COGGO Council of Grain Grower Organisations Limited ACN 091 122 039	**Final Report** **COGGO Research Fund for 2018 projects** **A project completion report covering the project. The acceptance of a satisfactory report against the objectives of the project, and agreement on the sharing of any commercial returns and/or IP will trigger payment within 4 weeks, by COGGO for any outstanding payments.**

This Final Report should be completed with reference to the Research and Intellectual Property Agreement (the Research Agreement) signed between the proponent and COGGO Pty Ltd.

1. Project information

Project title	Downfall of the aphids through a naturally occurring fungus
Commencement Date	7th March 2018
Completion Date	31st December 2018

Name of Proponent	CSIRO
ACN/Legal Name or ABN	41 687 119 230
Mailing Address	CSIRO Agriculture and Food 147 Underwood Ave Floreat, WA, 6014

Administrative Contact	Suzanne Blankley
Position	Project Support Advisor
Telephone	+61 8 8303 8709
Fax	
Email	Suzanne.Blankley@csiro.au

Project Supervisor/Principal Researcher	Silke Jacques and Louise Thatcher
Position	CSIRO Post-doctoral fellow / Research Scientist
Telephone	08 9333 6358
Fax	
Email	Louise.Thatcher@csiro.au / Jacques.silke@gmail.com

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Project Number	
Date Received	

2. Project results	This section provides a final report against the Project Aim and the Planned Outputs for the Project.

Achievement of the Project Aim	Brief statement of achievement in relation to the aim of the project

Aim: The project will be a collaboration between CSIRO and Planfarm (represented by Richard Quinlan) to assess potential enhancement of natural populations of entomopathogenic fungi for control of aphids and prolong the use of last remaining effective insecticide chemistries. The project aims to determine the identity, prevalence, distribution and conditions necessary to manipulate and enhance the efficacy of entomopathogenic fungi within the WA cropping system. Knowledge gained can be implemented by growers to magnify the natural prevalence and activity of entomopathogenic fungi for sustainable aphid control.

The project was a successful collaboration between CSIRO and Planfarm to gain knowledge and capability on the enhancement of natural populations of entomopathogenic fungi for aphid control. Green peach aphid (GPA) (*Myzus persicae*) causes yield and financial losses in canola both from direct damage by feeding, in insecticide resistance management, and as major vectors for plant viruses such as Turnip yellows virus (TuYV)/Beet Western Yellows Virus. A lack of canola host resistance and rapid evolution of GPA insecticide resistance necessitates alternate and viable aphid control solutions for WA growers. In Australia GPA populations are resistant to synthetic pyrethroids, organophosphates and carbamates. Further, metabolic resistance to the Group 4 (nicotinic acetylcholine receptor agonists) neonicotinoids has recently been identified (de Little et al. 2017). The only effective post-sowing chemical control option is sulfoxaflor (sulfoximine), another Group 4 mode of action insecticide. Current knowledge on GPA resistance mechanisms would suggest resistance to this last class of chemistry will occur rapidly in the absence of other control options.

This project is the first scientific study to determine the identity, prevalence and distribution of entomopathogenic fungi towards aphids in WA broad acre cropping. It included the development of laboratory fungal isolation and DNA fingerprinting methods to identify and classify entomopathogenic fungi. Through detailed sampling, fungal isolation and molecular studies, candidate entomopathogenic fungi were identified across northern, mid and southern canola growing regions. The process involved communication with agronomists and growers, and sending out aphid sampling kits as well as in field sample collection by the project team. Fungi were isolated from 60% of aphid samples, and 50% of these were positive for known or suggested entomopathogens. In general, aphid numbers were very low in the 2018 growing season, impacting the number of aphid samples collected. A dry start to the season also impacted on conditions favoring entomopathogenic fungi. Nonetheless, entomopathogenic fungi were isolated, particularly in samples obtained from mid and southern growing regions. A large number of aphid samples were also positive for parasitic wasps and supports anecdotal evidence that conditions unfavorable for entomopathogenic fungi tend to favour these beneficial insects.

