DETERMINING CHLORANTRANILIPROLE TRANSLOCATIVE ACTIVITY IN COTTON FLOWERS Jacob Smith Whitney Crow Don Cook Jeff Gore Mississippi State University, Delta Research and Extension Center Stoneville, MS Angus Catchot Mississippi State University Starkville, MS

Abstract

Chemical control is a critical tool in integrated pest management, especially in cotton production. The use of insecticides targeting (Helicoverpa zea) has become even more prominent in recent years due to documented failures of bollworm control in two-gene Bt cotton. In 2020 and 2021, at the Delta Research and Extension Center in Stoneville, MS, studies were conducted to determine if there was any systemic movement of chlorantraniliprole into the cotton flowers or anthers after the time of application. Two sets of flower or anther samples were collected at various time intervals after application, ranging from 4 to 14 days. One set was used for field related bioassays, while the other was sent the MSU chemical lab for testing. Chemical concentrations results were used in a series of insecticide diet-incorporated bioassays targeting wild host-reared and lab-reared bollworm. Results from the flower study indicated concentrations of chlorantraniliprole ranging from 0- 50.9 PPB in white flowers out to 14 days after application when using rates of 1.02 and 1.53 L per hectare. Systemic movement of chlorantraniliprole into the cotton flower should be expected based on this study. Analysis of the diet-incorporated bioassays resulted in comparable LC_{50} values for wild host-reared and lab colony bollworms (30.13 and 30.0 PPB, respectively) indicating similar susceptibility to chlorantraniliprole within each colony. No detections of chlorantraniliprole were present in the anthers which supports the anther bioassay finding where no mortality of bollworm was observed. Based on this study, bollworm mortality up to 47% might be expected in cotton flowers absent at the time of application assuming feeding occurred on the cotton petal compared to the anthers.