

Diallel Analysis of Ekangmian 9 and Other Cotton Varieties Apparently Resistant to *Fusarium* Wilt and Tolerant to *Verticillium* Wilt

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Introduction

- *Fusarium wilt* and *Verticillium wilt* are Two serious diseases affecting cotton production in China.
- Serious outbreaks of the *Verticillium wilt* epidemics occurred in 1993 and 1997 in the Jiangnan cotton-growing region of China. (Ma Cun, et al. 1997, 2007)
- This study aimed to accelerate the breeding of *Verticillium wilt*-resistant cotton cultivars suitable for the Jiangnan cotton-growing region.



Materials

- seven varieties were used as parents for diallel analysis.
- 21 diallel crosses were generated according to Griffing's diallel cross design method [4].
- Two check varieties : Xiangzamian 2 and Emian 20.

Method

- The experimental field was an artificial disease nursery.
- 15 main agronomic and fiber quality traits of F1 plants were calculated.
- Data were analyzed in two softwares:

in the QGA Station program by AD model

- genetic variance components for each trait
- additive effects of the parents
- dominance effects of the crosses
- correlations between lint yield and other traits

in Excel, the competitive advantages of 21 crosses over the check variety Xiangzamian 2 were calculated.

Results and Conclusions

1. **P2 (Ekangmian 9 or Jing 55173), P5 (CCRI 23), and P6 (Shiyuan 321) had significant positive additive effects on yield traits. Additionally, P2 didn't adversely affect the five fiber quality traits, so P2 represents the preferred parent for improving offspring characteristics, especially yield traits.**
2. **Seven superior combinations ($P1 \times P2$, $P2 \times P5$, $P4 \times P6$, $P2 \times P4$, $P2 \times P6$, $P4 \times P5$, and $P5 \times P6$), four involved P2, indicating the importance of this potential parent for significantly improving the yield traits of its offspring.**
3. **Pedigree analyses revealed that a series of new high-yielding and high-quality varieties (lines) have been developed with Ekangmian 9 as a parent (e.g., CCRI 63, CCRI 66, Ezamian 1, Ezamian 4, and Ezamian 24).**
4. **Increases in lint yield are mainly related to the diseased plant rate and infection index, and the negative correlation between them appears to be genetically stable.**