Editorial

Why Develop Technology That Cannot Be Used?

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Biotechnology has become a familiar term and represents, in part, the adaptation of microorganisms redesigned by in vitro gene construction and splicing techniques. The spin-offs and benefits from these modern methodologies are potentially enormous. Speed and site-directed, precise genetic manipulations can be key factors in the genetic improvement of world food and fiber resources, particularly now, when the human population is growing at close to exponential rates. In plant pathology, recombinant DNA technologies have already helped elucidate the nature of pathogenesis in several diseases. The technology also has application in plant disease control, as, for example, precise genetic modification of crops for disease resistance and genetic manipulation of microorganisms for biological control.

Although these new developments generally are applauded by the scientific community, vestiges of the stigma of the potential dangers of recombinant DNA remain and have blossomed in another arena. Environmentalists have influenced the Environmental Protection Agency to begin possible regulation of new bioengineered products by using its authority under the Federal Insecticide, Fungicide and Rodenticide Act and the Toxic Substances Control Act. Under these statutes, EPA could require biotechnologists to register new genetically engineered microbes, for example, and to submit detailed safety data. Environmentalists are primarily concerned about the environmental and public health effects of releasing new genetically engineered microorganisms or substances into the open environment. They ask whether genetically engineered microorganisms released into the environment might be harmful or toxic to humans and whether these organisms could disrupt existing ecosystems. Conversely, no one questions the safety of microorganisms genetically modified by standard procedures, for example, by simple selection of a microorganism with the most desirable trait.

Expediting genetic research by means of the new technology will be delayed if existing and new statutes are applied to biological agents. Risk assessments of genetically engineered agents are argued to be imperative, "because nothing is known about them in the environment." Ironically, geneticists and plant breeders, using classical genetic approaches, have been releasing genetically engineered organisms and plants into the environment for centuries. Also, the movement of genes has been occurring naturally.

Has applied genetics harmed the environment of this earth? 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. And these special cases often required geographically isolated communities. The argument that the introduction of a genetically engineered organism might affect the earth's environment is nonsense. The concept is actually a moot one, because organisms lacking genes for certain functions or burdened with extraneous genes are less equipped for survival than those that have withstood the test of time.

The current concern is not new to any society. History has shown that anything new and foreign to the public is not well accepted at first. There are always critics, followed by more critics. The debate on genetic engineering will continue as long as people view the technology as new and foreign. This is an overreaction due primarily to ignorance, even among eloquent environmentalists who appear knowledgeable.

If the findings of genetic engineering research in plant pathology and other sciences are to be used to benefit society, the American Phytopathological Society and other scientific organizations will have to embark on a program of educating the public. Efforts should be made to point out that the so-called new technology is simply an old technology made more efficient. A parallel exists in the science of electronics, where the radio evolved from lead sulfide and quartz crystals to vacuum tubes, then back again to the silicon crystals now used in solid-state circuitry.