A representative entomopathogenic fungus of the *Fusarium* genus was selected to determine conditions that enhance entomopathogenic fungal activity. Methods were developed within controlled environments and tested for fungal spore delivery on seed, seedlings and flowering canola plants, or onto detached leaves. Spore sprays were most effective with a clear deterrent effect (antixenosis) observed on GPA, but no aphid colonization could be induced despite a range of environmental parameters tested. Similar effects were recorded against bluegreen and spotted alfalfa aphids.

Discussions with the GRDC (western region), an international agrichemical company and a world-renowned insect pathologist and ecologist were initiated to further explore delivery and commercialization options of the research outputs.

Project Outputs		Please provide a report on the achievement, or otherwise, of the project outputs as per the planned outputs provided in the Project Proposal.
1	-	**Field survey conducted on multiple sites to sample naturally occurring entomopathogenic fungi and chart their distribution and prevalence.**

		This output and associated milestone completed. In-field assessments and field survey were conducted together with Planfarm collaborators to chart the prevalence of entomopathogenic fungi (milestone 1). Sampling protocols and aphid sampling kits were distributed to canola growers spanning four of the five GRDC port zones. A map of the aphid sampling sites can be accessed via the following link https://drive.google.com/open?id=1x4A5Va3oUsot-6vvP7ZYv-74iVyPCVbT&usp=sharing. In general, GPA numbers were very low in the 2018 growing season, impacting the number of aphid samples collected. A dry start of the season also impacted on entomophthorales numbers. A total of 20 samples were obtained from 14 sites, with the majority of them also including aphids carrying eggs deposited from a parasitic wasp. Candidate entomopathogenic fungi were isolated from 30% of sites sampled and this correlated with the absence of insecticide and fungicide spraying in paddock management. These fungi were restricted to Ascomycota of the *Fusarium* and *Alternaria* genera.
2	-	**The sampled isolates identified and their aphid host range tested.**
		This output and associated milestones completed. Due to delayed seasonal development of entomopathogenic fungi, mummified aphid samples obtained from Planfarm late in the 2017 growing season were used towards completion of this milestone. A combination of five methods for fungal isolation, growth, maintenance and species identification (molecular markers and DNA sequencing) were assessed and further optimized allowing for a standardized method for isolate identification (milestone 2). Laboratory bioassays using a representative entomopathogenic isolate of the *Fusarium* genus were performed on detached canola leaves and showed antixenosis and reduced aphid performance towards GPA, bluegreen aphid and spotted alfalfa aphid (milestone 3).
3	-	**Controlled environment bioassays to identify conditions that promote increased prevalence and activity of natural entomopathogenic fungi, resulting in a reduction of aphid populations and aphid-induced damage.**
		This output and associated milestone completed. Three delivery methods (seed coating, soil drench or spraying) using the representative *Fusarium* entomophthorales isolate were conducted over five rounds of controlled environment assays on canola, both on seedlings and flowering plants, using GPA (milestone 4). Clear deterrent effects (antixenosis) and reduced aphid performance (reduced aphid weight) was observed but no fungal colonization of aphids could be induced despite a range of temperature and humidity conditions tested. Our results indicate spore sprays are the most promising delivery method, enabling targeted delivery of the entomophthorales fungi at the point of aphid infestation. However, we also conclude from our results that improved delivery methods incorporating spore formulations such as emulsifiers or spore encapsulation technology may be necessary for aphid colonization.

Project results	Please provide brief statements on the results of the Project

This section should cover aspects identified in *Section 7.3* of the Research Agreement

- the results of the Project, including discoveries made and other achievements (including any Project IP and Project Confidential Information);
- the potential application of the outputs of the Project to the Western Australian grains industry and broader community;
- the actual or potential economic benefits flowing to the Western Australian grains industry and broader community from the Project;

- the difficulties encountered;
- the conclusions reached;
- the Researcher's recommendations for any further research;
- a list of scientific papers or publications resulting from the Project; and
- attach copies of any photos, diagrams or other artworks (including, if requested by COGGO, negatives, bromides or the like) which the Researcher has and which may be of assistance to COGGO in the dissemination of information concerning the Project to COGGO's stakeholders.

