



FINAL REPORT EXECUTIVE SUMMARY

Part 1 - Summary Details

CRDC ID: DAQ1802

Project Title: Mirid and mealybug best practice management

Project Start Date: 1/7/2017

Project Completion Date: 30/10/2019

Research Program: 1 Farmers

Part 2 – Contact Details

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Signature of Research Provider Representative:

Date submitted: _____

Part 4 – Final Report Executive Summary

Provide a one-page summary of your research that is not commercial in confidence, and that can be published on the internet. Explain the main outcomes of the research and provide contact details for more information. It is important that the Executive Summary highlights concisely the key outputs from the project and, when they are adopted, what this will mean to the cotton industry.

Mirids have always been and will continue to be key pests of GM cotton for the foreseeable future. Despite huge investments into RD&E over several decades, mirid management practices are still highly variable, contentious, and largely inconsistent with best practice. A key output of this project was a comprehensive review of all mirid-related RD&E over the last few decades. This review has provided the CRDC with a definitive analysis of prevailing mirid management practices and the value of past investments in mirid-related research from a scientific and quality control perspective. The mirid research review report proposes a new R&D framework, including new methodology to quantify mirid damage, that will be required to develop and promote best management practice into the future. A new, futuristic mirid management system will require fresh investment in RD&E with outcomes potentially 3-5 years into the future. In view of the theoretical, methodological and technological problems inherent in the mirid research done in the past, interim management guidelines based on “revised” mirid damage thresholds have been made available to the cotton industry as a stop-gap measure.

The project’s activities in years 1 and 2 have confirmed the widely-held belief that mirids are among the most difficult animals to work with. A key challenge lies in the production of “ecologically and biologically competent” individuals for use in experiments in the glasshouse as well as in the field. Researchers have typically relied on individuals reared on artificial diets or organic vegetables such as beans and corn, in insectaries maintained in laboratories. There is evidence from the project and published information suggesting that laboratory reared individuals are not as robust as their field dwelling counterparts. An immediate implication is that outcomes of prior research done using cultured individuals may be largely inaccurate. Ironically, the use of field caught mirids for experimental work is also problematic because physical damage sustained during capture typically results in high mortality rates, and individuals are of unknown age, which can result in highly variable feeding activity and damage.

Thus, a significant challenge for mirid research going forward is the requirement to produce sufficient numbers of mirids (adults and juveniles) of known age and stage that are readily available throughout the year and, most importantly, are equivalent to their field grown counterparts in terms of ecological competence – biological and/or physiological vitality and damage capability. This will require a move away from rearing of mirids on beans and corn (nutrient dense resources) in the laboratory to rearing on mixtures of (potted) plants within large cage enclosures in the glasshouse or other appropriate enclosed facilities with appropriate lighting and nutrient regimes to facilitate healthy plant growth, or insectaries established on plants growing in the field. The logistical aspect of this challenge is also likely to be significant, and will require the allocation of time and resources in future research projects.

The project’s activities on mealybug predators have addressed an important gap in management best practice for this pest – options that better exploit non-chemical, environmentally sustainable means of pest control. Predators and other natural enemies are important elements of the control strategy for most if not all field crop pests. However, in most instances the ability of crop managers and growers to exploit these agents of natural mortality (ecosystem service) has been extremely limited. Based on the predator assessment work undertaken in this project, crop managers and growers will be able to use commercially available mealybug predators to control mealybugs in a strategic way. However, further research (including cost-benefit analyses) and practical assessments of predator releases

under field conditions will be required to give growers and crop managers confidence in the expected outcome.