3. Viral Resistant Peanut

Georgia is the number one peanut producing state in the U. S. The 2000 crop comprised 40% of national production and was valued at $355 million with a production volume of 1.35 billion pounds.

Since the late 1980s, tomato spotted wilt virus (TSWV) has been a limiting factor in Georgia peanut production. Tomato spotted wilt virus has a wide host range, including many crops that are grown in Georgia in close proximity to peanuts. Georgia peanuts are therefore at higher risk of TSWV than peanuts in other states. The incidence of TSWV and severity of symptoms, though, vary from year to year in Georgia. Surveys have found 100% of peanut fields in Georgia are infected with TSWV, with as many as 60% of plants in some fields showing symptoms. A field with 50% incidence will lose an estimated 1,000 to 2,000 pounds in yields. Early infections may be so severe that the plant is stunted or even killed. In surviving plants, infection reduces production yield by reducing peanut pod size and number, and reduces production quality by deforming and discoloring peanuts.

Tomato spotted wilt virus is only transmitted by thrips, tiny winged insects which feed on plants. There are no pesticides to treat TSWV, but many growers apply insecticides to reduce thrips populations in order to manage TSWV spread. Research has shown, though, that insecticidal control of thrips does not decrease TSWV incidence or severity because thrips must feed on the treated plant in order to be killed, and TSWV transmission may take place before the thrips dies. One insecticide, phorate, while not showing greater efficacy against thrips, does provide added protection against TSWV through some unknown mechanism, reducing incidence by 20-25%. Since 1991, phorate use has increased three fold. In addition to phorate use, growers are planting varieties with moderate resistance to TSWV. One such variety, Georgia Green, is planted on more than 90% of Georgia's peanut acreage. Though Georgia Green may provide moderate suppression of TSWV in the field, it may suffer significant damage during epidemic years such as 1997, when over $43 million in peanut production was lost to TSWV. With management techniques such as phorate use and planting Georgia Green, annual losses to TSWV are generally not significant, averaging around 5% ($ 17 million/ yr.)

Researchers at the University of Georgia have transformed a peanut variety with the coat protein gene from TSWV to give it resistance to the virus. The transgenic peanut shows TSWV resistance comparable to that of Georgia Green. Work continues to increase the expression of resistance and to introduce it into commercial peanut varieties which already have some natural resistance, such as Georgia Green, so as to create a variety with complete resistance to TSWV.

Potential Impacts of Viral Resistant Transgenic Peanut
Change in Production: prevent loss of 59 million lbs./ yr. ($ 17 million/ yr.)

Contacts:
Peggy Ozias-Akins
University of Georgia
Phone: 912-386-3902
Email: ozias@tifton.cpes.peachnet.edu

Steve L. Brown
University of Georgia
Phone: 912-386-3424
Email: bugbrown@arches.uga.edu

Full Report: The Potential for Biotechnology to Improve Crop Pest Management in the U. S.: 40 Case Studies by Leonard P. Gianessi, Cressida S. Silver, Sujatha Sankula and Janet Carpenter
Available at http://www.ncfap.org
Contact: Sara Pace
Phone: 202-328-5044
Email: pace@ncfap.org

For the full report click here