



Impacts of transgenic poplar-cotton agro-ecosystems upon target pests and non-target insects under field conditions

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ABSTRACT. Poplar-cotton agro-ecosystems are the main agricultural planting modes of cotton fields in China. With increasing acres devoted to transgenic insect-resistant poplar and transgenic insect-resistant cotton, studies examining the effects of transgenic plants on target and non-target insects become increasingly important. We systematically surveyed populations of both target pests and non-target insects for 4 different combinations of poplar-cotton eco-systems over 3 years. Transgenic Bt cotton strongly resisted the target insects Fall webworm moth [*Hyphantria cunea* (Drury)], *Sylepta derogata* Fabricius, and American bollworm (*Heliothis armigera*), but no clear impact on non-target insect cotton aphids (*Aphis gossypii*). Importantly, intercrops containing transgenic Pb29 poplar significantly increased the inhibitory effects of Bt cotton on Fall webworm moth in ecosystem IV. Highly resistant Pb29 poplar reduced populations of the target pests *Grnsonoma*

minutara Hubner and non-target insect poplar leaf aphid (*Chaitophorus po-pulialbae*), while Fall webworm moth populations were unaffected. We determined the effects of Bt toxin from transgenic poplar and cotton on target and non-target pests in different ecosystems of cotton-poplar intercrops and identified the synergistic effects of such combinations toward both target and non-target insects.

Key words: Bt toxin; Insect-resistant gene; Non-target insects; Target pests; Transgenic poplar-cotton eco-system