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Alternative Light Brown Apple Moth (*Epiphyas postvitanna*) control techniques to reduce the use and reliance on broad spectrum insecticides.

FINAL REPORT to
GRAPE AND WINE RESEARCH & DEVELOPMENT CORPORATION

Project Number: RT 01/11

Principal Investigator: John Jeffs

Research Organisation: Pest & Disease Monitoring Services

Date: 15th of July 2002

FINAL REPORT

RT 01/11

Alternative Light Brown Apple Moth (Epiphyas postvitanna) control techniques to reduce the use and reliance on broad spectrum insecticides

2. Executive Summary

This project has proven that if growers adopt pest and disease monitoring and practice IPM, they can have rapid and positive results. All growers involved in this project only used softer more specific insecticides compared to the broad-spectrum insecticides used by some growers previously. This will therefore help in maintaining Australia's clean green image, improve worker safety and reduce environmental contamination. Growers have also gained more knowledge of pest and disease levels in their vineyard as a result of this project.

Although LBAM was the main focus, diseases such as Powdery Mildew, Downy Mildew and Phomopsis were also challenging. Powdery Mildew was a particular problem in most vineyards suggesting spray coverage, rates and timing of applications need closer attention. There are also several weather stations in Eden Valley allowing the potential for a Cropwatch SA type service to be established. This would allow for much greater knowledge of Downy Mildew infection periods resulting in accurately timed eradicants/protectants as opposed to growers applying Downy Mildew protectant fungicides on a regular basis. This would inevitably result in growers applying s less copper based sprays therefore saving money and less environmental contamination. Phomopsis was also challenging due to two growers spraying for the disease with no need to.

Towards the end of the season, I decided to dissect some of the LBAM larvae to determine if they had been parasitised or not. In two vineyards, larvae were dissected two and four weeks before harvest and showed that forty to fifty percent of the larvae had been parasitised. White cocoons in bunches from parasitised LBAM larvae were continually found in all patches throughout the season. Often more cocoons in bunches would be found than LBAM larvae hence prompting me to dissect the larvae. The practice of dissecting larvae to determine the percentage of parasitised larvae is also done in Brassicaceous crops by Pest and Disease monitoring Services. Research is currently being done on the effects of larval parasitism at The University of Adelaide and several overseas countries in Asia. The percentage of parasitised LBAM larvae is another area which could require further research by the winegrape industry. Vineyard managers would benefit greatly from this knowledge so they can make better control decisions if warranted. Had this been done, sprays late in the season (such as veraison onwards) may not have been required therefore saving money and protecting the parasitoids.

3. Background

Light Brown Apple Moth (LBAM) is a major pest in Australia and New Zealand. This is particularly the case in Eden Valley, South Australia. LBAM causes significant crop loss each season by feeding on bunches which also results in the bunches becoming increasingly susceptible to attack by *botrytis*. As a result of the potential for crop loss, broad spectrum anticholinesterase insecticides have been consistently used up to four times per season. The continual use of broad-spectrum insecticides has many potential detrimental effects on the environment, consumer and worker safety. Resistance and secondary pest 'flare ups' are other

potential problems. Although, there is no known resistance to insecticides in Australia, there has been a degree of resistance found in New Zealand.

In order to maintain Australia's clean and green image, growers and wineries need to reduce chemical use so that pesticide residue levels in wine meet maximum residue limits (MRL's). These MRL's are becoming more stringent in many export countries. To ensure MRL's are not exceeded, the Australian Wine and Research Institutes has reduced the withholding period for chlorpyrifos from 30 days before harvest last season down to 80% capfall this season. Therefore, the only available insecticide to use after 80% capfall is *Bacillus thuringiensis*. It would be very difficult to keep LBAM in check after 80% capfall just with *B. t.* type sprays in high pressure areas such as Eden Valley. Hence the need for research into alternative control methods. The results from this research can be easily applied to other grape growing regions which also suffer from crop loss due to LBAM.

This research will involve the implementation of an Integrated Pest management (IPM) program in order to reduce chemical use. This project aims to reduce the use and reliance on broad-spectrum anticholinesterase chemicals to control LBAM. Therefore, if less insecticides are used, there would be less detrimental effect on the environment and vineyard workers. Wineries will also find it easier to meet MRL's for export markets which all helps to maintain Australia's clean green image.

4. Objectives

The main objective of this project was to reduce the use and reliance of broad-spectrum insecticides used to control LBAM by implementing an IPM program. As part of implementing an IPM program, growers knowledge of pests and diseases would also hopefully have been increased. As a result of this, some growers who have used three-four broad-spectrum insecticides in the past will only use one (or none).

5. Method

Ten growers were selected and monitored on a fortnightly basis from around budburst through to harvest. Each visit consisted of monitoring 100 shoots and bunches for sites less than two hectares and 200 shoots and bunches for sites two to four hectares. Shoots were inspected in groups of ten walking slowly and scanning the foliage between each group of ten. Any pests or diseases found were tagged in the field and/or shown to the grower. A hand lens was used when required. After each inspection, a report (See appendix 1) detailing pest and diseases levels and any recommendations if warranted was given to the grower and discussed.
LBAM Delta traps were also used as an IPM aid (See Appendix 3).

6. Results/Discussion

The implementation of an IPM program to reduce broad-spectrum insecticides has had a quick and positive result. No broad-spectrum anticholinesterase compound insecticides were used by any grower this year compared some growers using three-four in the previous season.

Of the ten growers involved, only six growers controlled for LBAM of which two growers were not recommended to apply any controls (see Appendix 2). One grower sprayed twice for LBAM with a *B. t.* type spray in March although not warranted or recommended but as a precautionary measure. The controls used were mainly Mimic or *B. t.* sprays with one grower releasing *Trichogramma* wasps.

Mimic sprays worked well in general. In those patches where it didn't perform as well as other patches, there was also a Powdery Mildew problem suggesting spray coverage may not

have been adequate. Some growers preferred the quick fix and cost of chlorpyrifos over the slow acting Mimic. *B.t.* sprays had mixed results as some growers weren't aware of it's mixing constraints with other products or the need to buffer the tank mix if required. It was also difficult to time the sprays when the grubs were less than third instar. *Trichogramma* wasps were released at a rate of 60 capsules per hectare in February in one vineyard after a peak in egg lay activity. Although no parasitised egg masses were found, LBAM levels at harvest were or no real concern (see appendix 3.7).

LBAM pressure varied greatly within Eden Valley with some growers having low pressure and therefore no need to spray compared to some growers having much higher pressure. For example, there were two Chardonnay patches about 100 metres apart separated by pasture. One of the patches had to spray with Mimic and *B.t.* whilst the other patch didn't need to be controlled.

Although this project was mainly focussed on LBAM, some other interesting aspects were also discovered. For example, two of the ten growers sprayed for Phomopsis although none was seen in either vineyard. One of the growers has even tested twice for this with no Phomopsis being found. Both growers applied mancozeb on a fortnightly basis starting at budburst. This continued although it was suggested to them that no Phomopsis was seen and the possibility of Rust Mite problems.

Powdery was also found in all blocks monitored at various levels ranging from the odd leaf lesion after veraison to flag shoots on spring. Not surprisingly, powdery was quite bad (50-60% bunch infection) in those three blocks which also had difficulty trying to control LBAM. This suggests that these three growers in particular may be struggling with spray coverage and timing.

Downy Mildew only occurred in one vineyard and was easily controlled early in the season.

7. Outcomes/Conclusion

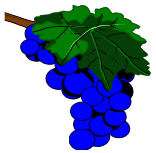
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Appendix 1.



