

Research Report (FY 2007-2008) to
the Georgia Peanut Commission

TITLE: Evaluation of Production Systems Using Breeding Lines with Resistance to Leaf Spot and Tomato Spotted Wilt Virus to Improve Net Farm Profits

C. Corley Holbrook
USDA-ARS, Dept of Crop and Soil Sci
Coastal Plain Experiment Station
Tifton, GA 31793-0748

Albert Culbreath
UGA, Dept. of Plant Pathology
Coastal Plain Experiment Station
Tifton, GA 31793-0748

PROGRESS REPORT:

- S Released Georganic as a peanut cultivar for use in organic production systems. This variety has excellent disease resistances, but also has a red seed coat color so it is not recommended for standard commercial production.
- S Continued breeding program to combine resistance to leaf spot with high yield and grade and high oleic acid content. This included continued hybridization and generation advance for breeding populations involving 31 cross combinations. Material is first advanced to the F₄ generation when individual plants are harvested. This material is grown the following year with no fungicide sprays. Progeny that show resistance and high yield are selected. These selections are then tested in replicated yield trials. We have several late generation breeding lines that have a high levels of resistance to leaf spot and good yields when grown with no fungicide sprays. We are also cooperating with plant pathologist and economists to examine the net return of growing these lines under sprayed, and reduced or non sprayed conditions.
- S Continued breeding program to combine resistance to TSWV with acceptable yield and grade. This included continued hybridization and generation advance for breeding populations involving 44 cross combinations. We have several late generation breeding lines that have a higher level of resistance than Georgia Green. These lines are being considered for possible release as varieties.
- S We have observed that Tifguard has a moderate level of resistance to leaf spot. Given that Tifguard is a medium maturity variety, we are evaluating the economics of growing this cultivar with reduced fungicide sprays.

See back of this page for a list of publications from this research focus.

Publications from this Research Focus

- Anderson, W. F., C. C. Holbrook, and T. B. Brenneman. 1993. Resistance to *Cercosporidium personatum* within peanut germplasm. *Peanut Sci.* 20:53-57.
- Anderson, W. F., C. C. Holbrook, and A. K. Culbreath. 1996. Screening the peanut core collection for resistance to tomato spotted wilt virus. *Peanut Sci.* 23:57-61.
- Culbreath, A. K., J. W. Todd, D. W. Gorbet, W. D. Branch, C. C. Holbrook, F. M. Shokes, and J. W. Demski. 1996. Variation in susceptibility to tomato spotted wilt virus among advanced breeding lines of peanut (*Arachis hypogaea*). *Acta Horticulturae* 431:402-410.
- Culbreath, A. K., J. W. Todd, D. W. Gorbet, S. L. Brown, J. A. Baldwin, H. R. Pappu, C. C. Holbrook, and F. M. Shokes. 1999. Response of early, medium, and late maturing peanut breeding lines to field epidemics of tomato spotted wilt. *Peanut Sci.* 26:100-106.
- Holbrook, C. C., and W. F. Anderson. 1995. Evaluation of a core collection to identify resistance to late leafspot in peanut. *Crop Sci.* 35:1700-1702.
- Holbrook, C. C., and A. K. Culbreath. 2007. Registration of >Tifrunner= peanut. *J. of Plant Registrations* 1:124.
- Holbrook, C. C., and A. K. Culbreath. 2008. Registration of >Georganic= peanut. *J. of Plant Registrations* 2:17.
- Holbrook, C. C., P. Timper, and A. K. Culbreath. 2003. Resistance to tomato spotted wilt virus and root-knot nematode in peanut interspecific breeding lines. *Crop Sci.* 43:1109-1113.
- Mandel, B., H. R. Pappu, A. K. Culbreath, C. C. Holbrook, D. W. Gorbet, and J. W. Todd. 2002. Differential response of selected peanut (*Arachis hypogaea*) genotypes to mechanical inoculation by tomato spotted wilt virus. *Plant Disease* 86:939-944.
- Xue, H. Q., and C. C. Holbrook. 1998. Evaluation of peanut breeding lines for resistance to leaf spot. *Biol. and Cult. Tests for Cntrl. of Plant Dis.* 14:80.
- Xue, H. Q., and C. C. Holbrook. 1999. Evaluation of peanut breeding lines for resistance to leaf spot, 1999. *Biol. and Cult. Tests for Cntrl. of Plant Dis.* 15:84.
- Xue, H. Q., and C. C. Holbrook. 1999. Evaluation of peanut breeding lines and their parents for resistance to leaf spot, 1999. *Biol. and Cult. Tests for Cntrl. of Plant Dis.* 15:85.