Aphids are the most economically important sap-sucking insect pests worldwide, with over 4,000 species that cause yield and financial losses both from direct damage by feeding, as major vectors for disease (transmitting over 50% of all plant viruses), and in insecticide resistance management. High levels of GPA resistance across multiple insecticide types are widespread across Australia (Umina et al., 2015). This includes resistance to synthetic pyrethroids, organophosphates and carbamates. The last remaining effective chemistries are the Group 4 Nicotinic acetylcholine receptor competitive modulators, where metabolic resistance to neonicotinoids has recently been identified (de Little et al. 2017). In 2018 many member states of the European Union voted in favour of an almost complete ban on the use of neonicotinoid insecticides across the EU due to studies associating their use with the decline of bees and other pollinators (BBC news). Similar restrictions have been proposed in Australia by some industries. Currently the APVMA has proposed no ban. The downstream effects of ineffective aphid control are viral epidemics such as the 2018 Turnip yellows virus (TuYV) epidemic spread by GPA across pre-flowering canola crops of southern WA. It is predicted these viral epidemics may become more frequent due to earlier canola sowing times, high susceptibility of current commercial varieties, and variable efficacy of neonicotinoid seed dressing (Congdon et al. 2019).

Although there is anecdotal evidence from several agronomists and growers of a naturally occurring entomopathogenic fungus in the field that mummifies and as such kills aphids, it had not yet been scientifically evaluated in WA. Its presence has been identified by growers and agronomists as a vital tool for keeping aphid populations under control, reducing crop damage and reducing chemical insecticide costs. This scoping study supported by COGGO funding was successful on a number of fronts to evaluate entomopathogenic fungi in WA broad acre cropping:

1. **Developed and evaluated laboratory fungal isolation and culturing protocols.** This included laboratory growth and maintenance systems. A combination of five fungal isolation and three fungal growth and maintenance methods were evaluated for throughput and sensitivity (**Table 1, Figure 1**).
2. **Developed a pipeline for fungal isolation and species identification.** Four molecular markers (two reported in the literature and two designed in-house) were selected based on sensitivity and specificity. These markers allowed for genetic fingerprinting following amplicon sequencing (**Figure 1**).
3. **Completed a 2018 field survey charting the distribution and prevalence of entomopathogenic fungi spanning four of the five WA GRDC port zones**. This involved distributing sampling protocols and assembled sampling kits to canola growers as well as the project team performing in-field assessments. A total of 20 samples were obtained from 14 sites (**Figure 2**). Fungi were isolated from 60% of aphid samples and 50% of these were positive for known or suggested entomopathogenic fungi (**Table 2**). The isolation and molecular validation of entomopathogenic fungi correlated with the presence of mummified aphids and the absence of insecticide and fungicide spraying in paddock management. Paddock fungicide treatment in the Northern growing region was associated with an inability to culture any fungi from aphid samples. The prevalence of mummified aphids was highest in samples obtained from mid and southern canola growing regions and paddocks that received neither insecticide or fungicide sprays, suggesting geographic location and chemical pest and disease management play a role in conditions favouring activity of entomopathogenic fungi. While isolation methods facilitated fungal outgrowth from aphids, the method is non-selective towards identification of entomophthorales. As a result, non-

entomophthorales fungi such as aphid symbionts and fungi associated with exoskeletons were also detected (e.g. *Penicillium, Sporobolomyces*).

