

# Two-spotted stink bug gut content

## *Identifying alternative hosts and bacteria required for development and survival*

### *Problem*

- The identity of alternative host plants of the two-spotted stink bug is unknown. It is thus not clear where stink bugs feed until macadamia nuts are present in orchards.
- The future of stink bug control lies in biological control, thus a toolbox of different control options for IPM needs to be developed.
- Bacterial symbionts required for brown marmorated stink bug and southern green stink bug development and survival have been targeted with antimicrobials leading to high mortality rates in these stink bugs. The gut symbionts of the two-spotted stink bug is unknown, and potential symbionts required for the development and survival of the two-spotted stink bug needs to be identified to explore an additional “soft” control strategy.

### *Aims*

- Develop a DNA-based diagnostic tool capable of identifying the plant species present in stink bug guts.
- Identify bacterial species conserved throughout the two-spotted stink bug’s life cycle which may be linked to development and survival of the two-spotted stink bug.
- Determine what the effect of the removal of the bacterial symbionts are on stink bug survival.

### *Results*

- A DNA-based diagnostic tool capable of detecting the identity of plant species in the gut of stink bugs was developed. Fly-ins will be targeted in future to determine where stink bugs are moving from into orchards. In preliminary analysis, sunflower, green/black tea, carrot and almond have been identified in the guts of stink bugs collected from macadamia orchards.
- A bacterial species (*Pantoea*) was identified from the M4 gut region of two-spotted stink bug specimens from all geographic regions, instars and eggs, and thus appears to be conserved in the two-spotted stink bug. This bacterial symbiont may be transmitted from the mother to the egg surface, where it is acquired by the nymphs upon hatching.
- A pilot experiment which sterilized egg surfaces showed that removal of the bacterial symbiont had an effect on the viability of nymphs.

### *What does this mean?*

- Alternative host plants can be used as trap crops, or plants can be removed or treated to eliminate possible reservoirs of two-spotted stink bugs. Fly-ins will be evaluated on a large scale with the new tool that was developed.
- The best chemicals and sterilization times for the removal of the bacterial symbionts from the egg surfaces will be investigated further, and the survival of treated eggs and untreated eggs will be compared in an effort to identify an additional control option for growers.