Effects of Agronomic Factors on Lint Yield and Quality of Hybrid Cotton Zheza 166 and Its Heterosis in Some Physiological Traits

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Abstract: Pot and field experiments were carried out on 3 locations in Zhejiang province to study the effects of agronomic factors on lint yield and quality of hybrid cotton Zheza 166 and its heterosis in some physiological traits. The results showed that the optimal plant density and N application rate in terms of boll number varied in locations, and Jinhua required lower plant density and more N fertilizer than both Hangzhou and Cixi. In the experiement invovled in planting patterns, the highest boll number was obtained in the plants sowed on April 15 and covered with mulch membrane. As to lint yield and lint index harvested before frost ,the optimum plant density and N level were 45000 plants per hactre and 180 kg N per hactre, respectively, and the optimal planting pattern was that sown on April 15 and covered with mulch membranes both for Hangzhou and Cixi; and sown on April 20 and covered with mulch membranes for Jinghua. No difference was found among N fertilizer rates, plant densities and planting patterns in all fiber quality characters, except in Cixi, treatment N1 made significant short fiber length than other N treatments. There is a great variation in chlorophyll content as evaluated by SPAD value over the growth, the hybrid had higher values than its parents and a conventional cultivar, Simian 3 at initial flowering and boll-opened stages, but lower at fully flowering and boll-setting stages. In addition, a great fluctuation of MDA content during the growth was found in both the hybrid and its parents. The changed pattern of the hybrid over the growth stage was basically same as its male sterile line in that MDA content was relatively low at squaring stage, but remained quite high at initial flowering stage and thereafter. The heterosis in SOD activities was distinctly detected in the hybrid Zheza 166, but with the same changed pattern of SOD activity over the growth as the male-sterile line.

Key words: cotton (*Gossypium hirsutum* L.); heterosis; fibre quality; yield