

**Advances in cotton resistance
breeding to Fusarium and
Verticillium wilts in China during
past fifty years**

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ABSTRACT

This review summarizes the main advances in cotton resistance breeding to *Fusarium* and *Verticillium* wilts in China during the past fifty years. Topics discussed include achievements, experiences, problems and countermeasures to solve the problems. *Fusarium* and *Verticillium* wilts are two main diseases affecting cotton production; *Verticillium* wilt is the main factor that influences cotton production today. There is no effective fungicide to control these diseases, because the pathogens infect the vascular system of cotton plants. The main measure to control these two diseases is planting resistant varieties. After the implementation of IPM in 1972 in China to control *Fusarium* and *Verticillium* wilts, China has made fast progress to develop *Fusarium* and *Verticillium* wilt resistant cultivars. These cultivars have 85% resistance in all cotton production area and increase the crop value with more than 4 billion yuan every year. Cotton germplasm and strains in China have been screened in a comprehensive study. We have de-

veloped a new method for *Fusarium* wilt resistance screening that is named "The Paper Cup Soil Infected with the Pathogen method (PCSP)". This method is today usually used indoors in China. At the same time we had developed a method for *Verticillium* wilt resistance identification, named "The Paper Cup Cut Root and Exert Root (PCTER)". Both these methods are quick, accurate and simple ways to screen seedlings for resistance in the greenhouse. More than 10000 cotton strains have been screened for *Fusarium* and *Verticillium* wilts, including *Gossypium hirsutum* L., *Gossypium barbadense* L. and *Gossypium arboreum* L. Few of these strains (10%) showed resistance to *Fusarium* wilt and even less (1%) to *Verticillium* wilt. Many high yielding cultivars had been bred with resistance to *Fusarium* and *Verticillium* wilts. The main recommendations for resistance breeding to *Fusarium* and *Verticillium* wilts in China are:

- Set up serious and uniform infested *Fusarium* wilt and *Verticillium* wilt nurseries.
- Understand the genetics of resistance.
- Improve breeding techniques.