vegenotes 46

2015

IN THIS ISSUE:

• Managing biting (stable) fly in vegetable crop residues.

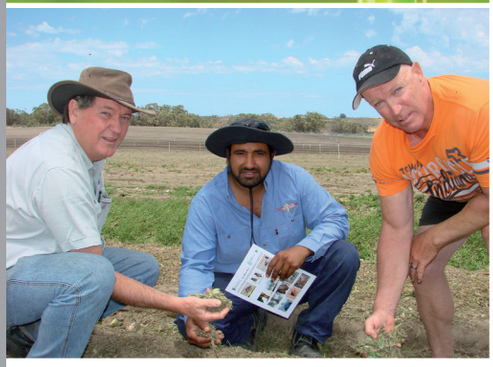
HIA R&D project number: VG12022

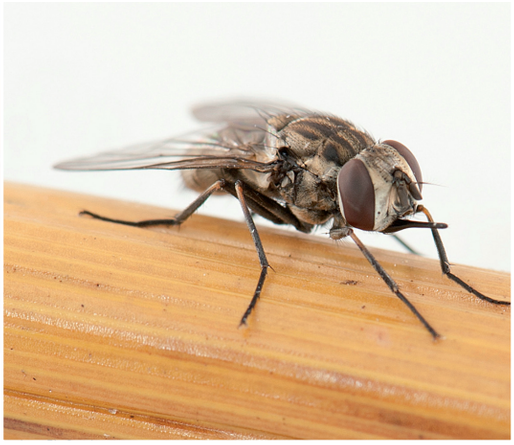
Project VG12022 is aiming to reduce the development of stable flies in vegetable crop residues by non-chemical means.

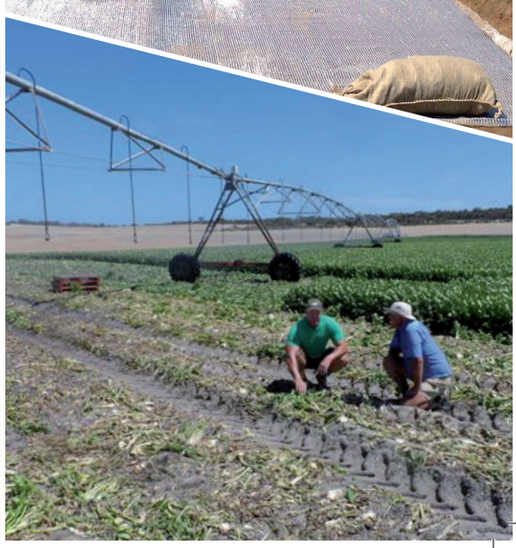
• An investigation of low cost protected cropping.

HIA R&D project number: VG13075

Project VG13075 is investigating the suitability of protected cropping elements as low-cost options for field vegetable production in a selection of regions.







Managing biting (stable) fly in vegetable crop residues.

Facilitators:

Project VG12022 is being conducted by Project Leader Dr Ian McPharlin, from the Department of Agriculture and Food, Western Australia, and Dr David Cook, from the University of Western Australia.

Introduction

Rotating crop residues of vegetables such as cauliflowers, broccoli, celery, cabbage and lettuce has been continually shown to produce extremely high numbers of biting flies if not properly managed. Livestock producers and vegetable growers across many shires around Perth, Western Australia continue to bear the impact of this pest.

About the project

In 2013/14, Dr Ian McPharlin, from the Department of Agriculture and Food, Western Australia, and Dr David Cook, from the University of Western Australia, undertook fieldwork examining the impact of various treatments on stable fly breeding on the properties of Bogdanich Farms, MG Monte & Sons and T&C Do and Son in the Gingin Shire north of Perth.

A randomised block design was used in the experiments in both open field plots, where 60-litre black tote boxes were used to test treatment effects on residues of broccoli, cabbage, celery and cauliflower crops.

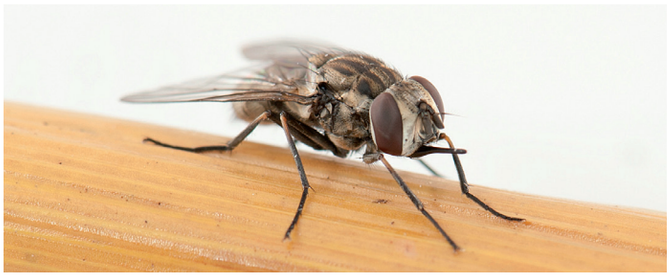
The investigation found that a selection of biological products proved very effective at controlling breeding in vegetable crop residues in the field.

