

Beautiful but oh so destructive.

It's guilty of giving other bugs a bad name.

I found this bug on one of my citrus trees, so I used Google Lens on my phone and discovered it is a **Fruit Spotting Bug**. This is in the nymph stage.

There are two types of FSB but the average person cannot tell the difference. It also has a relative called the Banana Spotting Bug but that is more prevalent north of Nambour. Like the SEQ fruit fly, FSB are native to Australia

Up to 22 different crops can be affected, most significantly avocados, macadamias, custard apples, lychee, passionfruit, paw paws, citrus and mango.

Other crops that can suffer FSB damage include grapes, figs, longan, carambola, stone fruit, cashew, pecan, mangosteen, kiwi fruit, cucurbits, pistachio, persimmon, lemon aspen, rambutan, tamarillo, raspberry, blueberry and almond.

FSB is the most significant pest of Macadamias.

They feed on fruit, flowers and tender new shoots of fruit-bearing plants and trees.

The Damage They Cause

1. Paw paw trees die from the top – sometimes they recover, sometimes they don't. (Figure 2)
2. Sting new growth on trees (Figure 3)
3. Causes early fruit drop. (Figure 4)
4. Causes marks on more developed fruit Figure 5-7)
5. Causes damage to the actual flowers

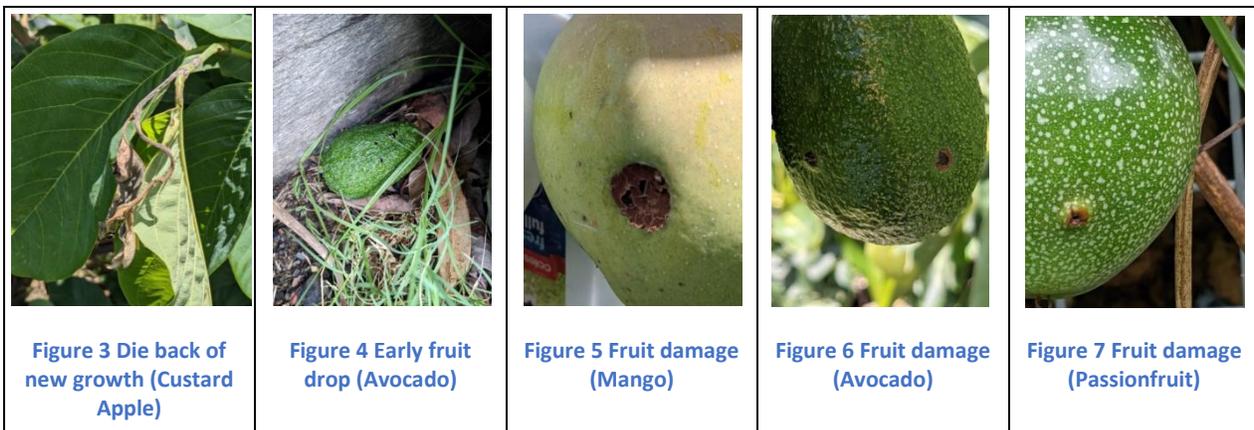
This is just a sample of the destruction these bugs can cause.



Figure 1 Fruit Spotting Bug Nymph Stage



Figure 2 Paw Paw die back from FSB



For years I have struggled to grow paw paws and I knew there was a bug that could come out of the bushland nearby and sting the tree but I have never before actually seen the bug.

FSB, Fruit Fly or Something Else?

Fruit fly and some other bugs like Stink Bugs are so well known that when damage appears on fruit it is easy, especially for anyone not familiar with the FSB to blame these well known bugs. FSB don't lay eggs in fruit, so if you find larvae wriggling around in the fruit, it is more likely fruit fly. However, sometimes FSB does the initial damage and then fruit fly take advantage of the sting site.

FSB Life Cycle

FSB commence as eggs and the bug is virtually present all year round but most prolific during the warmer months of the year. Their life cycle has 7 stages from eggs to adult. The life cycle speeds up with an increase in temperature – a full life cycle ranges from 63 days at 20° while only 41 days at 30°. Therefore during spring and autumn there will be one generation of FSB while in summer there will be two generations. The adults alive at the end of autumn will survive the winter ready to recommence the cycle in spring.



Figure 8 Early Nymph Stage



Figure 9 Later Nymph Stage



Figure 10 Adult FSB

Detecting FSB

Detecting FSB often begins with unexplained damage to new growth, flowers, fruit and especially early fruit drop of immature crops. Consider FSB as a possible cause.

If you live near bushland there is a good chance you will be affected by FSB. Their eggs have been found on Eucalyptus tree leaves but not exclusively.