4. **Identified new entomopathogenic fungal candidates from GPA in WA.** Candidate entomopathogenic fungi of two genera, *Fusarium* and *Alternaria,* were prevalent in the 2018 survey and samples assessed in 2017. These were *Alternaria alternata*, *Fusarium thapsinum, F. verticillioides* and *F. incarnatum-equiseti.* Definitive species identification within both of these genera is difficult as some species are very closely related and are hard to distinguish even with molecular markers and DNA amplicon sequencing. *Alternaria alternata* has been reported as a potential biocontrol agent of aphids (Christias et al. 2001). However, *Alternaria alternata* is a plant pathogen and one of three *Alternaria* species responsible for black spot of canola therefore its application as a biocontrol may be limited. Isolates of the *Fusarium* genus; *F. verticillioides*, *F. nygamae* and *F. thapsinum* are very closely related species. *Fusarium verticillioides* has been cited for its potential to control grasshoppers and woolly aphid in sugarcane (Mehetre et al., 2008, Pelizza et al., 2011), but it is a known plant pathogen and can produce mycotoxins. *Fusarium incarnatum-equiseti* is a reported entomopathogen of the brown soft scale insect *Coccus hesperidum* (Fan et al., 2014). Interesting the 2017 sampling and this 2018 survey did not identify *Zoophthora radicans* as predicted. This may reflect the seasonal conditions that were not conducive to *Z. radicans* activity.
5. **Completed laboratory dose response bio-assays and tested aphid host range.** A representative entomopathogenic fungi of the *Fusarium* genus (*F. thapsinum*) was selected to determine conditions that enhance entomopathogenic fungal activity. Clear deterrent effects (antixenotic) and reduced aphid performance (reduced weight) on detached leaf assays was recorded for three aphid species; GPA, bluegreen aphid (*Acyrthosiphon kondoi*) and spotted alfalfa aphid (*Therioaphis trifolii*). An antixenotic effect was observed within one day of fungal spore treatment (**Figure 3**). After five days, up to 96% of aphids produced wings when treated with spores whilst only 24% were winged in the mock treated aphids. Five biological repeats confirmed the clear deterrent effect.
6. **Evaluated controlled environment bioassays to identify conditions that promote increased prevalence and activity of natural entomopathogenic fungi.** Three methods (seed coating, soil drench, foliar spray) were developed within controlled environments and tested for fungal spore delivery on seed, seedlings and flowering canola plants. Spore sprays enabled targeted delivery of the entomophthorales fungi at the point of aphid infestation and was the most effective of the methods tested. A clear deterrent effect (antixenosis) was observed on GPA, but no aphid colonization could be induced despite a range of environmental parameters tested including temperature (4, 15, 25 and 37°C) and relative humidity (35%, 50%, 75%, 80%).
7. **Connected with world leading experts.** Connections were initiated with world leaders in bio-protection against insect pathogens and agrichemical commercialization to trouble-shoot delivery methodology and explore further investment and commercialization options of the research outputs.

Table 1: Summary of isolation methodologies for fungal field samples and growth media tested.

Fungal isolation methods		Fungal growth media
External aphid sterilization	**Fungal extraction method**	
UV	Crush and spread	Luria broth agar
Ethanol	Crush and emulsify, dilution series	Potato dextrose agar
none	Moisture treatment, single isolate selection	Complex Sabouraud dextrose agar + yeast extract dextrose agar + egg yolk and milk

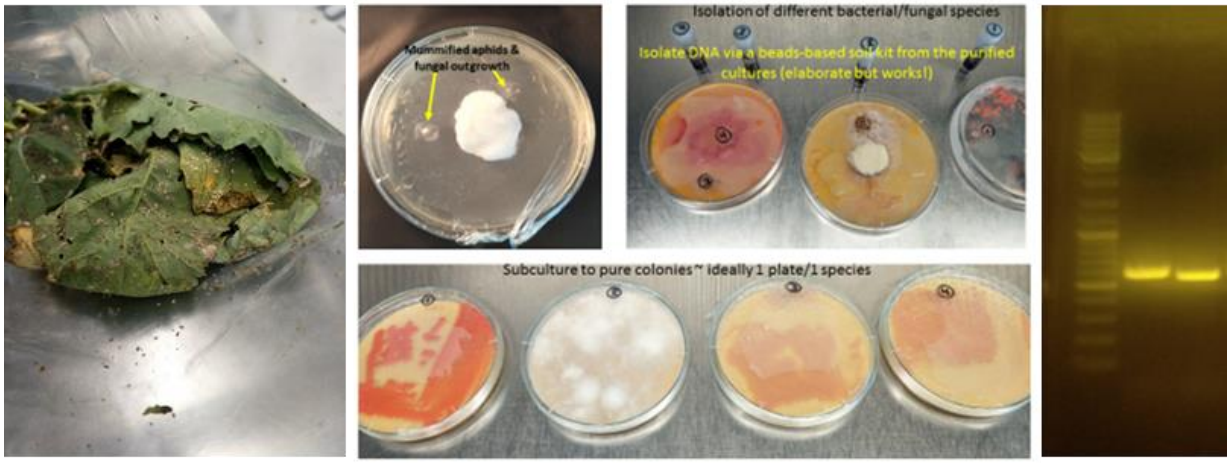

Figure 1. Established pipeline for fungal isolation and species identification from mummified aphids. From left to right: samples received, mycelial outgrowth, culturing for single species, DNA extraction, and species identification by generating a genetic fingerprint based on molecular markers followed by DNA sequencing.

