

INFLUENCE OF (+)- TO (-)-GOSSYPOL RATIO ON *Helicoverpa zea* LARVAL DEVELOPMENT**J. L. Perez****L. S. Puckhaber****C. P.-C. Suh****A. A. Bell****D.L. Hall****USDA-ARS, ICCDRU****College Station, TX****Abstract**

Gossypol enantiomer ratios vary considerably among *Gossypium* species and between different plant tissues. Breeding efforts have focused on the development of germplasm lines with a high (+)- to (-)-gossypol ratio due to the toxicity (-)-gossypol to non-ruminant animals. Interestingly, a previous study conducted in Uzbekistan reported that boll damage by *Helicoverpa armigera* was negatively correlated with high levels of the (+)-gossypol enantiomer in plants. USDA recently developed a germplasm line that has a high (+)- to (-)- gossypol ratio, commonly referred to as the G + line. In this study, newly-hatched *H. zea* larvae were fed squares (6-9 mm diam.) or bolls (15-20 mm diam.) collected from the G+ line and its genetically similar (~75%) parent line (SureGrow 747). Two and three feeding trials were conducted on squares and bolls, respectively, using 30 larvae for each cotton line and trial. After a 7-d feeding period on squares or bolls, mean larval weights on the respective food types were similar for both lines. However, survival of larvae on squares or bolls tended to be higher on the G+ line compared with SureGrow 747 (67% vs 37%, respectively). Additionally, we quantified six terpenoid aldehydes (TAs) (hemigossypolone, gossypol, and heliocides H1-H4) and calculated the (+)- to (-)-gossypol ratio for the tissues collected from greenhouse-grown plants. Overall, TA levels in greenhouse plants were higher than those reported in 2015 for field-grown plant, but the overall distribution pattern of the various TA levels were relatively similar between field and greenhouse plants. The total gossypol levels in squares were higher in SureGrow 747 compared with the G+ line, while the opposite relationship was observed for bolls. Total gossypol levels were also observed to be substantially higher in square tissue compared with boll tissues. In contrast, heliocides H1-H4 were substantially lower in square tissue compared with boll tissues for both lines of cotton. Given the lack of differentiation in *H. zea* feeding indicated by larval weights, we found no evidence that the ratio of (+)- to (-)-gossypol in squares or bolls influenced herbivory.