"Our initial results showed encouraging signs that stable fly breeding in rotting vegetable residues could be reduced by breaking the crop residue up with high-speed mulching and turning the water off after harvest," Dr McPharlin said.

Main findings

Dr McPharlin said the biological options for stable fly showed promise and appeared to verify the need to mulch and dry the crop residues as quickly as possible after harvest.

"The most effective product cut breeding by 90 per cent," he explained.



Stable Fly.

"These products fall under two broad categories; products that enhance beneficial microbes in the soil such as the 'dikarya' (higher or advanced) fungi, and biological products that contain the dikarya fungi in a formulation that can be applied directly after harvest to the crop residues in the field."

"One of these products is Mycoforce™ - a formulation that contains three dikarya fungi reported to be pathogenic to stable fly eggs or adults."

Dr McPharlin said that of these biological products, the best result was with the bio-accelerant Digester™, applied to cabbage just after planting at 12L/ha, which showed a decrease in stable fly emergence of 80 per cent in the harvested residue.

"This was followed by Mycoforce™ (60 per cent) at 4kg/ha and Bioprime™ at 120L/ha applied to the growing crop (20 per cent)."

By comparison, lime or lime sand at 2.5t/ha applied to the residue was found to reduce stable fly emergence by 50 per cent on average, with Perkla™ (66 per cent calcium cyanamide) at 500kg/ha and zero watering having the greatest impacts at 90 per cent reduction.

"These biological products may offer cheaper options than using high value fertilisers with insecticidal properties such as Perlka™," Dr McPharlin said.

"However, it should be noted that while properly composted chicken manure products should not breed stable fly, partially or poorly composted chicken manure applied to soils may breed more stable flies than untreated crop residues."

Conclusion

"Given these promising results, the HIA Stable Fly project has been extended for another season for more comprehensive testing of the biological products," Dr McPharlin said.

"One option we plan to investigate is the relative effectiveness of the three individual fungi that make up Mycoforce™."

"We are also discussing the acquisition of a stable fly specific strain of Metarhizium anisopliae with fellow researchers on stable fly in Britain."

Dr McPharlin said the research team was able to identify a number of effective treatment options against stable breeding applied individually.

"The next steps will be to test combinations of these treatments to determine the best co-ordinated approach to stable fly control," he said.

"This will involve working with commercial irrigation companies and growers over the next season to examine ways of modifying existing irrigation systems, especially centre pivots, to minimise over-watering or harvested crop residues."

Dr McPharlin said hand-harvested crops under centre pivots were particularly vulnerable to stable fly breeding, as large areas

of harvested residues continue to be watered as a consequence of the need to irrigate the unharvested crop.

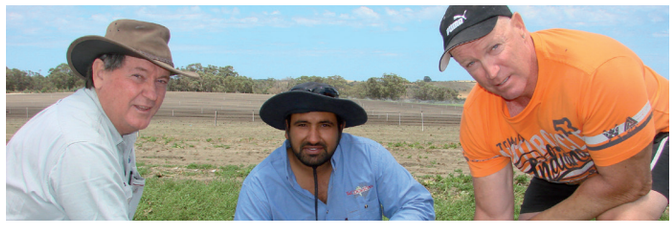
Project VG12022 is expected to be finalised in July 2015.

THE BOTTOM LINE: VG12022

- Current best-management practice of vegetable crop residue includes high-speed mulching of residues within three days of harvest completion; application of a pesticide to prevent fly breeding; drying of the residue for seven days; and incorporation into the soil after seven days of drying.
- Using a pesticide on crop residue is not sustainable as it costs the grower, the environment and the consumer with no agronomic benefit.

Acknowledgements

This project has been funded by HIA using levy funds from the Australian vegetable industry and funds from the Australian Government. Eight councils of the Swan Coastal Plain from Gingin to Capel, the APC-Vegetable Producers Committee and Vegetables WA provide the voluntary contributions.



Drs Ian McPharlin(lhs) and David Cook(rhs) discussing stable fly management in vegetable crops with Ali Al Boraich, Farm Manager, T&C Do & Son, Woodridge, WA.

An investigation of low cost protected cropping.

Facilitators:

Project VG13075 is being conducted by Dr Gordon Rogers, from Applied Horticultural Research Pty Ltd NSW.

Introduction

Prolonged heat waves and other extreme climatic events can significantly impact the quality of vegetable crops, in turn reducing grower profits and hampering supply continuity.

Dr Gordon Rogers, from Applied Horticultural Research Pty Ltd NSW, said extreme weather events such as heatwaves were occurring more frequently, posing a threat to Australian vegetable growers and to the industry more broadly.

