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Spined citrus bug

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Introduction

Spined citrus bug (SCB), *Biprorulus bibax* (Pentatomidae: Hemiptera), feeds on the fruits of lemons, mandarins and oranges, causing drying and brown staining of the fruit segments, gumming on the skin and premature fruit drop. Although native to Australia, SCB only emerged as a major citrus pest in the late 1980s. The major affected areas are inland regions of southern New South Wales, Victoria and South Australia. Damage is mainly confined to lemons and mandarins, but instances of damage to oranges have been reported.

Life cycle

The SCB life cycle consists of an egg stage, five nymphal stages, and an adult stage (see Figs 1, 2 and 3). Eggs are initially white but become mottled with black and red as they develop. Early-stage nymphs (stages I to III) are marked with black, green, yellow, white and orange. Late-stage nymphs (IV to V) are mainly green with black markings. Adults are green, 15–20 mm long, and have a pair of prominent spines on the shoulder of the thorax.

Stage I nymphs congregate on empty egg shells and stay there until they reach stage II, when they disperse.

Both adults and nymphs (except for stage I nymphs) feed on fruit. Lemons are preferred over other citrus fruits—the bugs pierce the rind of lemon fruit of any stage.

Eggs are laid on leaves, fruit or twigs in batches of 4 to 36.

Figure 1. Newly hatched SCB nymph on rough lemon

Figure 2. Late-stage SCB nymph on rough lemon

Figure 3. SCB adult on rough lemon

Photos in Figures 1, 2 and 3 courtesy of Sandra Hardy.

Development and survival

Development thresholds (T0) of individual stages of SCB range from 11.3°C to 17.5°C, and the thermal requirements range from 50 to 123 degree-days (DD). The entire egg-to-adult development threshold requires a total of 455 DD above the threshold of 14.3°C. The fastest rates of nymphal and egg development occur between 32°C and 35°C; however, nymphal survival is highest between 25°C and 30°C. Average survival of SCB from a stage I nymph to an adult varies from 41% to 63%.

In New South Wales, Victoria and South Australia, there are three generations per year: in spring, summer and autumn. The number of generations in Queensland is four: in spring, early summer, mid-summer, and autumn.

Female adults can live for up to 18 months.

Seasonal patterns

In south-western New South Wales, adults are recorded in all months, with the greatest number found during winter. Oviposition occurs during October–April, with peaks in November and February/March. The number of eggs per batch is generally higher during October–December than during January–April.

Nymphs are recorded in all months except August and September, and are most common during December–April. Nymphs of early stages (I–III) are dominant during spring and summer, and late-stage nymphs (IV–V) are most common in autumn and early winter.

Aggregation behaviour

Adults overwinter in aggregations on non-lemon citrus that are near lemons, or on their native host the desert lime, *Eremocitrus glauca*. Tight clusters of up to 50 adult bugs can be found in a single tree. A male-produced aggregation pheromone is responsible for the clustering. The pheromone is attractive to males and females, both reproductive and non-reproductive. A defence chemical common to stink bugs is also attractive to reproductive adults.

The overwintering adults disperse in spring to nearby lemon blocks and begin egg-laying.

Natural enemies

SCB eggs are parasitised by at least 12 wasp species. The main parasitic wasps are:

- *Trissolcus oenone* (Fig. 4), *T. ogyges*
- *Anastatus biproruli* (Fig. 5)
- *Acroclisoides tectacorisi*
- *Centrodora Darwini*

Figure 4. SCB egg parasitoid, *Trissolcus oenone*.

Figure 5. SCB egg parasitoid *Anastatus biproruli*.

Photos in Figures 4 and 5 courtesy of Smith et al. 1997.

Parasitism can be as high as 60% to 100%, with highest parasitism occurring during spring to early summer.

Predators of SCB nymphs and adults include:

- spiders
- predatory bugs
- praying mantids
- assassin bug (*Pristhesancus plagipenis*).

Ants and lacewing larvae consume significant numbers of SCB eggs.

Monitoring

SCB populations and parasitism levels of SCB eggs should be monitored fortnightly during November-March. At each monitoring site, check an additional four to five neighbouring trees for the presence of adults and nymphs. To estimate the egg parasitism rate, collect five to ten egg batches and store them in separate containers to check for the emergence of bug nymphs and parasitic wasps. Search for winter aggregations of adults in the first two rows of non-lemon citrus (oranges, mandarins, grapefruit).

Management

SCB management should be centred on the conservation of natural enemies, removal of overwintering adults, and judicial use of low-rate, selective insecticides.

Conservation of natural enemies is achieved by avoiding the use of harsh chemicals. Chemical intervention should be taken only when SCB pressure exceeds the action threshold. The recommended action threshold is 10% of trees infested with SCB adults or nymphs.

Removal of overwintering adults can be significantly enhanced through the use of aggregation pheromone.

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