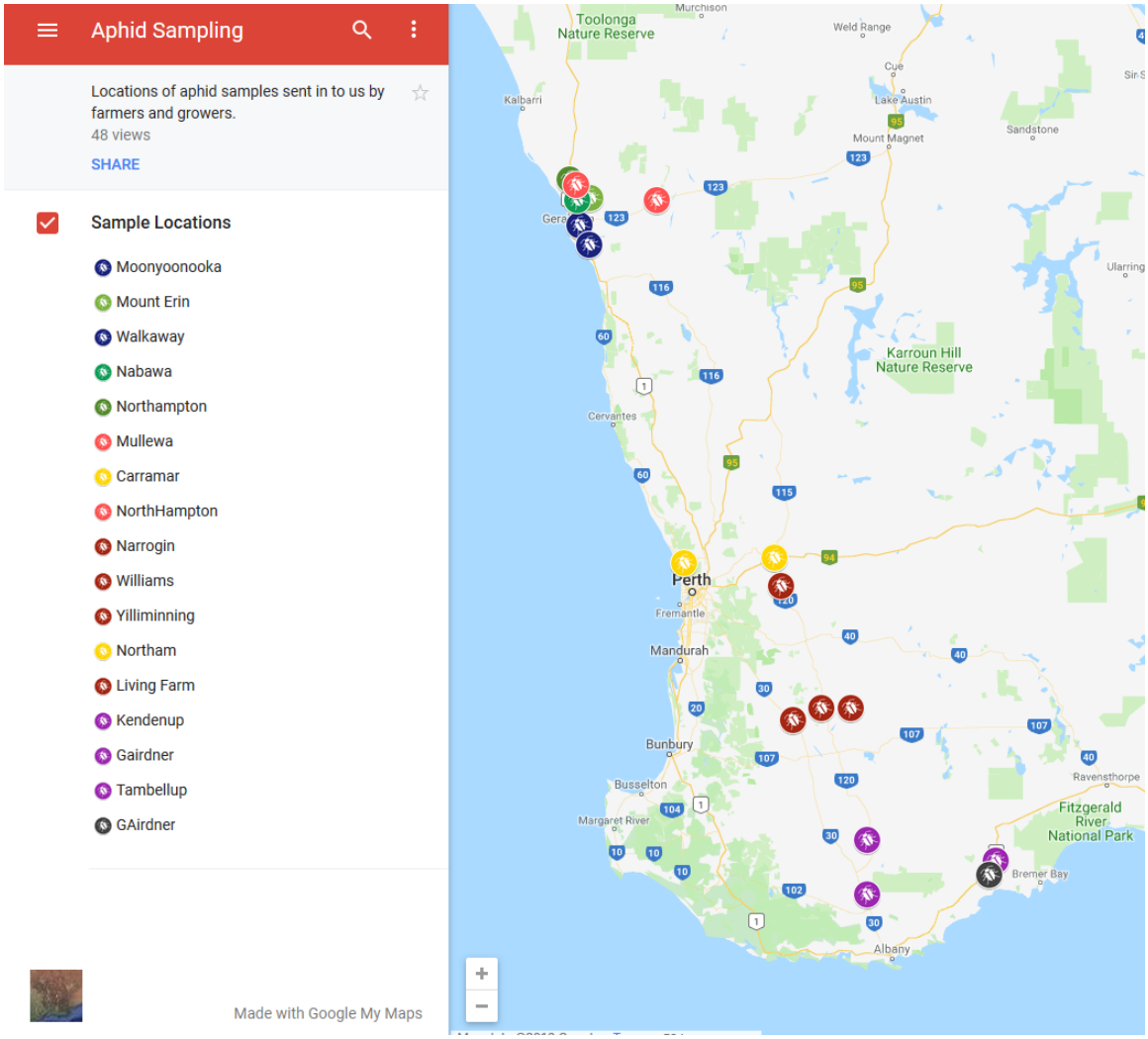

Figure 2. Geographical locations of sampled sites. Samples of mummified aphids were collected by growers or agronomists and sent to the CSIRO Floreat laboratory for isolation and identification of entomopathogenic fungi. Same colour depicts samples that were sampled at similar times.

