

Study on Physiological Characteristics of Floral Organ in Two Cotton Cultivars with Different Boron Efficiency

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Abstract: The sexual reproduction is often more sensitive to low soil boron content than vegetative growth, obvious seed yield reductions can occur without symptoms being expressed during prior vegetative growth. Because of the speciality of boron chemistry, the role of boron in reproductive growth is not clearly understood. Plant response to low soil boron ratio varies widely among species, and among genotypes within a species. The mechanism of genotypic variation in plant response to boron deficiency is little known yet. In this paper the relationship between cotton genotypic difference responding to boron deficiency and reproductive growth were studied. The experiments were conducted under soil culture with low($0.15 \text{ mg} \cdot \text{kg}^{-1}$) and sufficient($1.0 \text{ mg} \cdot \text{kg}^{-1}$) boron supply, the dry weight, pollen viability, the content of boron and some soluble compounds contained carbon and nitrogen in the different parts of floral organ in two cotton cultivars with different boron effi-

ciency were determined. The dry weight of calyx, corolla, stamen and pistil of boron-inefficient cotton cultivar was obviously decreased by boron deficiency, but only slightly downward trendy in boron-efficient treatment. Boron deficiency reduced the boron content and accumulation of different parts of floral organ in both cotton cultivars, but with greater intensity in boron inefficient environment, especially in stamen and pistil. The content of soluble sugar, starch, free proline and soluble protein in corolla, stamen and pistil and pollen viability were significantly cut down in both cotton cultivars by boron deficiency, but the degree of reduce in B-inefficient cotton cultivar was more greater. Those inferred that more boron in the floral organ of B-efficient cotton cultivar than B-inefficient one, especially in stamen and pistil, might result in a better assimilation of carbon and nitrogen and development of its reproductive organ in low boron soil. The reason why the floral organ of the efficient cultivar gained more boron was discussed, it may be more root absorption capacity or more boron mobility in phloem in B-efficient cotton cultivar under low boron soil than B-inefficient one.

Key words: cotton; boron; efficiency; floral organ; physiological characteristics