PEST & DISEASE MONITORING SERVICES

Report on Wine Grapes

Email: pdms@senet.com.au

Mobile: 0409 289 019 **Fax**: 8289 5531 **Address**: RSD 29, Via Houghton, SA 5131

Vineyard:

Date:

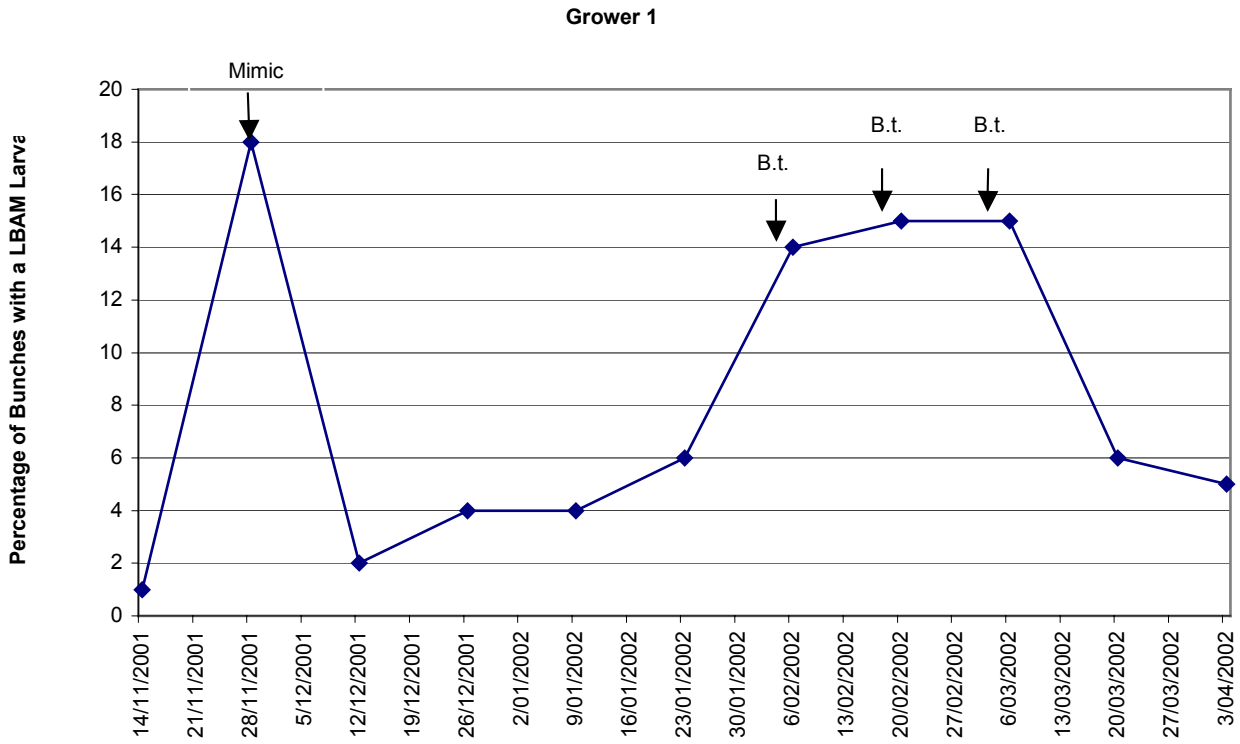
Block	Growth Stage	Powdery Mildew	Downy Mildew	Apple Moth	Vine Moth	Mealy Bug	Bunch Mite*	Blister Mite*	Rust Mite*		Comments

* **Mite Rating** 0 - Nil 1 - Very Low 2 - Moderate 3 - High 4 - Severe

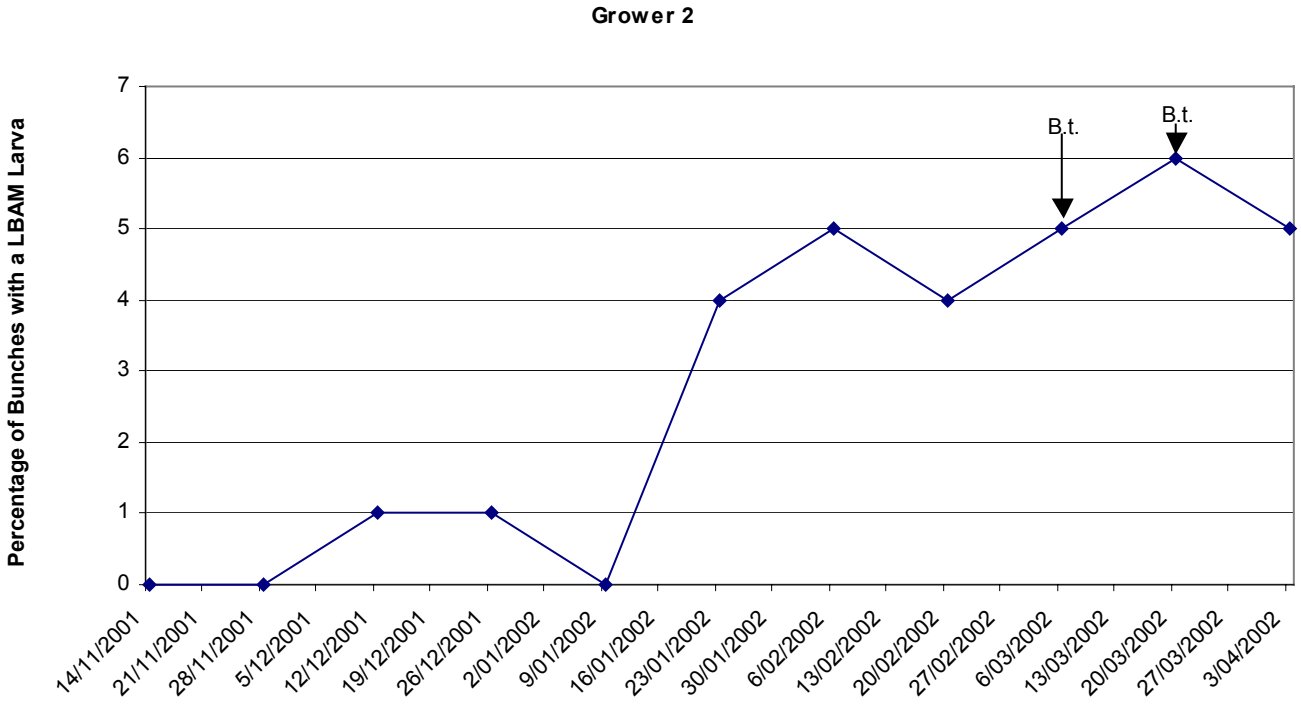
Recommendations:

