



Australian Government

Cotton Research and
Development Corporation

FINAL REPORT

Part 1 - Summary Details

Please use your TAB key to complete Parts 1 & 2.

CRDC Project Number:

Project Title: IPM Workshop series

Project Commencement Date: 21/11/16 **Project Completion Date:** 01/12/16

Part 2 – Contact Details

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Part 3 – Final Report

(The points below are to be used as a guideline when completing your final report.)

Background

1. Outline the background to the project.

Before the current cotton season commenced, it was predicted that early season pest numbers would be extreme and widespread due to good winter and spring rainfall in all areas.

This forecast was particularly alarming due to the potential for widespread insecticide applications which can have very serious consequences such as resistance, the disruption of natural pest enemies, secondary pest outbreaks, and damage to the environment.

Taking these potential threats into consideration, the CottonInfo team determined that the industry needed confidence to approach pest management using sustainable pest control measures encouraged via integrated pest management (IPM). The team also agreed that extending the IPM message early in the season will be a priority.

As a result, CottonInfo and CRDC partnered with leading industry experts, including Dr Lewis Wilson and Dr Michael Bange of CSIRO, to deliver a series of workshops on IPM across five cotton growing valleys – encouraging growers to consider their potential pest management strategies.

Objectives

2. List the project objectives (from the application) and the extent to which these have been achieved.

OBJECTIVES

1. Run a series of successful IPM workshops across five cotton growing valleys.
2. Increase confidence levels in growers and consultants to approach pest management using IPM tactics and still achieve high yielding crops.
3. In particular, increase confidence levels in growers and consultants to approach pest management using information from research results such as cotton plant compensation and using beneficial numbers in decisions.
4. Find out what pest management issues participants would like more information on.

ACHIEVEMENTS

1. Over 130 participants from the cotton industry attended the IPM workshops. 38 [er cent of these participants filled in evaluation forms. Results from these forms showed that 32 per cent of respondees were growers, 40 per cent were consultants and crop scouts and 28 per cent were from another sector of the industry, for example research staff and reseller agronomists. The five workshops took place at Warren, Darlington Point, Cecil Plains, Boggabilla and Boggabri during late November 2016 and early December 2016.
2. Other results from the evaluation forms showed that as a result of the workshop, 69 per cent of participants were **more confident** about growing high yielding crops using IPM (Wilcoxon Matched-Pairs Test $n=35$, $P<0.001$ (two sided test)). Of the 51 responses, 31 already thought IPM was the best approach, 53 per cent had a small increase in confidence and 16 per cent had a large increase in confidence levels.
3. Participants were asked to rate their levels of confidence in managing beneficial insects, silver leaf whitefly (SLW) and IPM in general before and after the workshops.

Topic	High confidence pre workshop (%)	High confidence post workshop (%)
Conserving beneficial insects	51	80
Managing SLW	21	71
Achieving high yields using IPM	33	75

4. Of the topics covered, managing SLW had the lowest level of confidence pre workshop and the highest increase post workshop. This provides an indication of need for awareness and training in managing SLW among growers and consultants. Improvement in confidence in achieving high yields using IPM was also high, with 50 per cent of participants indicating a shift to high levels of confidence.

We asked participants to rank six issues that they needed more information on. When six points was allocated to the highest ranked, down to one point for the lowest, the issues of insect resistance (155) and controlling mirids (140) ranked highest. Understanding plant compensation (121) and managing beneficials (117) were next, with mealy bug (63) and controlling thrips (61) lowest ranked. The incidence of mealy bug moving south will have an obvious impact on this perceived need.

Methods

3. **Detail the methodology and justify the methodology used. Include any discoveries in methods that may benefit other related projects.**

In order to successfully conduct five IPM workshops to achieve our set objective, CottonInfo enacted the following methods:

- Form a small working group with CottonInfo personnel and a grower to define the purpose of the workshops. This method gave the team clearer and more confident objectives in conducting the workshops.

