

Research Report
To
Oregon Processed Vegetable Commission
(for the year 1992)
Via
Agricultural Research Foundation

Title: Genetic Mapping of Beans via Restriction Fragment Length Polymorphism of DNA.

Project Leaders: David Mok and Machteld Mok, Horticulture

Project Status: Continuing to 1992.

Project Funding for this Period: \$9,700

Funds were used to support a doctoral student working on the project. Other sources supporting the principal investigators include competitive grants from the National Science Foundation.

Objectives:

1. To utilize direct DNA mapping techniques to generate a linkage map of beans.
2. To associate particular DNA fragments with quantitative traits of economic importance in order to assist targeted selection in plant improvement.

Progress:

The long term objective of the project is to construct a genetic map using DNA markers. This approach eliminates the effects of the environment (and other non-biological factors) on the expression of characters which interfere with classical gene mapping. Ultimately, the information will be used to correlate specific DNA markers with economically important traits to assist breeding. Some of the potential applications include identification of desirable individuals in early generations, and association of qualitative traits and disease resistance with specific DNA fragments.

In the past three years, 280 probes have been examined. Over 170 F_2 progeny in reciprocal crosses have been screened. A partial linkage map consisting of nine linkage groups has been generated. Other markers are gradually being added to the map. In addition, DNA markers associated with maternal transmission have been identified. Selective transmission is likely the basis of skewed distribution of parental types in interspecific progenies. Full length cDNA of one of these genes has been isolated.

The methodology of the gene mapping work is essentially complete. Future work will continue to refine the details of the genetic map. The present markers can be expanded to establish association with important characteristics. Examples include genes encoding proteins (chitinases and glucanases) related to disease resistance. Background information in this area will be presented at the meeting and may provide the basis for research proposals in the coming year.

Summary:

The construction of a genetic map based on DNA markers and correlating specific markers with performance will facilitate variety improvement by providing a means to directly assess the genetic composition of breeding lines and to predict their potentials.

Signatures:

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Project Leaders:

David W. S. Mok Date Machteld C. Mok Date

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P. S. Green, Interim Head Date