ABN: 62 476 849 663

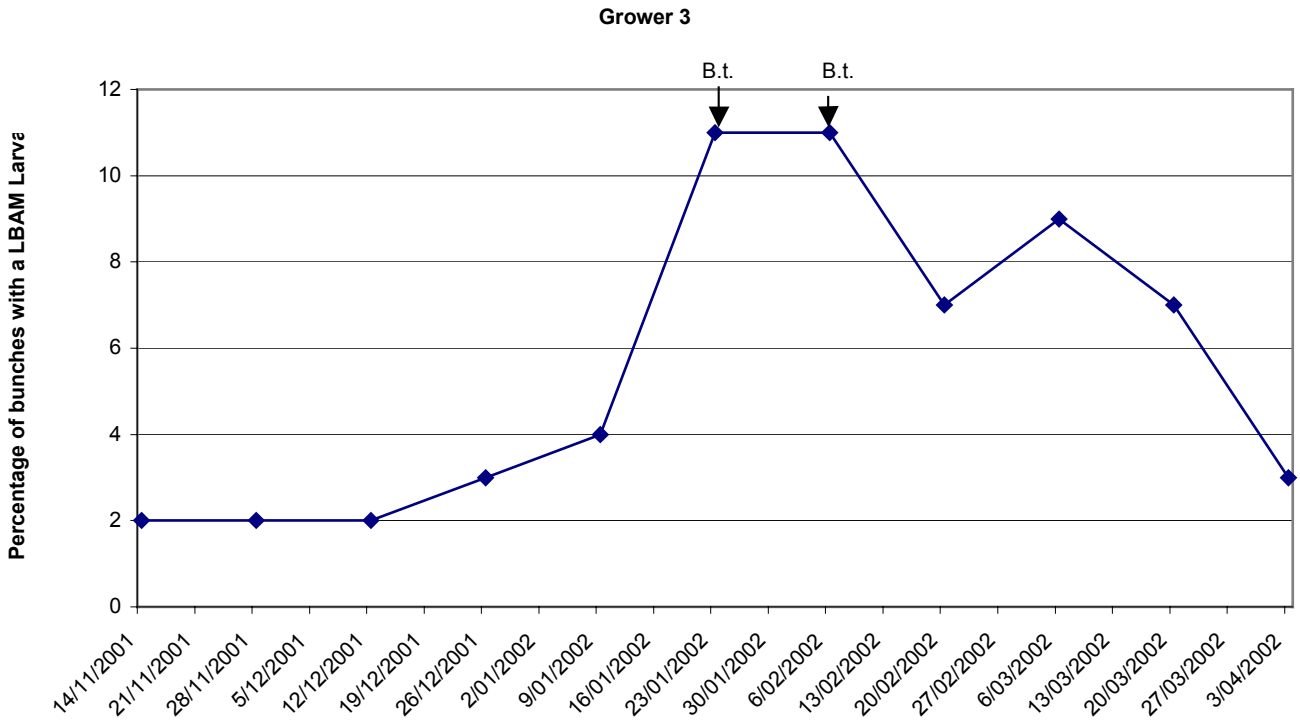
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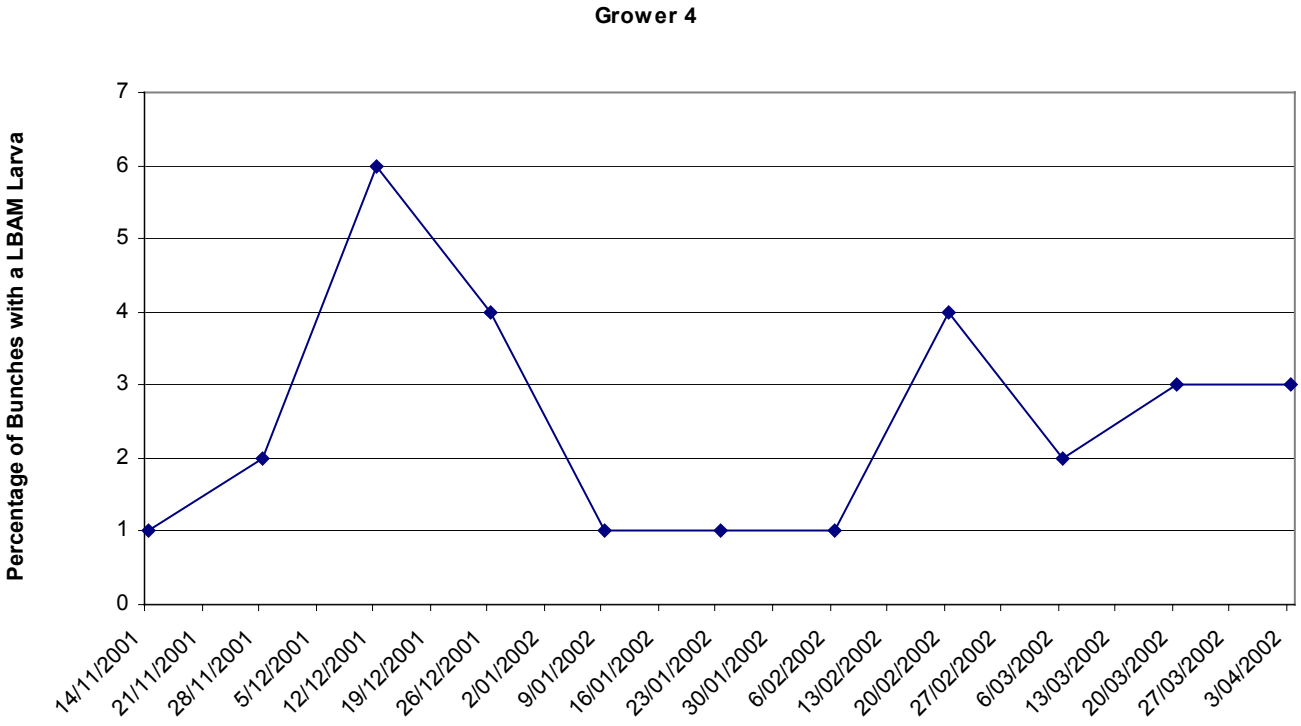
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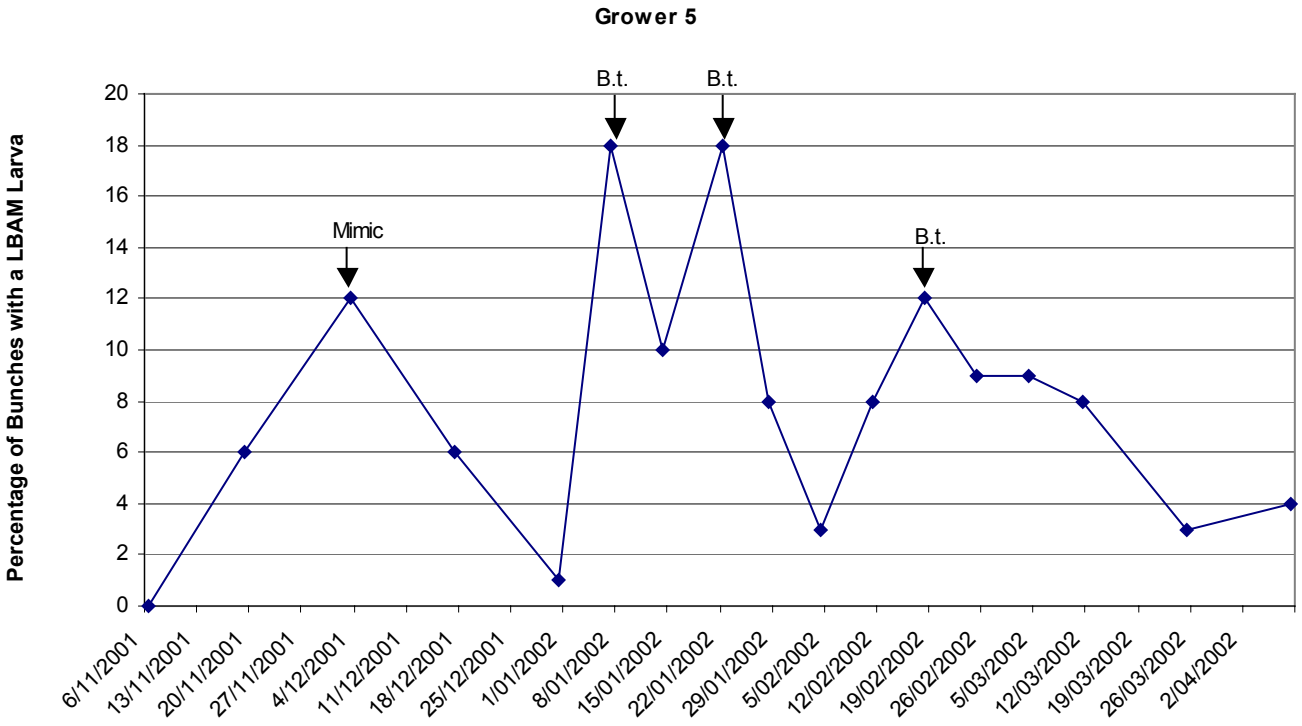
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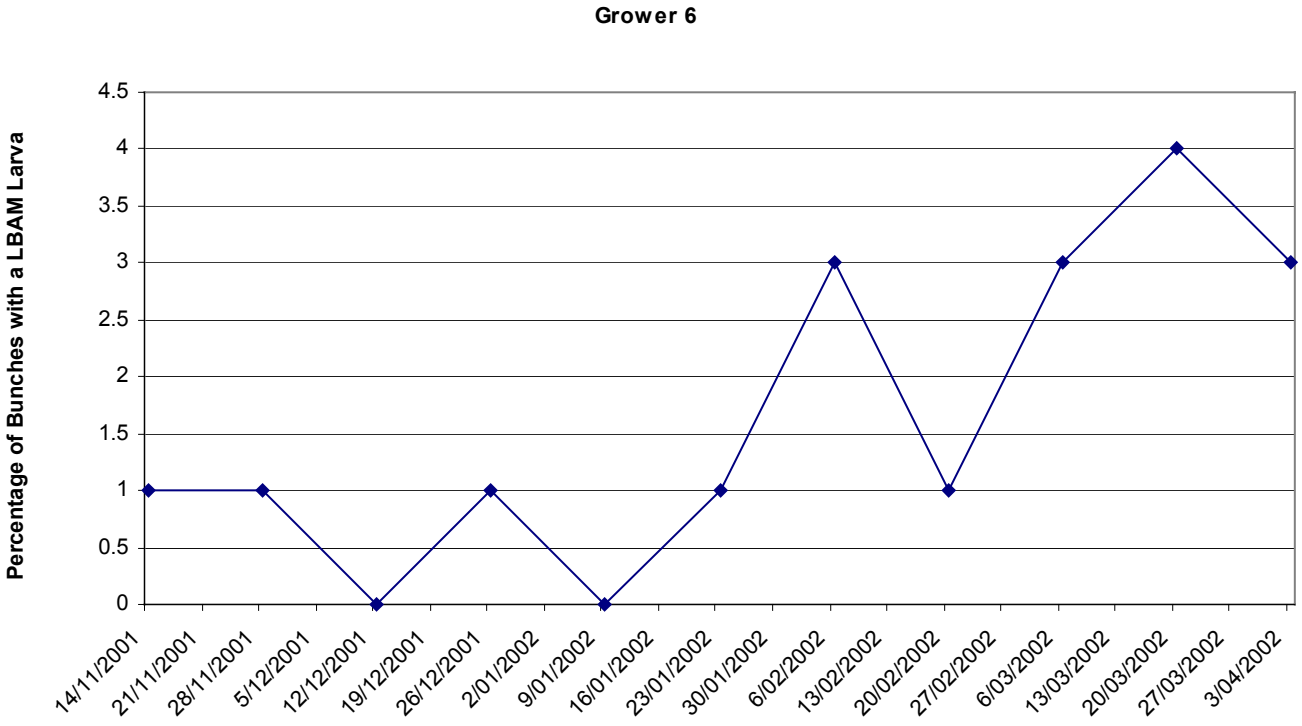
