

Effect of Water Stress on Carbohydrate Metabolism in Cotton with Varying Boll Size

LIU Ling-di, LI Cun-dong, SUN Hong-chun, GAO Xue-fei, REN Xin-mao
(*Agricultural University of Hebei, Baoding 071000, China*)

Abstract: Three genotypes of cotton varieties with different boll weight, small-boll varieties Ceheng Damianhua (single boll-weight 3.98 g), middle-boll varieties NuCotn 33B (single boll-weight 4.91 g) and big-boll varieties Sumian 9108 (single boll-weight 7.90 g), were studied under different water treatments. The water stress treatments were carried out in the waterproof installations and repeated 3 times. The irrigation time was determined by water percent measured in the field. After irrigation, the earth RWC in almost cotton growth time was controlled below 60% in the soil layer 20~80 cm; the CK was managed according to high yield management. The soil water percentage was examined by method of oven-dry weight loss, including different soil layer: 0~20 cm, 20~40 cm, 40~60 cm and 60~80 cm. In order to prevent water from exchanging in landscape orientation, before seeding, the 60cm-long plastic was buried in the field between the drought management and the CK, and was buried around the drought treatment. The paper analyzed the effect of drought stress on carbohydrate metabolism of these materials. The results were that; under water stress, the soluble sugar content of main stem and different branch leaves increased to different levels, and the starch accumulation were restrained significantly. Although the changing trend of soluble sugar and starch of different boll weight genotypes materials are the same, after flowering stage (July 5th), the change of soluble sugar content of small-boll materials is more stable than middle-boll and large-boll materials, and the starch content is less than that of large-boll materials. In the growing stage, the changing trend of starch content in top branch leaves is more obvious than that in middle and bottom branch leaves in big-boll and middle-boll materials, except the small-boll materials. The result indicated the spatial-temporal character changes with carbohydrate metabolism of cotton leave under water stress conditions.

Key words: cotton; water; carbohydrate metabolism