- Collaborate with the CottonInfo communications manager to manage the communications and logistics.
- Appointed the CottonInfo technical specialist for IPM as the lead, to more effectively coordinate the job list.
- Collaborate with the CottonInfo REOs to assist with organising each event.
- Secure and brief relevant researchers, including Dr Lewis Wilson and Dr Michael Bange.
- Ensure the workshop dates were organised around the speaker's availability. This was the key reason for chartering a small plane.
- Ensure the workshops were conducted as early as possible before or during early pest control decisions across the regions.
- Conduct the workshops at a range of locations, in particular the regions that missed out on the previous nitrogen tour.
- Locate the workshops on local farms with access to a cool shed and seating for forum style discussions as well as accessibility to a cotton field to enable hands-on activities.
- Ensure that well thought out evaluation sheets were printed along with additional information such as a re-print of the Pest and Beneficial Guide and insect check cards.

Outcomes

4. Describe how the project's outputs will contribute to the planned outcomes identified in the project application. Describe the planned outcomes achieved to date.

Our predictions regarding pest pressures were accurate. This season, in all cotton growing regions, numerous insecticide applications managing above threshold pest populations have been common. Positive responses from the evaluation suggests that as a result of the workshop, 55 per cent of participants now believe that using IPM is the best approach.

Importantly, Dr Michael Bange has confirmed that as a result of the IPM workshop series, he has noticed an increase in the number of enquiries from growers and consultants who attended the workshops wanting further information on cotton plant physiology.

A series of communications pieces were enacted by the CottonInfo communications manager to support and promote the IPM workshop series – both pre and post event – ensuring key messages went out to the wider cotton industry. This communications resulted in media coverage in local newspapers, plus the Cotton & Grain Outlook (which appears in both The Land and QLD Country Life) and an IPM feature in Spotlight.

Currently there are discussions between CRDC and CottonInfo on conducting post season review workshops with targeted consultants and growers to capture the experience of this unusual season. This will also provide valuable feedback to the research community on priority issues moving forward.

In addition, the CottonInfo team will also provide follow-up information around the six topics as recommended and ranked through the evaluation forms. These were insect resistance, controlling mirids, understanding plant compensation, managing beneficials, mealy bugs and controlling thrips.

5. Please report on any:-

a) Feedback forms used and what the results were

Evaluation forms were filled in by 38 per cent of the total participants. Results from the evaluation forms showed that the pace of delivery and the amount of information was 'about right' (see figure 1, below).

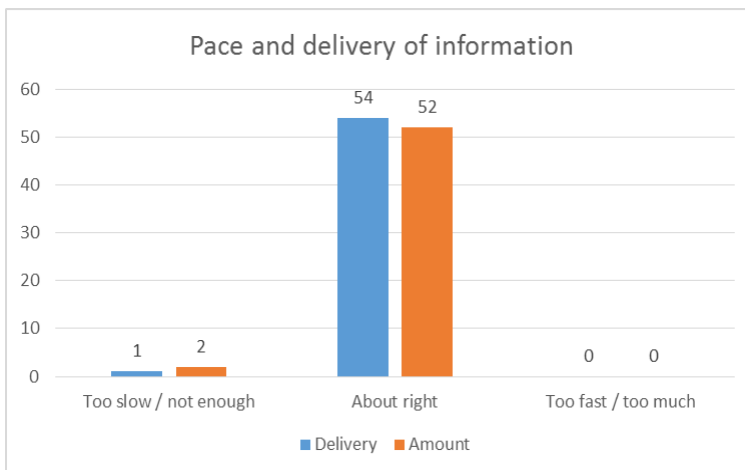


Figure 1. Results from evaluation sheets - Pace and delivery of information

Participants agreed that the topics presented at the workshops were useful, as evidenced in Figure 2 below (results are shown on a scale of 1-5, with 1 being 'agree' and 5 'disagree').