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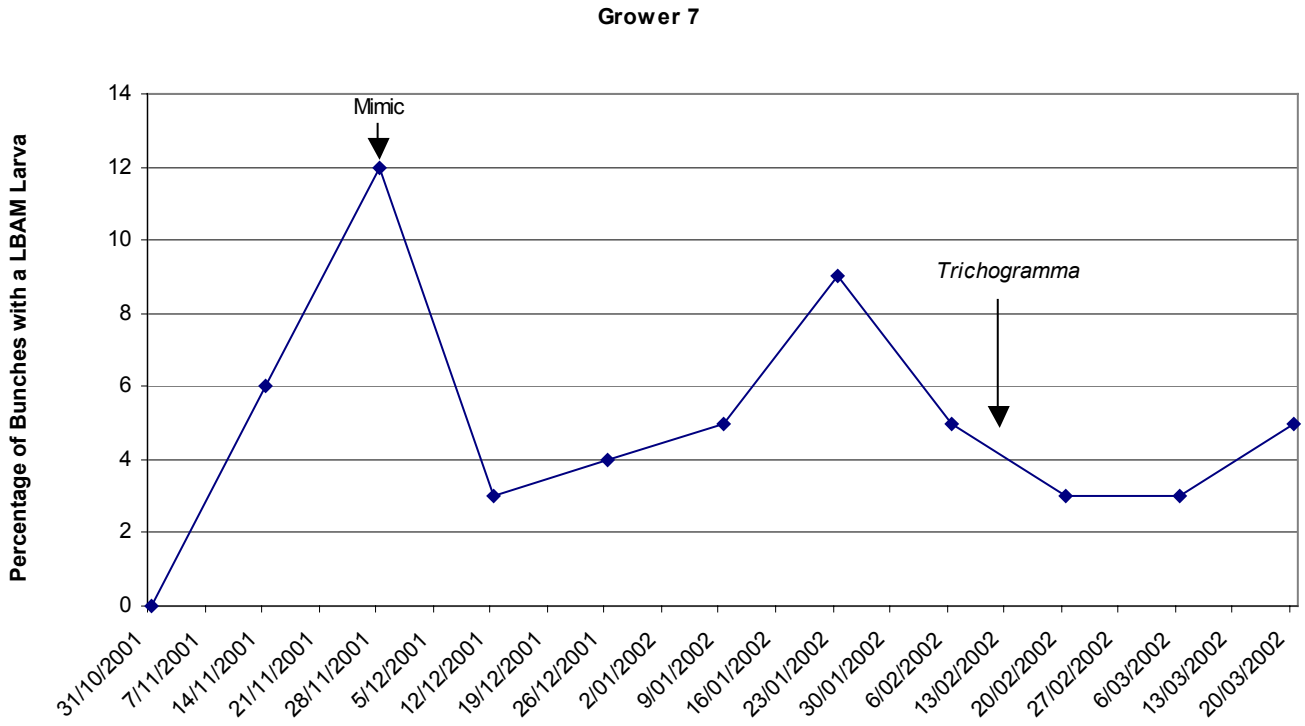
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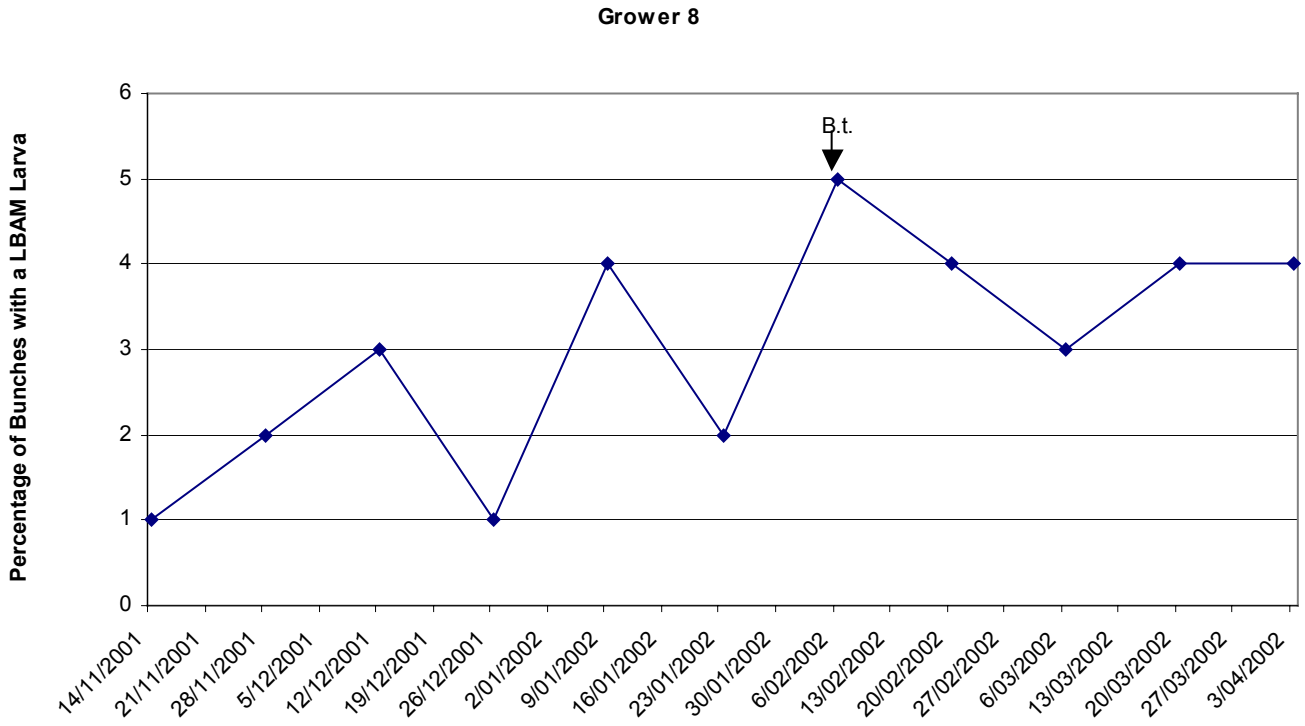
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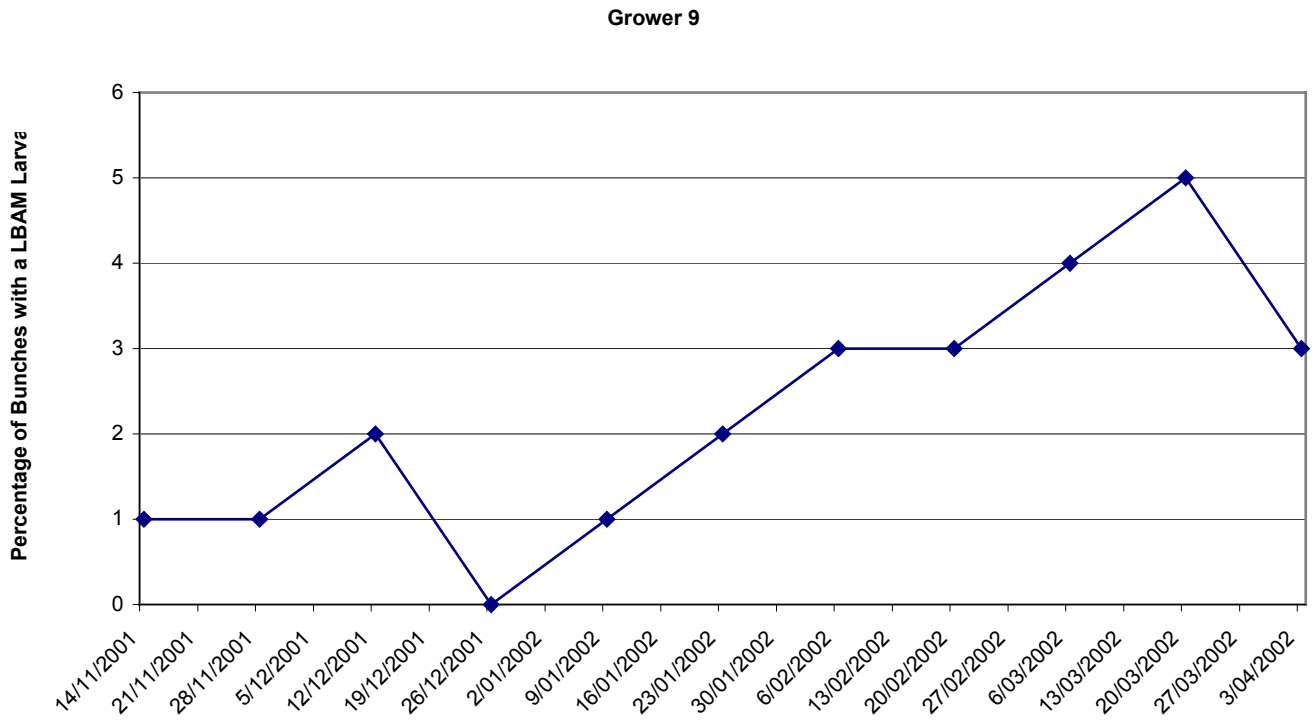
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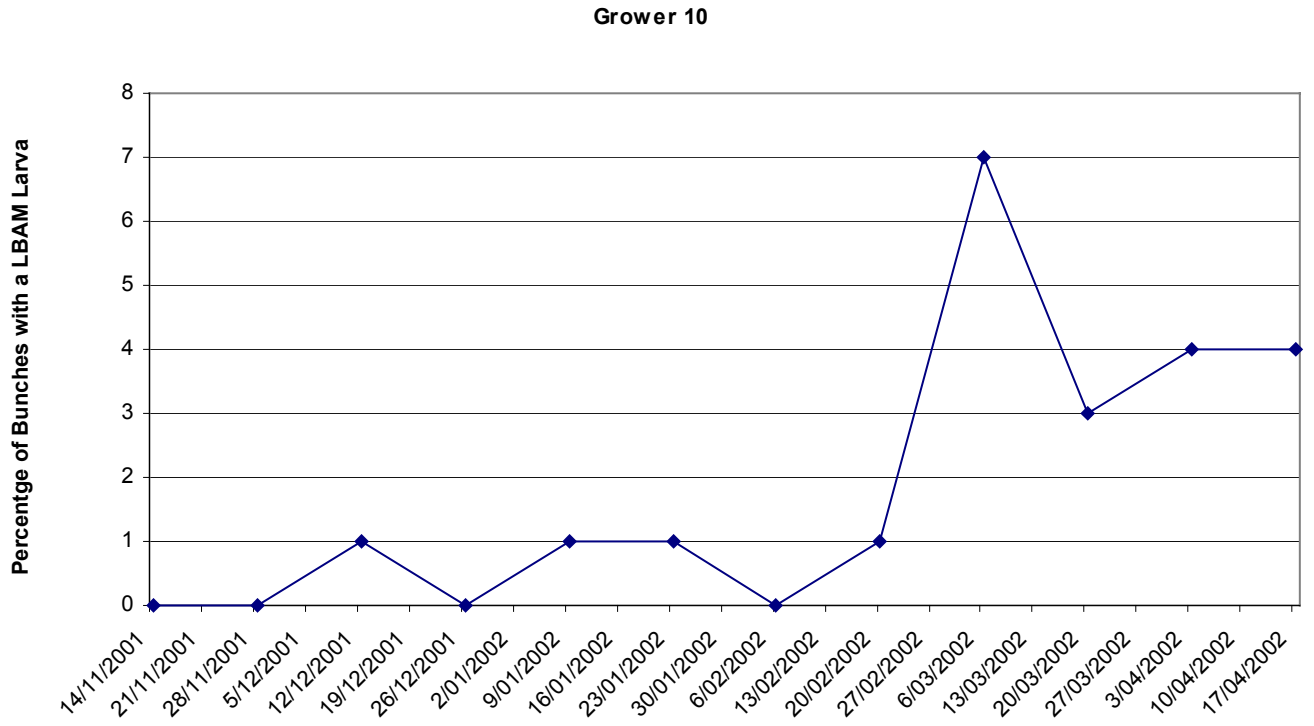
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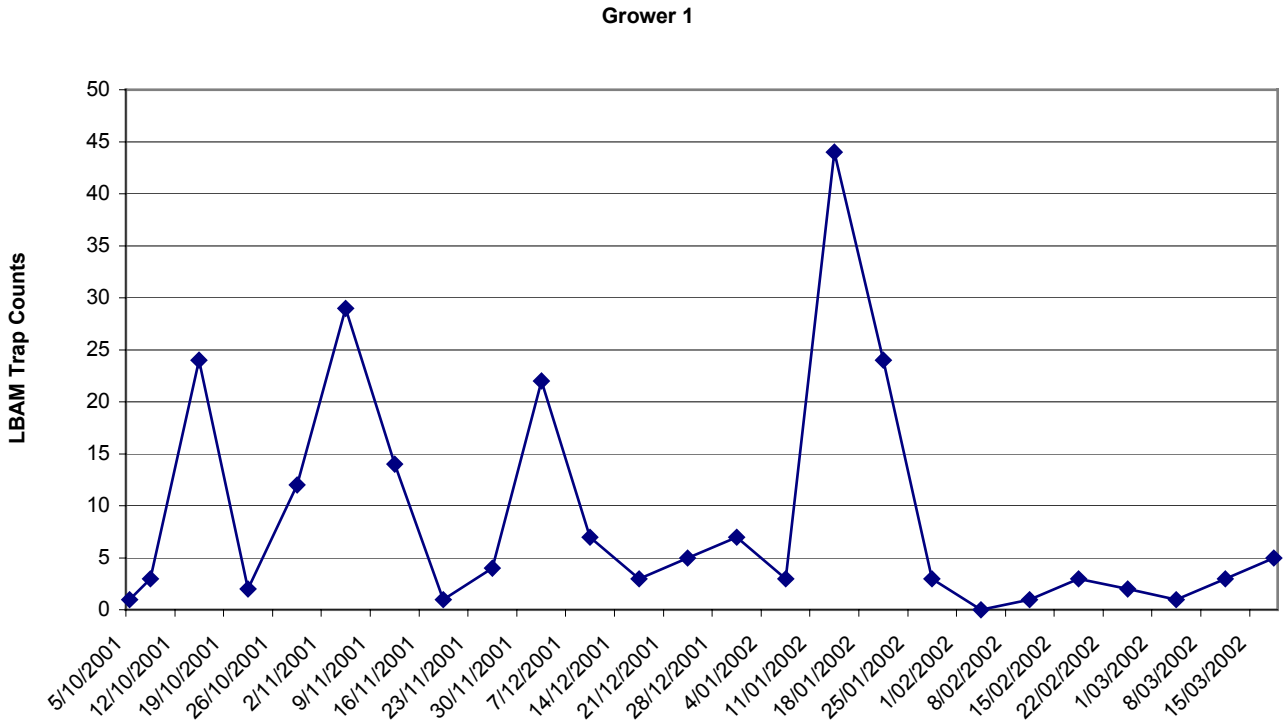
