page 363). In the first place, I take exception to the title, since regulation and testing by any agency does not *deny* use of any technology, except, perhaps, that which is found to be dangerous. In fact, the title qualifies, to paraphrase Dr. Kado's criticism of EPA regulation, as an "overreaction due primarily to ignorance, even among eloquent [scientists] who appear knowledgeable."

In the second place, I find specious the "argument that the introduction of a genetically engineered organism might affect the earth's environment is nonsense." Since we have relocated and thereby introduced into a new ecological niche such time-tested organisms as the gypsy moth, kudzu, and pathogens that cause Dutch elm disease and chestnut blight, and in the process affected our environment adversely, logic compels us to admit that manufactured organisms might also pose a threat. That, after all, is why we have P1 facilities!

Any agency's function of protecting the environment and public health is an immense and complex job. EPA is asked to pass judgment in a relatively short time (since most companies won't wait a 75-year lifetime for testing long-range effects). Chemicals or organisms must be tested on other animals for their effects on human well-being (including such subtle subclinical effects as psychosis). And the goal must be to protect all of the population, including the most sensitive individuals. I suggest that critics put themselves in the place of EPA and assess technological development while trying to avoid such dangers as thalidomide (which was kept off the U.S. market by a regulatory agency) or toxic waste problems so damaging to our species. We should be helping the EPA in the difficult

task of protecting our environment and health.

Jack D. Paxton, *Associate Professor
Department of Plant Pathology
University of Illinois, Urbana*

Dr. Kado replies: I am pleased to have received many favorable responses to my editorial that appeared recently in *PLANT DISEASE*. I received one negative response, from Dr. Jack Paxton, and I wish to answer his points of objection. First, titles are an important component of articles needing to attract attention, and judging from the responses I have received, the title did indeed do its job. The title used in my editorial does not imply that all technology is precluded from further use. It simply raises an important question.

Dr. Paxton's second point is moot, since I explained in the editorial that: "Inadvertent or deliberate introductions of new species into geographically isolated areas have altered the ecosystem and have occasionally been detrimental to humans, as in the case of some pests, infectious disease agents, weeds, or animals. But these few instances were of organisms (and viruses) that had evolved in a multimillion-year timetable and were well equipped for survival." The often cited gypsy moth infestation and Dutch elm disease epidemics, which Dr. Paxton uses as examples, are classic cases of ecological imbalance. These epidemics occurred because a large population of susceptible host material was available, with virtually no competition by other organisms.

It should be stressed that microorganisms undergo continuous very subtle changes as a result of genetic information being continually exchanged between unrelated species by means of virus and plasmid vectors that lack specificity. Any genetic component that man has introduced has already existed or preexisted in the milieu of genetic evolution. If one does not believe this to be happening, then one is not a believer of

evolutionary change and the DNA concept.

It is clear that certain man-made chemicals have imperiled the environment and health of our society and that some measures are being taken to ensure safety. However, there are many currently used pesticides and herbicides where the precise mechanism of action remains to be determined. The current scientific view is to replace these chemicals with biologicals (biorationals) that have been isolated from the environment, genetically modified for desirable traits, and returned to the same environment. The scenario that reintroduction of a modified organism will likely change the existing complex environment is based on illusions rather than scientific fact. I recall the early recombinant DNA scenario that if one introduces an efficient nitrogen fixation organism into the environment, we should expect a drastic change in the atmosphere by the depletion of nitrogen, which then would cause an overall change in weather and temperature of the earth, resulting in the death of all living creatures. Mother nature had already made very efficient fixers of free nitrogen before our time.

My editorial lucidly stated that we, as scientists, are not doing anything that had not already been done by mother nature or by microbial geneticists. Only the tools that are currently used and the approach taken to achieve the same end result are different.

Clarence I. Kado, *Professor and Head
Davis Crown Gall Group
Department of Plant Pathology
University of California, Davis*

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