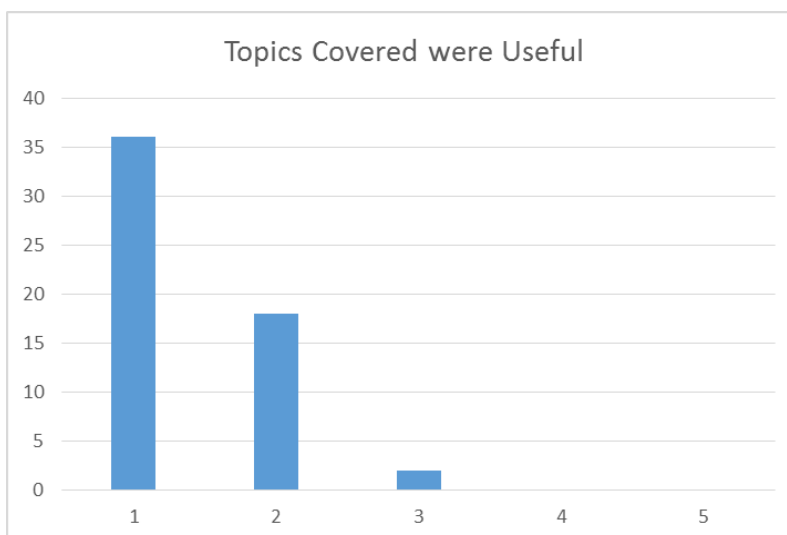


Figure 2. Results from evaluation sheets – usefulness of the topics covered.

From the evaluation sheets, some participants commented regarding how the event could be improved. Below is the list of constructive remarks/observations which will be referred to by the CottonInfo technical specialist in developing future workshop agenda's or in the delivery of late season information regarding IPM.

- Follow up of the topics later in the season
- The use of case studies
- Smaller groups and more discussion relative to this season
- More hands on activities (although they noted that the additional crop checking insect identification courses which were conducted separately would cover this need).

Perhaps most importantly, the evaluation shows that as a result of the workshop, 69 per cent of participants now believe that using IPM is the best approach (see Figure 3, below) and 40 per cent are more likely to adopt IPM in their business (see Figure 4, below).

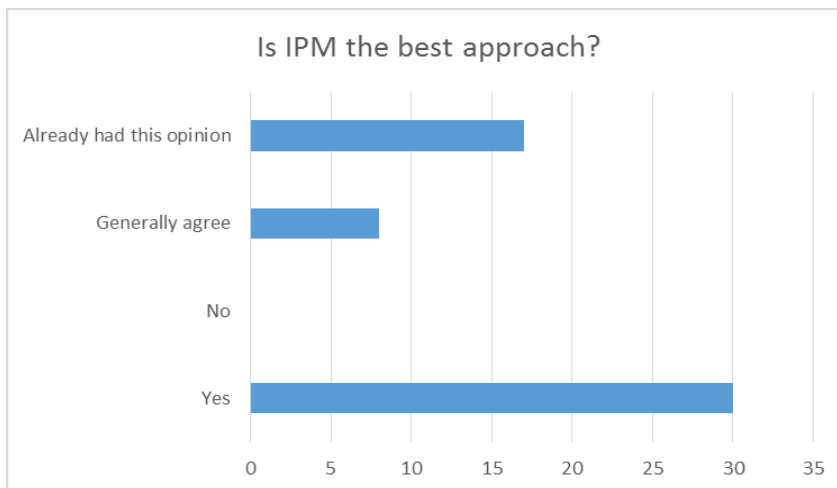


Figure 3. Results from evaluation sheets – As a result of the IPM workshop, do participants now think that using IPM is the best approach?