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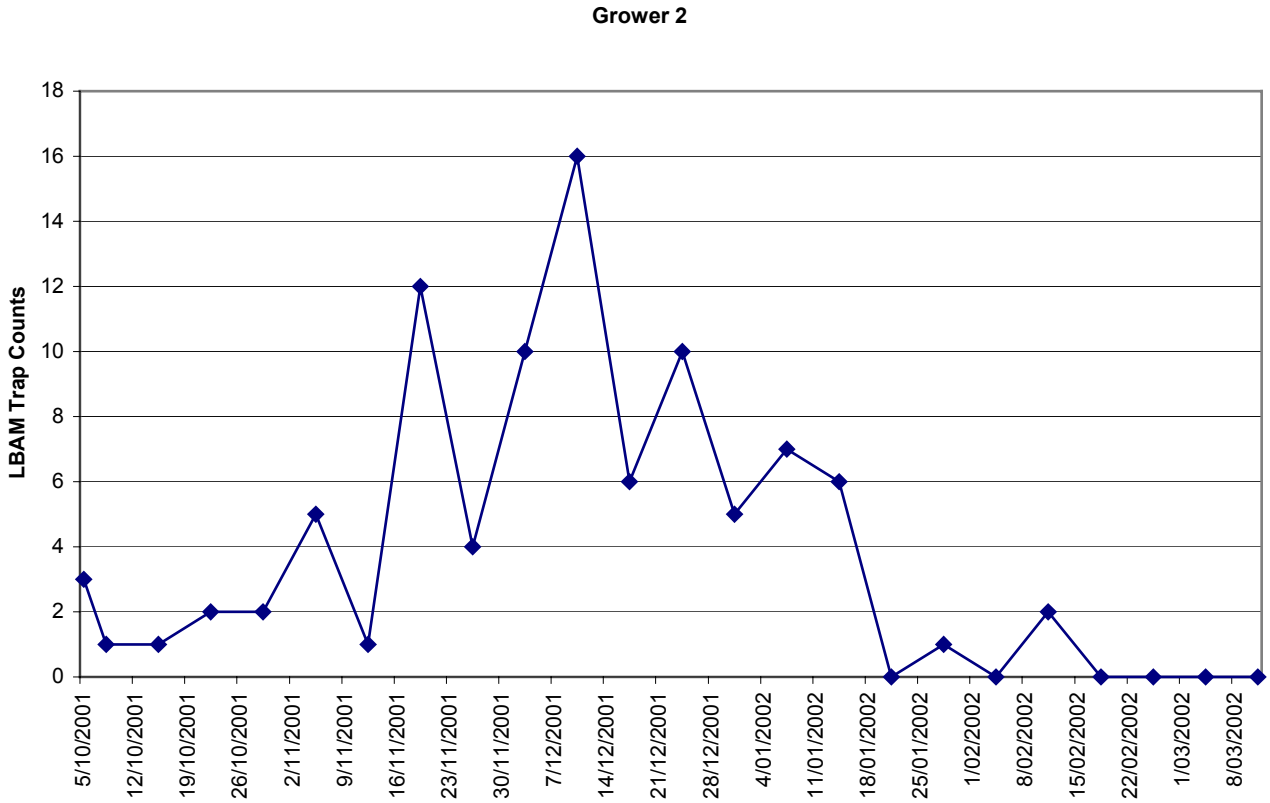
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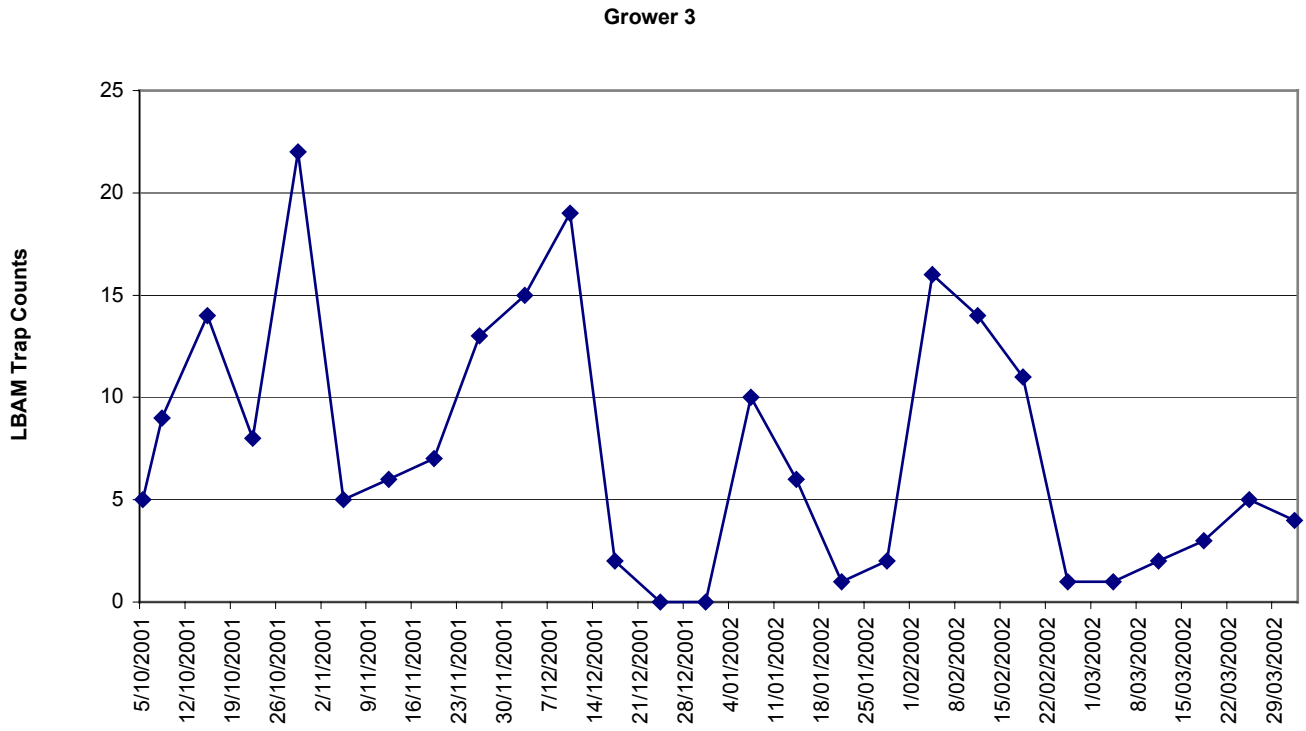
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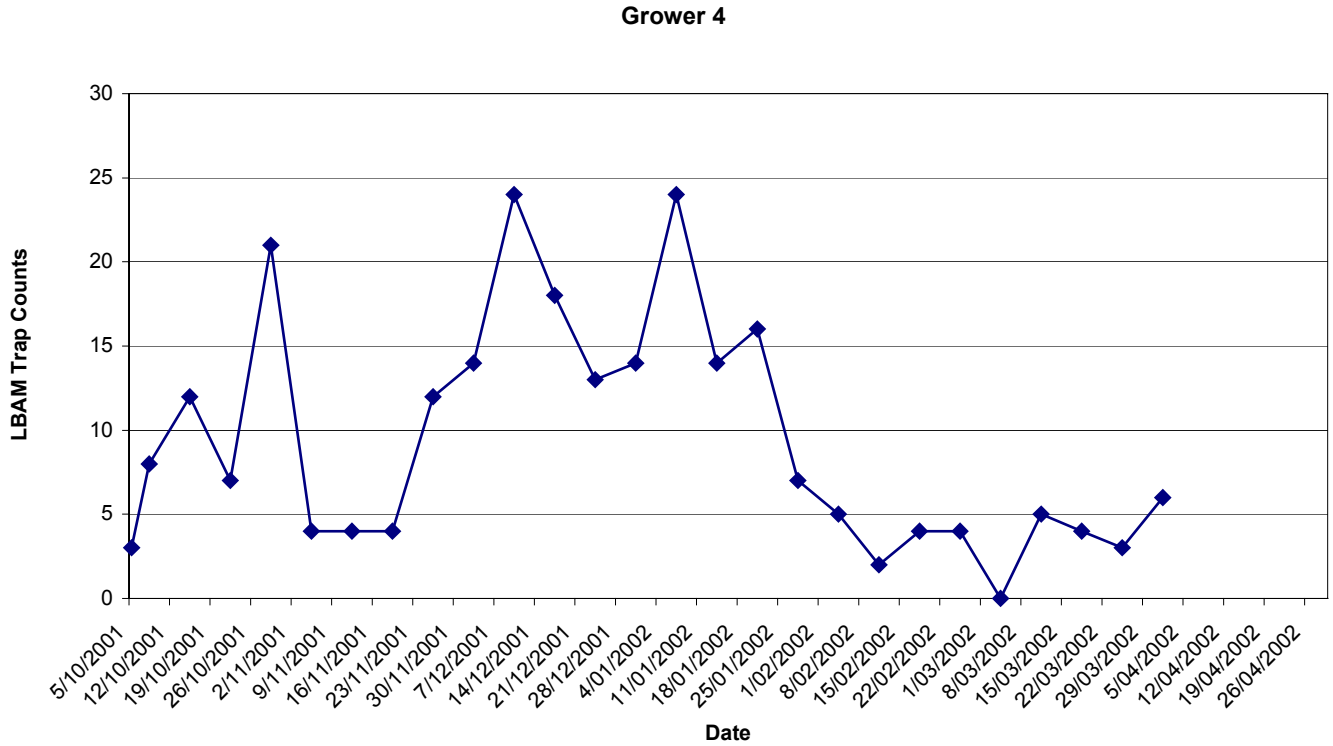
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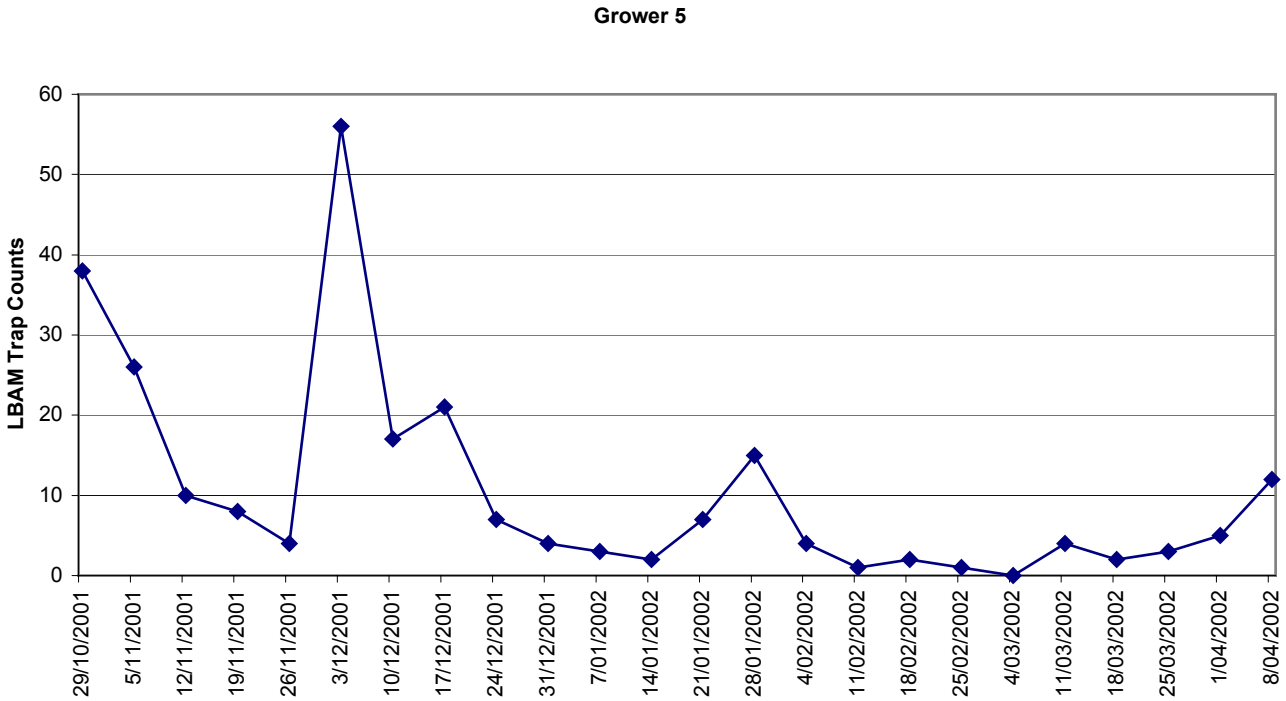