FSB eggs are laid on leaf surfaces, fruit, bark etc and sometimes in groups, sometimes in ones and twos. Therefore they can be difficult to observe. The nymphs are an orange colour and which makes them more easily seen, however they are shy and can easily be missed. Furthermore, they love to congregate in the tops of trees, so if your trees are more than a few metres high, there is a good chance you won't see them unless you are lucky to catch one lower down. Observation is the key. There is a pheromone trap available for one type of FSB but is ineffective for the other type, so really the trap is not a good way to determine if FSB is present and causing your problems.

FSB is often more prevalent when there is a lot of rain, so that is a cue to be even more vigilant.

Control Options

Now we come to the hard part, especially if you want to use organic methods. While there has been a lot of research into fruit fly control, research into FSB is on-going and so far there are no clear cut methods of control.

Chemical Sprays are available but they are not organic and are non selective as they kill the good bugs as well. It is not a strategy suitable for the home gardener and even for commercial growers; it is not a long term strategy as bugs eventually become resistant.

Organic Sprays – some research has been done using pyrethrum which is approved for organic use. Some laboratory tests have shown effective control rates but field tests haven't been so successful because pyrethrum does not have any residual effect on the bugs. It should be noted that pyrethrum also can kill good bugs, so care should be used if trialling this solution.

Here's a quote from the Executive Summary of a report on the subject.

“Using Pyrethrum to Control Fruit spotting Bugs in Organic Fruit Production”

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A range of pyrethrum formulations and plant oils (avocado, canola, sesame and tea tree) achieved variable levels of knockdown and mortality of fruit spotting bug adults in laboratory bioassays. This variability appeared to be more a result of application method (dipped or sprayed beans) than rate of application of either the pyrethrum or oil. Occasionally pyrethrum and oil treatments were as efficacious as a synthetic standard, but they were particularly inferior if applied as a spray.

In the field trials the pyrethrum and plant oil (canola, sesame or tea tree) treatments were ineffective at suppressing fruit spotting bug damage under high bug population pressure, and particularly if the treatments were applied selectively to individual trees based on the degree of bug activity. This occurred irrespective of the rate of application of either the pyrethrum or oil. However, at low to moderate levels of bug activity, and when applied to all trees in a treatment block, pyrethrum in combination with tea tree oil appeared to reduce bug damage, sometimes significantly. A pyrethrum concentration of 10 ml active ingredient/s per 100 L water (i.e. 0.01%) and 50 – 200 ml of plant oil per 100 L water (i.e. 0.05 – 0.2%) are the indicative rates.

Although pyrethrum clearly has broad-spectrum activity against beneficial organisms in an orchard our trials could not discern a difference between treated and untreated blocks. Spiders were perhaps the most significant predators affected by pyrethrum in the crops examined, but pollinators must also be considered by applying sprays late in the day.

Implications for relevant stakeholders

For organic growers there has been nothing in their armoury to defend against fruit spotting bugs in the large range of tropical and subtropical tree fruit and nut crops affected by them. Pyrethrum in combination with plant oil offers the potential for some relief from fruit spotting bug damage if the pest pressure is not too great. In particular, for those crops that would benefit from protection for a limited period (which includes cocoa, longans, lychees, macadamias and rambutans) pyrethrum use should be sufficiently limited to maintain the biological integrity of orchards.

My take on this summary is that it could be worth trialling a pyrethrum spray mixed with tea tree oil in a trigger pack by frequently looking for FSB and spraying the bugs directly rather than the whole tree. This

might seem tedious and for people who don't have much time it may not seem practical but this approach for the backyard grower would target the bug itself and minimise the effect on the beneficial bugs. In my case I would keep a close watch on paw paws and citrus where I have seen the bugs active.

Pyrethrum, Natural or Synthetic A Fact Sheet on Gardening Australia website by Jerry Coleby-Williams points out that there are two types of pyrethrum available – natural and synthetic. (For more information click the link at the end of the document). They work and act the same and must be used with the same precautions. The issue with the natural pyrethrum is the expense and it is harder to get. At the time of writing, natural pyrethrum costs around \$90-\$100 for 250ml while the synthetic available at Bunnings costs approximately \$14 for 200ml. If you insist on using the natural pyrethrum to control paw paw die back for example, you would need to weigh up the cost of spraying versus the cost of buying the fruit from the shops.

Netting. While netting (or bagging) is an excellent way to control fruit fly, it may not be suitable for FSB. Crops are in danger from fruit fly once the flower has been pollinated and the fruit begins to form. The fruit can then be netted. The problem with FSB is the trees and flowers are subject to attack and early netting would inhibit pollination of the flower and subsequently any possible fruit. However, if the damage is being caused to the fruit itself – i.e. marks on the fruit or premature fruit drop, bagging or netting may be an option. Netting has the risk of enclosing the bug that is already on the tree, so bagging is preferable. For me this bagging of small avocados will stop premature fruit drop.