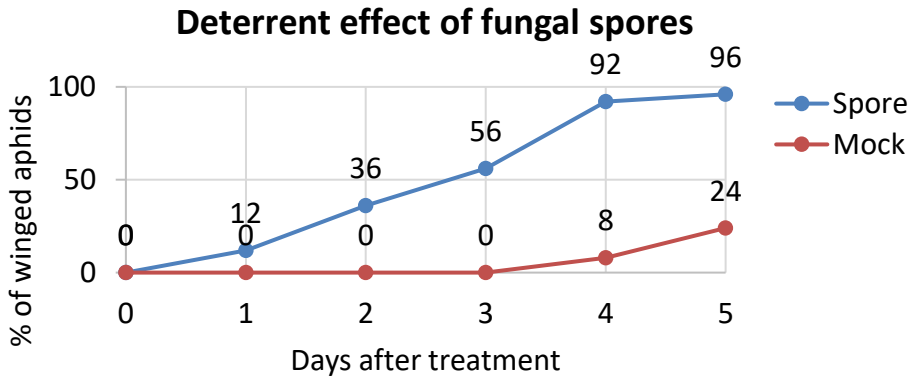

Figure 3. Foliar spore spray assessment. Detached leaf bio-assays performed within controlled environments (5 GPAs applied per leaf). Leaves were sprayed either with a *Fusarium* spore or water (control) solution. Deterrent effects were recorded as a measure of aphids producing wings.

Table 2: Summary of aphid sampling survey and molecular analysis of isolated fungi.

Sample no.	Sampling date	Location#	Aphid numbers	Mummified aphids	Insecticide sprayed	Fungicide sprayed	Culturable fungi isolated	Fungal ID (known biocontrol in bold font)
2017	8-Oct@	Geraldton	high	high	no	no	yes	***Fusarium verticillioides/nygamae/ thapsinum,*** *Sporobolomyces ruberrimus*
S1	19-Sep	Moonyoonooka	very low	very low	no	yes	no	-
S2	19-Sep	Walkaway	very low	very low	no	yes	no	-
A1	27-Sep	Mount Erin	low	low	no	yes	no	-
A2	28-Sep	Nabawa	low	high	no	no	yes	*Penicillium bilaiae*, ***Alternaria ethzedia/alternata***
A3	28-Sep	Northampton	low	low	yes	yes	no	-
B1	2-Oct	Mullewa North	low	low	yes	no	no	-
B2	3-Oct	Carramah	low	low	yes	no	yes	***Alternaria alternata***
B3	4-Oct	Northampton	med	low	yes	yes	no	-
C1	8-Oct	Narrogin	low	low	no	yes	no	-
C2	8-Oct	Narrogin	low	low	no	yes	yes	*
C3	10-Oct	Williams	low	low	no	yes	yes	***Alternaria ethzedia/alternata***
C4	11-Oct	Popanyinning	low	low	no	no	yes	*
C5	8-Oct	Northam	low	low	no	no	yes	***Alternaria alternata***
D1	10-Oct	Northam	low	med	no	no	yes	*Penicillium brefeldianum*
E1	16-Oct	Kendenup	low	low	no	no	yes	*
E2	17-Oct	Gairdner	low	low	no	no	no	-
E3	17-Oct	Kamballup	low	med	no	no	yes	***Alternaria ethzedia***
F1	15-Oct	Gairdner	low	med	no	no	yes	*Fusarium chlamydosporum*
F2	15-Oct	Gairdner	low	med	no	no	yes	*Fusarium tricinctum/acuminatum,* ***Fusarium equiseti,*** *Penicillium*
F3	15-Oct	Gairdner	low	med	no	no	yes	*Penicilium alexiae*

Notes:

@ Sample collected in 2017

Geographic location of sample collection — North, Mid, South

* Sequencing fail

This scoping study lays the foundation for future research into the benefits and deployment of entomopathogenic fungi in the WA cropping system and should be used as a stepping stone to attract future investment. There is huge untapped potential to enhance the activity of these natural killers in the field by increasing their prevalence and activity. Importantly, this aids to prolong the efficacy of the last remaining insecticide chemistry for GPA control in WA.

