

BioResources Update June 2020

Note: All the [blue links](#) on these pages go to either a BioResources web page or to a PDF hosted on that site.



MacTriX, egg parasitoid of macadamia nutborer

MacTriX Trichogramma wasps remain our main product line. Macadamia nutborer is not the major pest in macs it used to be, thanks to this tiny wasp but MNB still rears its head under the right conditions. We have noted that MacTriX can be affected by heat wave conditions as are most insects especially when its dry. It handles high temps better if its humid. So be aware of the potential for an increase in nutborer after such a spell. Also, we had some reports of late nutborer activity in the Bundaberg district in late varieties. So, next season, consider releasing a bit longer in late maturing crops. We have also struck problems getting the finely corrugated card we use and are testing alternatives. So expect a change there at sometime. Link to: [MacTriX Info Sheet](#) and [MacTriX web page](#)



Anastatus wasp, egg parasitoid of spotting bugs and spined citrus bug

Use of Anastatus continues to grow. Now around 150 clients. We have consolidated over the last year and improved our rearing system. We had a bit of a rough patch early this year with Covid19 causing delays in supply of silk moth eggs from China but we are back on track now and have increased capacity for the coming year. So let us know if you wish to do another block or get your neighbours on board to improve the local coverage. Link: [Anastatus & FSB Hosts Info Sheet PDF](#) and [Web Page](#).



Green Lacewings

Green lacewings larvae are generalist predators, feeding on small insects and mites, moth eggs and small larvae (we rear it on MNB) and **lace bug**. They are creating more interest as growers seek to reduce their chemical use or to restock after the spraying season and to have around during the long harvest period quietly hunting down their prey. We send them out as adults so they can be released to fly up into the trees to lay their eggs. Link to: [Green Lacewings Info Sheet PDF](#) or to [Green Lacewing web page](#)



Inter row Project

Our Hort Innovation Research Project MC16008: Inter row management in macadamias, has just been completed. In this project we asked the questions: Can we modify inter row management practices to increase non-pest arthropod abundance and diversity in the orchard without causing pest issues in the trees, and in this way provide more resources for beneficial insects and pollinators? The answer was “Yes”.



The project provided 11 macadamia growers from mid-coast NSW up to Bundaberg QLD with the practical experience of growing and maintaining an inter row insectary. BioResources then monitored these inter row insectaries in terms of their vegetation composition and insect community composition in comparison to industry standard mown areas within these farms for 2.5 years and analysed the data for differences.

Aside from the practicalities learnt about maintaining an inter row insectary in macadamia orchards, the most important finding was that well-functioning insectaries increased the diversity of arthropod communities in both inter row and tree habitats, in turn creating a more complex food web with higher proportions of beneficial invertebrates (predators and parasitoids) that were more stable in population abundance over time. We were amazed at the diversity of species at some sites.



Our Final Report is detailed and long. It will be available soon on our web site and ResearchGate. For some shorter summaries and some key snapshots check out the following links:

[Inter row Publications Web Page](#)

[Summary of Inter Row Final Report MC16008 PDF](#)

[Intro Inter Row Project Video](#)

[Inter row management Options Table PDF](#)

[Bevan & Willemse, smother grass vs diverse species mohawk, Dalwood PDF](#)

Planting insectaries and cover crops at the Harris farm

One of the study sites taken on later in the project was Harris's near Bangalow. They are part way through a row removal program and have gone boots and all into cover cropping, initially to improve soils and breakup compaction, increase water penetration etc. This they have achieved. We came in and compared insect populations in the cover crop area with the a still dark block.



The differences were dramatic, with many times more lacewings and spiders in the cover crop area. Care needs to be taken in choice of cover crops as some can host GVB. Lablab was planted at this site and probably won't be planted again for this reason. If you want some inspiration check out Rex's Twitter page, you don't need to have a Twitter account to view it. Scroll down to see earlier posts of crimper roller and planting of cover crops.

<https://twitter.com/drexharris>

Direct drill seeder

During our inter row project we became more aware of the development of cover crop technology overseas and in Australia. We are now asking the question: How can we adapt cover crop technologies to macadamias with the various physical and environmental limitations? Taking the lead from Rex Harris, we purchased a cheaper version of a double disc drill seeder (Network Brand) and have been experimenting with planting inter row insectaries.



In spite of the dry last year we were able to get an insectary going on a farm near Lindendale NSW. And have done several plantings since January. There are many logistical issues to work around but we feel its worth working through them as the benefits of insectaries and cover crops are many. We now have another disc seeder at Bundaberg where we hope to do more plantings soon. Links:

[Video: of Direct Drill seeder](#) and see [Pics of Lindendale insectary plantings PDF](#)

New Landcare Projects

Our growing interest in inter row management and cover cropping led us to apply for two LandCare Grants to follow up this work. And we were successful with both:

1. Inter row management in Bundaberg district

This small Landcare Project seeks to engage growers with inter row management and cover cropping technology. Tens of thousands of trees are being planted in the region. But are there better ways to utilise an inter row that has so much light penetration, than having the standard regularly mown Rhodes grass? We think there are opportunities to improve soils with cover crops to increase organic matter (and sequester carbon), improve water holding capacity, reduce runoff and compaction, etc etc.



The main limitation in this area is water. Rainfall is unpredictable and you need good moisture and followup to raise a cover crop. Some farms have mini sprinklers that throw into the inter row which opens up more options but usually young trees use drippers. If water is available, fixed sprinklers, say every 3rd row or small water winches may be possible? Good for heat waves too. Insectaries and cover crops not only provide the benefits mentioned above but in the longer term can provide input replacement, especially as manures are getting more expensive and in demand. If water is available then there is an opportunity to grow some of your inputs instead of importing them.



2. Row removal and cover crop study case Bangalow NSW

This Landcare project will document what the Harris's have done on their property (as mentioned above) and followup with more arthropod surveys and mini studies and communicate this work to growers in the region. The Harris experience presents a way forward for dark orchards, especially in Northern NSW where rainfall is (usually) more reliable. Stay tuned.

Drop Sheets report

Back in Jan-Feb, BioResources in collaboration with Coates Horticulture did a preliminary investigation into the use of spray drop sheets in the Northern Rivers. Primarily to see if it would improve the capacity to monitor for late FSB but also to see what other insects including beneficials fell out of the trees.

The results were very interesting and demonstrated that this method has great potential once you get a system worked out. It also showed that there are many gaps in our knowledge in the behaviour of FSB and many other pests and beneficials. Regular drop sheets is a way of getting season long information on the ups and downs of arthropod populations. We are looking at continuing this study later in the year.



We are currently writing up what we found, so it should be available soon.

Research Program and future trends

Pressure is increasing on all industries to reduce their environmental and carbon footprints and to start measuring those footprints. The label "sustainable" will soon have to be proved. Various "Sustainability Indexes" are in development. And as other industries reduce their footprints, there will be more and more pressure on agriculture to do so, as it will form an increasing percentage of national emissions. It helps that tree crops sequester carbon but meanwhile many dark farms are losing soil. Food miles may also become an issue, so a farm in carbon credit will be an advantage.

So, clearly, there are many subjects for research, and experimentation with innovative practices to help us move in that direction.

BioResources is looking at ways of extending our research program and ways of funding it. As mentioned above, there are many general and focused studies that could be done to help growers develop their IPM programs and enable reductions in chemical use in the long run. For instance: pest movements and feeding behaviours, better understanding of natural enemies and pollinators, better monitoring techniques and thresholds, inter row and boundary area insectaries, finding ways to use cover crop technologies....