"Retail markets don't really care about the weather," he said. "They want a regular supply of fresh produce at a consistent quantity all year round."

"It is left to growers to manage weather viability and, somehow, deliver quality produce irrespective of conditions."

"However, a variable climate is something Australian vegetable growers have always had to deal with – it is their 'stock and trade', and they do it well."

"There are a range of tools available to help growers deal with variability and manage risk, and one of these is low cost protected cropping (LCPC)," Dr Rogers said.

"These structures can fill the gaps between open field production and controlled environment systems to manage key production risks, allowing regions and businesses to adapt to extreme weather events."

About the project

Research conducted by Dr Rogers and Jeremy Badgery-Parker is evaluating the potential of LCPC for adoption by Australian vegetable growers.

Activities completed to date include a desktop study published in 2014 and field trials testing the most promising methods in light of technical and economic feasibility.

Phase two of the project, currently underway, concentrates on strategies for adoption.

Dr Rogers said the results of the review, on-farm assessments and cost-benefit analysis and recommendations would be communicated to growers and industry professions through field days, a website, articles, fact sheets/information packs and personalised consulting.

"The aim is to increase grower knowledge, understanding and appreciation of the benefits and costs of LCPC options as an adoption strategy against extreme weather events," he said.

Project VG13075 is planning to run field days at five demonstration farms managed by Dr Rogers and his research team.

The demonstration sites are located at Stanthorpe, Queensland; Mareeba, North Queensland; Bairnsdale, Victoria; Sydney, New South Wales and Robinvale, Victoria.

In conjunction with the monitoring of growing conditions, crop data will be collected from within the protected trial areas and corresponding unprotected areas.

Yield and time to harvest will be measured for crops with and without protection, and the incidence and impact of pests and diseases and physical damage with and without crop protection

will be quantified by periodic monitoring over the crop cycle.

An assessment of produce quality will also be undertaken.

Major findings

"The project review found that there are a number of viable protected cropping options for the Australian vegetable industry which should be further evaluated under field conditions," Dr Rogers said.

The three most promising forms of LCPC with the greatest potential to manage risk and improve financial returns within a five-year period are shade canopies, floating crop covers and windbreaks.

Conclusion

"In all regions, current and projected near future summer daytime temperatures, especially the one in five year extremes, exceed upper thresholds for most vegetable crops from autumn through to spring," Dr Rogers said.

"Expected impacts on yield from high temperatures could be between 20 per cent and 50 per cent."

Dr Rogers said shade canopies were a significant LCPC option for large-scale vegetable production in many Australian regions.

"In most locations and crop situations, a shade canopy would be more suitable than an enclosed structure which would omit the potential additional benefits of wind protection and pest exclusion," he said.

Floating covers were also suggested as likely to be a suitable LCPC option for crop establishment and transition season in most locations and for most crops.

"Although build-up of heat under the covers will limit the period that they can be used in most regions before they cause a negative impact, row covers also help to exclude insects from the crops, which is an added benefit," Dr Rogers said.

Hydroponic Lettuce, Tolga SE Qld.

"Floating covers can also be unsuitable for windy conditions, but a windbreak could be used to manage this limitation."

"Windbreaks could provide local benefits to all regions where they are not already being used, and a complementary and protective aspect for other LCPC options."

THE BOTTOM LINE: VG13075

- Climate-related risks have always been a part of agriculture in Australia, and both management and marketing practices have been developed and implemented to deal with these challenges.
- Growing vegetable crops in a protected environment offers a level of insurance against adverse impacts of extreme weather events such as higher average temperatures, heatwaves and greater risk of frost.
- These structures can also potentially enhance crop quality, improve pest management and contamination control, and extend the growing season.

Acknowledgements

This project has been funded by HIA using the National Vegetable Levy and funds from the Australian Government.

Photo credits:
VG12022 photos credit: Some photos provided by Dr Ian McPharlin, some stock images.
VG13075 photos credit: Applied Horticultural Research.

Please contact Shaun Lindhe at AUSVEG on 03 9882 0277 or email shaun.lindhe@ausveg.com.au to submit topics for potential inclusion in future editions of **vege**notes.

ISSN: 1449 - 1397

vegenotes is produced by AUSVEG Ltd
PO Box 138, Camberwell, Vic, 3124
T: 03 9882 0277 | F: 03 9882 6722
This project has been funded by HIA using the National Vegetable Levy and funds from the Australian Government.

AUSVEG

Horticulture Innovation Australia