Future research should focus on formulation development and include field trials. Collaborations between institutes who have experience with biocontrol options would be highly recommended. Discussions with a leading agrochemical company (BASF, Functional Crop Care portfolio managers) and a world expert in insect pathology (Professor Travis Glare, Director of the Bio-Protection Research Centre New Zealand, Professor of Applied Entomology Lincoln University) were initiated. From these discussions it was suggested the 'micro-environment' around spores may explain the absence of successful aphid colonization in our controlled environment bio-assays despite a wide range of delivery methods and environmental parameters tested. BASF expressed a keenness to explore future collaborations with CSIRO, with support through investment from the GRDC, to formulate and test the WA entomopathogenic isolates obtained within this COGGO project. These formulated prototypes could be tested alongside a soon to been released BASF entomopathogenic fungal spore concentrate (Broadband®, *Beauveria bassiana*). Broadband will only have APVMA registration for use within protected horticulture. The product has not been tested for broad acre use within Australia, nor an assessment of how well-adapted this microbe is to Australian environments or the geographical distribution of native *Beauveria bassiana* strains, therefore a comparison against the entomopathogenic fungi isolated within this project is warranted.

Targeted areas of future research are:

- Further survey the aphid population in WA and isolate the entomopathogenic fungi that influence GPA population in canola crops over different growing seasons to model the environmental drivers.
- Formulate Australian entomopathogenic fungi into emulsified spore solutions.
    - Evaluate formulations against a commercial biopesticide (e.g. Broadband®) under controlled environments for infection of GPA.
- Evaluate a defined set of entomophthorales formulations in the field and determine what field conditions are conducive to their spread and infection of GPA.
- Evaluate commercial potential of entomophthorales formulations.

Taken together, there is potential for local fungal isolates to be formulated into emulsified spore solutions that can be used as a direct applicant to help the WA Grain Industry to control highly resistant GPA populations. We estimate adaptation of entomopathogenic fungi within the cropping system would at least half the chemical insecticide applications, reduce yield losses due to aphid or transmitted viral damage, and extend the life of the last remaining insecticide chemistry.

3. Project resources	This section describes use of the funding listed in the initial plan and any refunds due to COGGO

Expenditure of funds requested from COGGO	$ Total funds budgeted	$ Total funds expended (actual)	$ Total funds requested from COGGO*	$ Total COGGO funds expended	$ Refund due to COGGO of any unexpended COGGO funds
Salary/Contractors		26,228	25,044	25,044	0
Operating costs	0	24,260	24,000	24,000	0
Capital	-	-	-	-	-
TOTAL		**50,488**	**49,044**	**49,044**	**0**

*Funding provided by COGGO.

IMPORTANT: Return of unused funds to COGGO is required as per *Clause 3.3* of the Research Agreement.

4. Commercialisation	Insert details of the proposed commercialisation process,as applicable, with reference back to the planned commercialisation plan in the project proposal) for any outputs from the project. This should include recommendations for the commercialisation of the results of the project and the registration or other protection of Project IP and Project Confidential Information as per the Research Agreement.

This project has shown potential for newly discovered entomopathogenic strains adapted to the WA cropping system to be used as foliar spore sprays. Investment to continue this research and specifically for in-depth formulation strategies will be essential. Potential investors might include the GRDC and BASF and new collaborations with specialists in the field e.g. Travis Glare, the Director of the Bio-Protection Research Centre in New-Zealand, would be beneficial.

It is understood that this may require further discussion and agreement with COGGO via its' agent GIWA, as per the undertakings given and terms agreed, in the project proposal. This can be the subject of an appended letter and attachments. In all cases such discussion and subsequent agreements need to be governed by *Section 8 Project IP, Improvements and Project Confidential information* of the Research Agreement.

5. Communication/ Extension	Insert details of how the communication and extension of the project outcomes has been achieved to date and recommendations for future activities to disseminate and promote adoption of the results of the Project.

