

Genes and parasites effect diseases in plants

Lancaster Farming, Saturday, October 7, 1978-45

UNIVERSITY PARK - A new concept of breeding plants for long-lasting disease resistance by returning both plants and their parasites to more "natural" states is a possibility, says a research plant pathologist at The

Pennsylvania State University.

"Historically, natural populations of plants and their parasites have learned to live together over time," declared Dr. Richard R. Nelson. "Plants and parasites attained their

ability to co-exist together by each accumulating a number of genes for their own defense. This developed throughout a long co-evolution. Their mutual safety and survival was due to numbers of genes," he explained.

Dr. Nelson is Evan Pugh Professor of Plant Pathology at Penn State, one of only 11 faculty members currently carrying this Evan Pugh designation for unusually distinguished achievements in research and teaching.

Attempts by modern man to control most plant diseases with single resistance genes have taken many cultivated plant hosts and their parasites out of balance at a catastrophic cost, he observed. As examples he listed the potato blight responsible for the Irish famine of 1840, and, in more recent years, epidemics of stem rust of wheat.

"Developing plant varieties with single gene resistance, as done widely today, is a feast or famine approach," he contended.

At the heart of the new system being advocated by Nelson and other plant pathologists is a concept sometimes called generalized resistance. With such resistance, a disease increases at a slow rate - producing less losses than otherwise by the end of the growing season.

"This generalized resistance is what plants possess in the 'natural' states," he affirmed. "Plants evolved to that kind of resistance without man's intervention by accumulating genes for both attack and defense. Most plants can endure some level of disease without a major yield loss," he added.

Dr. Nelson and Dr. David R. MacKenzie and their associates are combining a number of resistance genes to determine if this approach

can manage diseases to economically acceptable levels and remain effective over a long period of time. The research is sponsored in part by funds from the Rockefeller Foundation. The Penn State scientists believe that use of several genes together should return plants and parasites to balance and would be evident in slow build-up of disease.

The research project being conducted by scientists with the Agricultural Experiment Station at Penn State is to help meet the increased need for world food production.

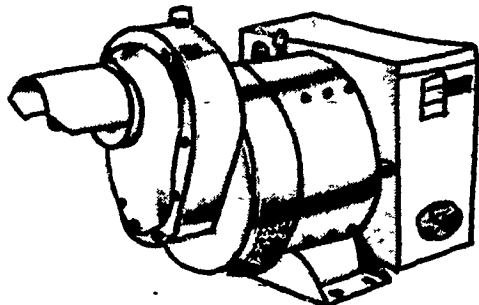
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