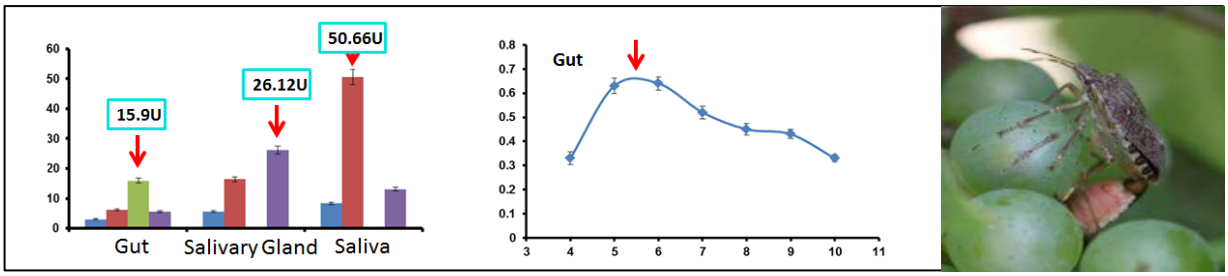
INSECT RESISTANCE

Characterization of digestive proteases and nucleases in stink bugs



DESCRIPTION

Stink bugs are hemipteran pests that deleteriously impact 12 major agricultural crops across the globe. Stink bugs rely on a battery of digestive enzymes for extra-oral as well as gut-based digestion of plant tissues. Stink bug salivary enzymes are released into the plant and the partially digested proteins ingested for further degradation in the gut. During the course of this project, both the proteases and nucleases in the gut and salivary gland of the southern green stink bug (SGSB), *Nezara viridula* (Linnaeus) and the brown marmorated stink bug (BMSB), *Halyomorpha halys* were characterized and enzyme coding sequences identified. Biochemical characterization showed that the proteases in the gut and saliva differ radically in composition allowing for a two-pronged approach for digestion of plant material. Nuclease activity is abundant in the saliva of both stink bug species. These enzymes present a major challenge for the stability of putative stink bug control agents.

HOW THIS IS DIFFERENT THAN RELATED RESEARCH

Stink bugs have arisen as primary agricultural pests due to 1) reductions in chemical insecticide application associated with adoption of insect resistant transgenic crops, and 2) invasion by non-native stink bug species. Relatively little was known of the digestive proteolytic enzymes and nucleases of stink bugs prior to this project. Both the coding sequences and biochemical properties of stink bug digestive nucleases and proteases have been elucidated.

MEMBER BENEFITS

- Improved understanding of the enzymatic environment encountered by proteinaceous or RNA-based bioactives for stink bug control.
- Access to proteomic and transcriptome sequence datasets for the gut and salivary glands of SGSB and BMSB.
- Knowledge of enzymes critical for stink bug feeding may allow for development of novel control strategies.

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