The project was communicated in several ways; to growers across the Planfarm and Synergy Consulting newtorks, and through social media and CSIRO online presence. A scientific paper detailing the study and our findings is in preparation for submission to a national journal.

https://twitter.com/Richard1quinlan/status/1032605152111341568

https://twitter.com/cropgenomicswa/status/1034661795045171200

https://twitter.com/thatcherlouise/status/988748723562823680

https://research.csiro.au/crop-disease/on-the-hunt-for-aphid-killers/

Note: As per *Clause 7.3 (b) (ii)* of the Research Agreement COGGO may require the Researcher to produce an edition of the Final Report in a form suitable for general distribution. If so required by COGGO, the Researcher must produce a non-confidential version of the Final Report within 28 days of receiving a request to that effect from COGGO.

6. Certification

The Project Supervisor and the Research Organisation certify that all information contained in, and forming part of, this final project report is complete and accurate. The project supervisor and research organisation further warrant that the project complied with all the relevant guidelines affecting the conduct of research, for example in relation to ethics, bio-safety, environmental legislation, GMAC or National Health and Medical Research Council Codes.

Project Supervisor's signature 

Name (in Capitals) LOUISE THATCHER

Date: 19 March 2019

Research Organisation signature _____ 

_____

Name and title of authorised signatory (in Capitals)

GRAHAM BONNETT

RESEARCH DIRECTOR, Integrated Agricultural Systems, CSIRO

Date: 22-03-2019

Completed Final Project reports

Email to coggoresearchfund@giwa.org.au or mail to
COGGO Research Fund, GIWA, PO Box 1081, Bentley DC, WA 6983

For any further enquiries please email questions to coggoresearchfund@giwa.org.au

Or phone (08) 6262 2128

COGGO representative

For the purpose of this Project agreement contract, COGGO will be represented by Grains Industry Association of Western Australia (GIWA), or such other representative that is nominated by COGGO as authorised to operate on behalf of COGGO.

PROJECT SYNOPSIS SUITABLE FOR GENERAL PUBLICITY AND COGGO WEBSITE

Aphids are the most economically important sap-sucking insect pests worldwide, causing yield and financial losses both from direct damage by feeding, as major vectors for plant viruses, and in insecticide resistance management. High levels of green peach aphid resistance across multiple insecticide types are widespread across Australia. This includes resistance to synthetic pyrethroids, organophosphates and carbamates. The last remaining effective chemistries are the Group 4 however, metabolic resistance to neonicotinoids has recently been identified. A lack of canola host resistance and rapid evolution of insecticide resistance necessitates alternate and viable aphid control solutions for WA growers. There is anecdotal evidence of a naturally occurring entomopathogenic fungus in the field that mummifies and as such kills aphids, and its presence has been identified by growers and agronomists as a vital tool for keeping aphid populations under control, reducing crop damage and reducing chemical insecticide costs. This project was a successful collaboration between CSIRO and Planfarm to survey entomopathogenic fungi towards aphids in WA broad acre cropping, and to gain knowledge and capability on the enhancement of these fungi for aphid control.

Candidate entomopathogenic fungi were identified across northern, mid and southern canola growing regions. Fungi were isolated from 60% of aphid samples, and 50% of these were positive for known or suggested entomopathogens. In general, aphid numbers were very low in the 2018 growing season, impacting the number of aphid samples collected. A dry start to the season also impacted on conditions favoring entomopathogenic fungi. The isolation and molecular validation of entomopathogenic fungi correlated with the presence of mummified aphids and the absence of insecticide and fungicide spraying in paddock management. Paddock fungicide treatment in the Northern growing region was associated with an inability to culture any fungi from aphid samples. The prevalence of mummified aphids was highest in samples obtained from mid and southern canola growing regions and paddocks that received neither insecticide or fungicide sprays, suggesting geographic location and chemical pest and disease management play a role in conditions favouring activity of entomopathogenic fungi. New entomopathogenic fungal candidates of two genera, *Fusarium* and *Alternaria*, were identified from green peach aphid in WA. A representative entomopathogenic fungus of the *Fusarium* genus was selected to determine conditions that enhance entomopathogenic fungal activity. Within controlled environments, foliar spore sprays were most effective with a clear deterrent effect (antixenosis). Similar effects were recorded against bluegreen and spotted alfalfa aphids. This scoping study lays the foundation for future research into the benefits and deployment of entomopathogenic fungi in WA cropping and aid to prolong the efficacy of the last remaining insecticide chemistry for green peach aphid control.