

Studies on Cotton Breeding Resistant to *Fusarium* and *Verticillium* wilt Diseases

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Both *Fusarium* and *Verticillium* wilts are important soil-borne diseases, which can not be effectively controlled by chemical fungicides. The two diseases, especially *Verticillium* wilt, have spread all over the cotton belt, and obstructed the progress of cotton production in China in recent years. It has been proven that breeding and growing resistant cultivars is one of the most economical and effective measures to control these diseases. The program of breeding cotton for resistance to wilt diseases has been continuously studied in Industrial Crops Research Institute, Sichuan Academy of Agricultural Sciences (ICRI-SAAS) for more than 50 years. The breeding technique for multi-resistant to wilt diseases in cotton varieties is established based on the method of artificial inoculation. By artificial inoculating with the pathogens both of *Fusarium* wilt and *Verticillium* wilt in seedling nursery, the resistance of plants was evaluated, and the resistant individuals were selected at early stage. It has sped up the pace of development of multi-resistant varieties with high yield and quality fiber. With this breeding technique employed, the resistant cotton germplasms Chuan 52-128, Chuan 57-681, Chuan 737, and Chuan 2802, were obtained. Chuan 52-128 and Chuan 57-681 were both highly resistant to *Fusarium* wilt, and the resistance was durable. In tests from 1984 to 2003, the disease indexes of Chuan 52-128 varied from 6.63 to 7.32, and that of Chuan 57-681 varied from 3.62 to 4.76, respectively. Chuan 737 and Chuan 2802 were both resistant to multi-biotypes of *Verticillium* wilt and highly resistant to *Fusarium* wilt. The *Verticillium* wilt disease indexes of Chuan 737 and Chuan 2802 were 10.68 and 13.42, respectively, and the *Fusarium* wilt disease indexes of those were 5.37 and 6.44, respectively. These resistant germplasms were used extensively as parental material in cotton resistant breeding. From these resources, more than 130 resistant cultivars have been derived, and they were authorized for cultivation by national or provincial governments in China. Most of these resistant cultivars also were characterized with high yield and quality fiber. The planting areas of these resistant cultivars amounted to about 18 millions hectares, and they have greatly benefited the cotton growing industry in China.