RNA-SEQ TRANSCRIPTOME PROFILING IN UPLAND COTTON UNDER COTTON FLEAHOPPER (*PSEUDATOMOSCELIS SERIATUS*) FEEDING PRESSURE

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Abstract

Cotton fleahopper (*Pseudatomoscelis seriatus*) (Hemiptera: Miridae) is a piercing-sucking insect that has emerged as a major pest in the Texas cotton industry over the past decade. Cotton fleahopper feeding results in square damage and abscission and subsequently, yield-loss. Previous studies in *Gossypium hirsutum* indicate that plant trichome density plays an important role in conferring resistance to cotton fleahopper, but the mechanism of resistance remains largely unknown. Six potentially resistant lines and two high-yielding lines were screened for resistance to cotton fleahopper under field infestation levels. In this project, three lines (GH18-3, GH15-2, GH20-1) found to be resistant in field-screening and one susceptible line (TAM07V-45) were subjected to cotton fleahopper feeding pressure, and RNA was isolated from squares collected from each of the plants for RNA sequencing. RNA was isolated using a Spectrum® Plant Total RNA Kit and sequenced in four lanes of 100bp SE Illumina HiSeq2000. Expression analysis was conducted for each line, comparing the fed-on and not-fed-on conditions. Within these comparisons, for line TAM07V-45, 1,396 genes were significantly differentially expressed; for GH15-2, 732 genes were significantly differentially expressed; for GH18-3, 1,153 genes were significantly differentially expressed; and for GH20-1, 694 genes were significantly differentially expressed. Of those, various genes involved in plant immunity and defense were found to be significantly upregulated in all lines under the fed-on condition, suggesting the role of plant immune response in resistance (square retention) or susceptibility (square shedding) to cotton fleahopper feeding. Particularly, differences were noted in the expression of regulators of the hypersensitive response, indicating attenuation of lesion formation during this immune response may play a role in conferring resistance.