Stink bugs and their relatives on citrus

A look at the biology, monitoring and management of some stink bugs and relatives recorded on citrus in SA.

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Stink bugs (Pentatomidae), tip wilters (Coreidae) and seed bugs (Lygaeidae) belong to the order Hemiptera or sucking bugs. They are characterised by their piercing-sucking mouthparts, nymphs that look like miniature versions of the adults, winged adults, and the ability to produce noxious smells as a defence mechanism. Stink bugs are small to medium sized (5–20 mm long) with a round body shape, often in shades of green, yellow and brown (**Figure 1A–G**). Tip wilters attacking citrus are larger (20–40 mm), usually grey to black (**Figure 1H–I**). The only known seed bug to potentially damage citrus is the brightly patterned (black, red and grey) milkweed bug (**Figure 1J**).

These insects are sporadic pests of citrus. Stink bug feeding causes a high percentage of fruit drop, particularly in mandarins (**Figure 2**). Stink bugs generally cause damage to coloured fruit (with some exceptions, like the antestia bug). Stink bug feeding can also cause discoloration, and potentially an entry point for fruit flies, false codling moth and fungal pathogens. Outbreaks appear to have become a more common occurrence in recent years. In the Western Cape, the antestia stink bug, *Antestiopsis thunbergii thunbergii* (**Figure 1B**), feeds on young blossoms and fruit before colour break.

Throughout the country, the green vegetable stink bug, *Nezara viridula* (**Figure 1A**), is probably the most common fruit feeding stink bug. A variety of other species are sporadically problematic in different growing regions (**Figure 1C–G**). Tip wilters on the other hand mainly feed on young shoots, causing them to die ("wilt") due to toxin secretion. The large black tip wilter, *Anonplocnemis curvipes* (**Figure 1H**), is the most common species on citrus in the northern growing regions, while the similar *Holopterna (Elasmopoda) valga* (**Figure 1I**) is the most common species on citrus in the Western Cape. The milkweed bug, *Spilostethus pandurus elegans*, has only been recorded on citrus this year, and it is unsure whether it causes primary damage or feeds through previously damaged rinds (**Figure 1J**). It is important to understand that the majority of these insects are able to feed on a large number of host plants, with citrus being an incidental host.

Host plants of these insect pests include soya and castor-oil bush (for green vegetable bug), Dutch alder and pine windbreaks (for antestia bug) and weeds in orchards (milkweed bug, *Carbula* stink bug). The proximity of avocado and macadamia orchards to citrus orchards in the northern growing regions are probably a source of some stink bugs, including sporadic outbreaks of the two-spotted stink bug *Bathycoelia distincta* (**Figure 1C**) – a common pest in macadamia orchards. Disruption of the preferred habitat (e.g., crop harvesting, weed control or natural drying of weeds) is probably the main precursor to migration into other crops like citrus. It is worth considering what role the use of synthetic pyrethroid sprays (the most widely used chemical group used in stink bug management in macadamia) plays in the dispersal of macadamia feeding stink bugs to adjacent citrus orchards.

Monitoring methods and treatment thresholds are not yet established for stink bugs in citrus orchards. Chemical knockdown monitoring methods are commonly used in macadamia, but its usefulness may be limited in citrus due to fruit being damaged after colouring towards harvest. Additionally, such an approach to monitoring is not IPM-compatible. The use of both yellow and blue sticky traps as a potential indicator of stink bug migrations into orchards will be investigated in tunnel trials at CRI in the coming season.