Biological Controls There has been some research done using the Anastatus wasp as they attack FSB eggs and have proven to be quite effective. I have contacted BioResources and Bugs for Bugs to discover if the Anastatus wasp solution is available to the backyard grower – it is not!

Macadamia nuts are subject to FSB and the Macadamia Nut Borer. The MacTrix wasp (*Trichogrammatoidea cryptophlebiae*) has proven really effective for the Macadamia Nut Borer but is not a solution for the FSB.

Bugs that are predators of FSB are:

Natural enemies of FSB include **ants**, especially the green tree ants, **spiders** *Ocrisiona* sp., **lacewings**, green and brown but especially **brown lacewings**, birds, **micro bats**, even **frogs**, while predatory bugs such as **Assassin Bugs** and **Predatory Shield Bugs** are likely to feed on FSB nymphs. Of course, Assassin bugs will also predate on bees and the



Figure 11 Spiders
Predate FSB



Figure 12 Lacewing eggs

Predatory Shield Bug is not to be confused with the Shield Bugs (Stink Bugs) often found on citrus.

The stink bugs found on citrus feed on plant material while the Predatory Shield Bug predate on other bugs. I haven't been able to find out if oil sprays used to control stink bugs in the early stages of their development also kills the Predatory Shield Bug.

If you choose to buy some of these predatory insects to control FSB you will need to work out a program for a controlled and systematic release over many weeks to target the life cycle of the FSB.

Encouraging Predatory Insects

Assassin bugs love Queen Anne's lace, daisies, and alfalfa. You could also try planting flowers like marigolds, dandelions, goldenrod, and tansy. Herbs like dill and fennel may also attract assassin bugs.

Lacewings Adults are attracted to nectar and pollen. They love Alyssum, Angelica, Caraway, Carrot, Coriander, Daisy family (Coreopsis), Dill, Fennel, Heather, Oleander, Queen Anne's lace, Red and white cosmos (*Bipinnatus*), Tansy, Yellow yarrow

Predatory Shield Bugs need ground covers for shelter during winter. However, from my reading on these bugs, they don't seem to exist in large quantities. Plants that attract them are *Leptospermum continentale* (Prickly Tea-tree). Other plants that attract these bugs seem to be mostly temperate zone plants.

Micro Bats can be encouraged by providing purpose-built Micro Bat boxes or houses for them.

Strategic Summary

In summary, there are no proven fully effective solutions for the home gardener. To control this pest requires a multi-pronged and experimental approach and hopefully some sort of control can be achieved.

- Be observant and even more so when the season is particularly wet.
- Tree height – keep trees pruned to around 2-3 metres
- Try spraying the FSB with pyrethrum and Tea Tree Oil, but target-spray the bugs themselves.
- Plant flowers and plants to attract beneficial insects – try planting a meadowland of flowers among your fruit trees.
- If buying in predatory insects, work out a plan to progressively release them over months so the generations of FSB can be kept in check.

Images



Figure 13 Damage to paw paw fruit



Figure 14 last year's damage to paw paw

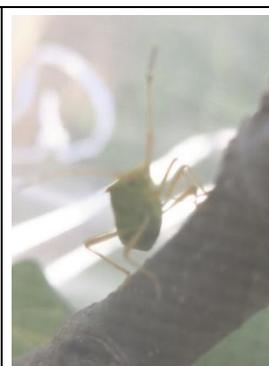


Figure 15 FSB trapped in organza bag on fig



Figure 16 Adult FSB on paw paw

List of Susceptible Plants

Acerola	Carambolla	Custard apple	Meyer lemon	Silver quandong
Avocado	Carob	Grape	Miniature umbrella tree	Siratro
Banana	Cashew nut	Grenadilla	Mock orange	Soap bushwhite sapote
Bangalow palm	Castor bean	Guava	Mulberry	Tucheroo
Bauhinia	Champak	Indian hawthorn	Pawpaw	White cedar
Beach bird's eye	Cheese tree	Jaboticaba	Passion fruit	Zigzag plant
Cabbage palm	Choko	Lillypilly	Pomegranate	
Camellia	Common fig	Longan	Ribbonwood	
Camphor laurel	Coral tree	Loquat	Rough-leafed fig	
	Corky passion flower	Lychee		
	Cotton tree	Mango		

Further Reading

[Biocontrol pays off | Queensland Country Life | Queensland](#)

[Anastatus \(goodbugs.org.au\)](#)

[Anastatus Home \(bioresources.com.au\)](#)

[Bug Host Plants \(bioresources.com.au\)](#)

[Killer bug fells trees | News Mail \(news-mail.com.au\)](#)

[Glossy shield bug | Insects and Organic Gardening](#)

[Using Pyrethrum - Fact Sheets - Gardening Australia - GARDENING AUSTRALIA \(abc.net.au\)](#)

Compiled by Greg Lindner February 2021 V2