

THE EFFECT OF LOW TEMPERATURE ON THE INSECTICIDAL PROPERTIES OF BT COTTON**Xiang Zhang****Chen Yuan****Yonghui Wang****Feng Yang****Aili Ma****Dehua Chen****Jiangsu Provincial Key Laboratory of Crops Genetics and Physiology****Yangzhou University****Yangzhou, China****Abstract**

Bt transgenic cotton show as unstable resistance to bollworm in China as in other major cotton-growing region of the world. The objective of this study was to investigate the effects of low temperature on the CryIA insecticidal protein content and nitrogen metabolism at the leaf of Bt transgenic cotton. The study was undertaken on two transgenic cotton cultivars, one conventional (Sikang1) and the other a hybrid (Siakng3), during the 2007 and 2008 growing seasons at Yangzhou University Farm, Yangzhou, China. In the 2007 study, potted cotton plants were exposed to 18°C for 24 hours under glasshouse conditions at three growth stages – peak square, flowering and peak boll periods. The leaf insecticidal protein content, GPT and Protease activities were investigated. In 2008, the same two cultivars were exposed to the same low temperature for 48 hours during the three growth stages, and the leaf Bt toxin content, the amino acid and soluble protein contents, GPT and Protease activities were measured. The results of the studies indicated that the leaf insecticidal protein content decreased significantly with the low temperature stress. However, the reduced extent was greatest exposure to low temperature at peak boll period, the CryIA protein content decreased by approximately 23.7% for the cultivar Sikang1, and 28.1% for Sikang3 after 24 hours stress in the 2007 study, and by approximately 52.9% and 47.6% for 48 hours with the same cultivars, respectively, in the 2008 study. GPT activity, total free amino acid, soluble protein content and the activity of protease in the leaf, showed similar changes of reduction in response to low temperature, and there were biggest decrease at the peak boll period too. The results suggest that low temperature may result in the reduction of soluble protein thesis in the leaf, with a resulting decline in the level of the toxin CryIA. It is believed that this may be the cause of the reduced efficacy of Bt cotton in growing conditions in China, where temperatures during the cotton growth season often decrease by 15 to 20°C.