

Annual Report of Progress
to the
MISSISSIPPI SOYBEAN PROMOTION BOARD
for 1999

PROJECT TITLE: Development of Value-Added Soybeans

PROJECT LEADER: Nancy A. Reichert, MAFES, Mississippi State, MS

OTHER PARTICIPANTS: Gabriel L. Sciumbato, MAFES, DREC, Stoneville, MS
Jeffrey M. Tyler, USDA-ARS, Stoneville, MS

OBJECTIVES & SIGNIFICANT ACCOMPLISHMENTS:

1. We isolated and sequenced CP genes from Mississippi strains of BPMV and SMV.

We attempted to obtain an already-cloned BPMV CP gene from one researcher, then attempted to obtain purified BPMV virus from another researcher. Although both had agreed to provide such, they only contributed to delays in this project. Therefore, we isolated our own CP genes from both BPMV and also from SMV (not part of original proposal). Fortuitously, the BPMV strain we isolated from infected soybean plants (provided by Dr. Sciumbato) is unique (our CP gene is different from the other source's gene). Therefore, our BPMV CP gene will be specific for the strain that may be prevalent in Mississippi. Our isolated SMV CP gene was similar to those previously isolated by other researchers.

2. We isolated and sequenced PAP-like genes for use in development of generalized virus resistance.

In a MAFES-funded project, we isolated three versions of PAP (pokeweed anti-viral protein) genes. Those genes have displayed anti-viral properties in transgenic tobacco (Lodge et al. 1993, Smirnov et al. 1997, see above list of references). PAP genes have also displayed anti-fungal properties in transgenic tobacco (Zoubenko et al. 1997), so transgenics containing our PAP-like genes will also be incorporated into our proposed research to develop soybean with resistance to charcoal rot.

Our PAP-like genes were isolated from another plant species not covered by existing PAP gene patents. We plan to file a provisional patent application on these genes by mid-2000.

3. We confirmed our transformation/regeneration protocols successfully generates transgenic soybean.

Transgenic soybean plants have been generated from at least one variety each in maturity

groups IV-VI. In one case, T1 and T2 progeny have been analyzed, confirming the introduced genes are heritable. Using our protocols, transgenic shoots can be confirmed via polymerase chain reaction (PCR)-based analyses approx. 4 months post-bombardment. From data to date, a 2% transformation frequency (2 transgenic plants produced per 100 bombarded hypocotyl explants) could be expected.

PUBLICATIONS:

Chen, L., Y. Dan, J.M. Tyler, and N.A. Reichert. 1999. Transgenic soybean generated from hypocotyl explants. Congress on In Vitro Biology, New Orleans, LA, June 5-9. *In Vitro Cell. Dev. Biol.* 35A:61. (Abstract)

Dan, Y., and N.A. Reichert. 1999. Soybean transformation and regeneration methods. U.S. Patent No. 5,968,830, issued October 19.

Padegimas, L.S., and N.A. Reichert. 1999. Isolation of maize root promoter for nematode resistance studies. Congress on In Vitro Biology, New Orleans, LA, June 5-9. *In Vitro Cell. Dev. Biol.* 35A:46. (Abstract)

Reichert, N.A., L. Chen, Y. Dan, and J.M. Tyler. 1999. Transgenic soybean generated from seedling hypocotyl tissues. World Soybean Research Conference, Chicago, IL, August 3-7. *Proc. World Soybean Res. Conf. VI*, p. 433. (Abstract)