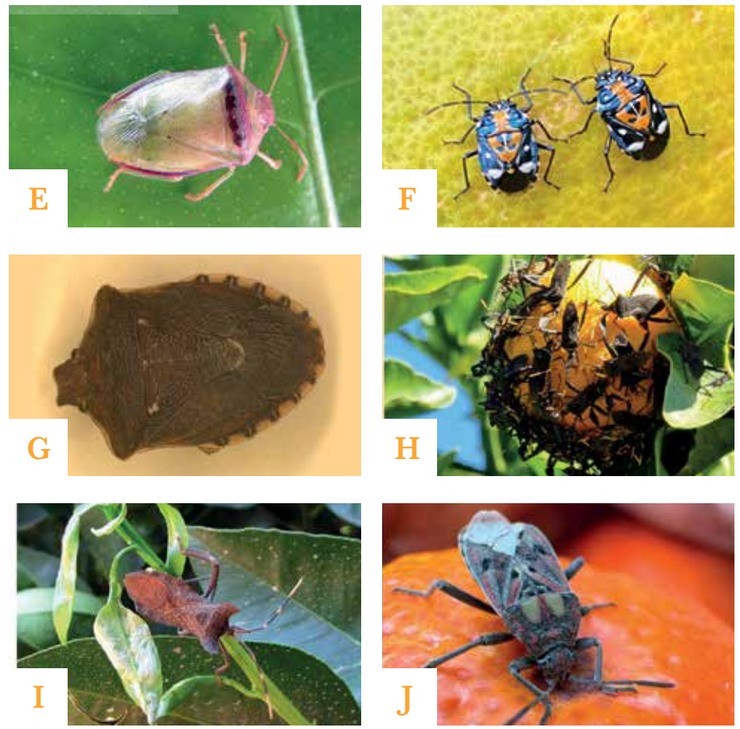

Figure 1. Some stink bugs and relatives recorded on citrus in SA, A.) green vegetable stink bug, (P. Stephen), B.) antestia stink bug (S. Hansen), C.) two-spotted stink bug (S. Schoeman), D.) Gynaecia stink bug (M. Bester), E.) small green stink bug (P. Stephen), F.) Stenozygium stink bug (M. Woodburn), G.) Carbula stink bug (S. Hansen), H). Large black tip wilter (T. Grout), I) Elasmopoda tip wilter (P. Stephen), H.) milkweed (seed) bug (D. Viviers).

Figure 2. Stink bug damage on mandarins

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There is only one product registered for the management of stink bugs in citrus (but none for their relatives). The natural pyrethin product Xterminator™ is registered at 500 mℓ/100 ℓ foliar application and can be used right up to harvest. As target insect wetting is imperative with this product, it should be applied early in the morning before insects become more mobile. Mevinphos at the rate registered for bollworm has also been shown to be effective against stink bug outbreaks.

Given the limited chemical options available to the grower, cultural techniques can play a role in management of potential stink bug outbreaks. Due to the wide number of different hosts and differing biology of the various species, generalisations are risky.

Practices that can be applied to reduce the risk of citrus damage by stink bugs and tip wilters

1. Use of windbreak trees that are not hosts of antestia bug in the Western Cape, i.e., other options, except for pine or Dutch alder such as Chinese poplar. (See *Guidelines on Cultural Practices* under IPM and CRI Production guidelines.)
2. Management/extermination of preferred host plants for stink bugs in the vicinity of orchards with historic invasion of these pests:
   - Castor oil bush, *Ricinus communis*, which is a preferred host and is used as an overwintering site for green vegetable bug and many other stink bug species (as well as being an alternative host for citrus thrips, and the polyphagous shot-hole borer for farms that also grow macadamia and pecan). However, avoid disruption during the citrus season to prevent migration into citrus.
   - Soya, other legume vegetables like beans, and other vegetables like potatoes, which are favoured hosts for the green vegetable bug and tip wilters.
3. Avoid disruption of orchard weeds through either chemical weed control or mowing, if large populations of stink bugs/seed bugs are visible on these during the season.

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Due to the sporadic nature of stink bugs, tip wilters and the milkweed bug on citrus, information on most aspects of their biology, behaviour and management is limited. Consequently, in the case of outbreaks, information, photos and samples should be shared with CRI research and extension personnel. This will enable the experts to build up a case history and help in the development and updating of management guidelines. The local CRI extension manager can be contacted, who will direct requests and/or samples to the CRI entomology research team. Advice can then also be provided on specific pest biology and the best management strategy.

References

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