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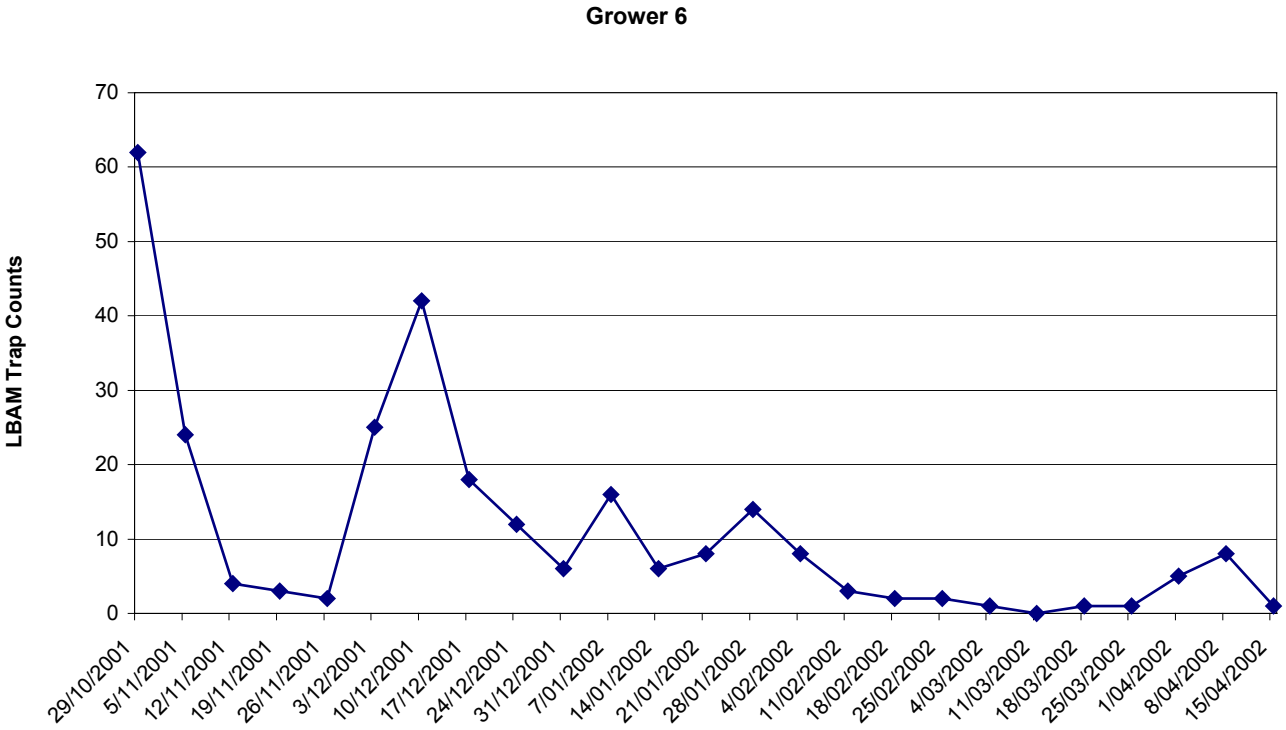
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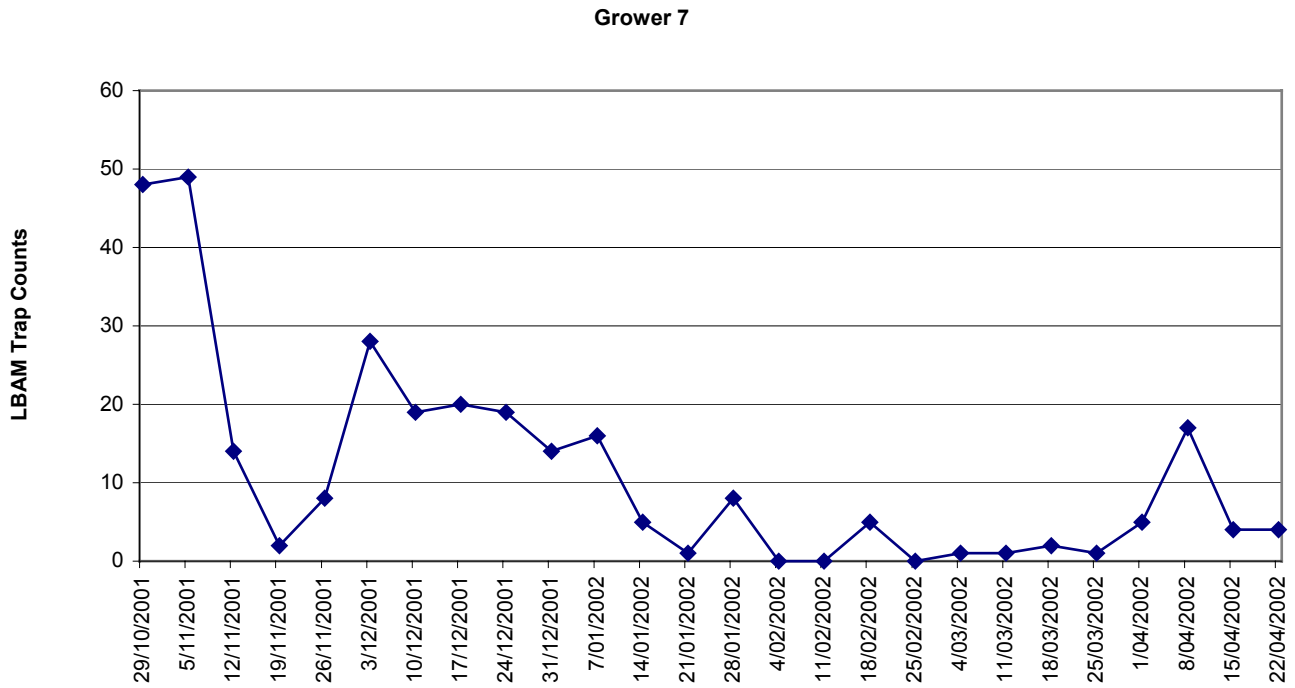
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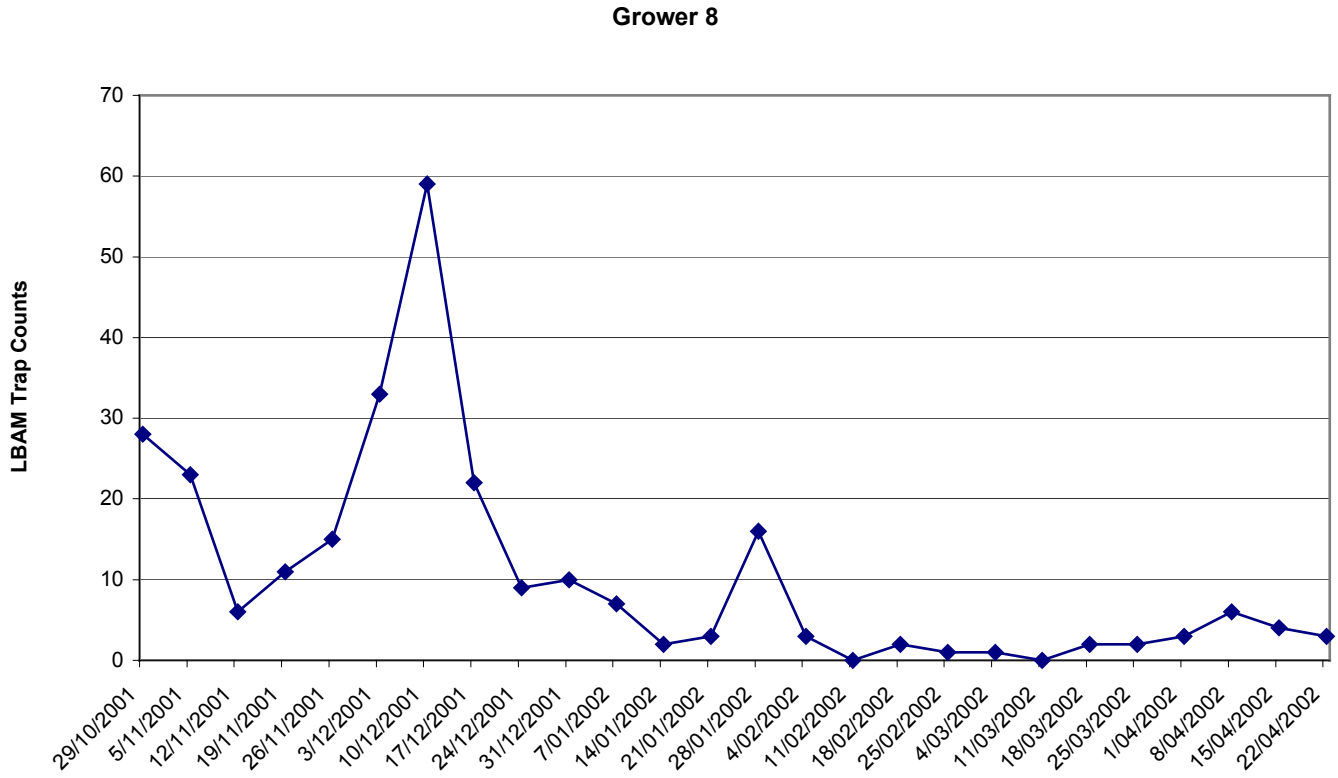
Appendix 3.6.



Appendix 3.7.



Appendix 3.8.



Note, only eight graphs out of ten could be drawn due to the lack of information from some vineyard managers.

Budget Reconciliation

Budget	Funding Required From GWRDC		Actual Expenditure
10 LBAM Delta Traps			$440.00
Sprays – Mimic ($70/Ha by 11Ha)			$770.00
- *B.t.* ($20/Ha by 31Ha)			$620.00
Trichogramma release (1)			$120.00
Monitoring by PDMS for 10 vineyards 18 visits/grower at $75/visit	$13,500.00		$13500.00
Organisation by PDMS = 4 days			
Report writing by PDMS = 3 Days			
Mail out to Eden Valley growers by Eden Valley Grape growers Association			$45.00
Total	$13,500.00		
Plus 10% GST	$ 1,350.00		
Total Funds Requested from GWRDC	$14,850.00	**Total Expended**	$15,495.00

Note, Costs for sprays applied is for the product only and doesn't include tractor expenses or labour.