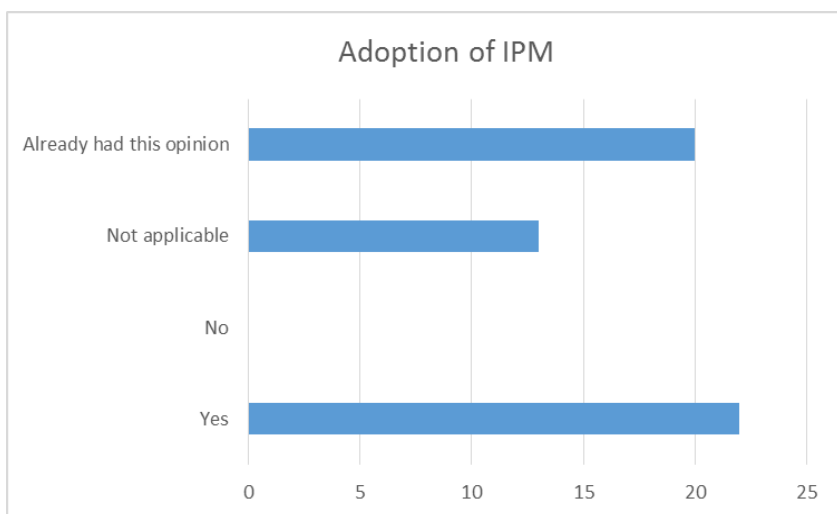


Figure 4. Results from evaluation sheets – As a result of the IPM workshop, are you more likely to adopt IPM in your business?

Results from the evaluation sheets were very positive and indicated that participants felt increasingly confident to either understand or implement an IPM approach. As shown in the above information and figures, the majority of participants agreed that IPM is the best strategy. However one question explored reasons why some found implementing IPM a challenge. These include:

- Changing pest dynamics, other yield losses such as cloudy weather or water stress
- Grower adoption to thresholds and benchmarks that change from original perception with sprays
- Growers opinions
- My consultant, more results from thrip/mirid/slw trials
- Increased knowledge
- Practicality of IPM against benefits
- Research in early insect pressure and chemistry available for insects such as Rutherglen bugs
- Nothing
- Agronomist
- In new situation
- If Mrs looking @ ↓ \$ + no return
- Growers decision based on their experience and opinions

- Practical approach
- Cost and time
- Neighbours

The above reasons will be referred to when producing information relating to IPM. This will ensure that information generated or CottonInfo activities planned, needs to be based on a practical solutions and case studies, it must contain information based on sound research results.

- b) The number of people participating and any comments on level of participation
Over 130 participants from the cotton industry attended the IPM workshops. 38 per cent of these participants filled in evaluation forms. Results from these forms showed that 32 per cent of participants were growers, 40 per cent were consultants and crop scouts and 28 per cent were from another sector of the industry, for example research staff and reseller agronomists.

Budget

6. Describe how the project's budget was spent in comparison with the application budget. Outline any changes and provide justification.

The main expense for the workshop tour was the chartered flights to transport the researchers and CottonInfo members. This was within budget. Catering expenses were driven by attendance, and came in close to or below budget. Some additional advertising was included for three of the regions to raise awareness and encourage attendance.

Conclusion

7. Provide an assessment of the likely impact of the results and conclusions of the research project for the cotton industry. What are the take home messages?

Our predictions regarding pest pressures were accurate. This season, in all cotton growing regions, numerous insecticide applications managing above threshold pest populations have been common. Therefore, conducting IPM workshops early in the season was valuable and enormously relevant, to help encourage the uptake of IPM and discourage an overreliance on insecticide.

The timing of the IPM workshop series was always going to be a challenge with a cold start to the season meaning a later planting window that clashed with a later winter harvest period. It was appropriate that the workshops were conducted just as the first and very complex pest management decisions were being made.

The workshop topics proved relevant and covered a range of research information aimed to assist with early pest management decisions, for example the physiological effects of tipping out. The development of the workshop content was informed by consultation with consultants and growers.

As the season progresses we will see the impact of early season insect control play out in the presence of beneficials and the impact of SLW and mealy bugs, which are both sensitive to the presence of beneficials. With this in mind, CottonInfo IPM Technical Specialist has provided a follow-up CottonInfo e-news article warning the industry of potential late pest flares.

The current incidences of mealy bug on the Darling Downs and in the Boarder Rivers regions is continuing to drive information demand on control options, the conservation of beneficials and the importance of farm hygiene. This high demand for continued information on IPM will mean that the CottonInfo team will sustain their focus around

the importance of IPM over the winter months as we approach next season. Details of the activities involved will need to be planned over the next few months. During this planning phase we will also take into account the constructive comments from participants of the IPM workshop series regarding how the event could be improved.

We were fortunate to have both Dr Lewis Wilson and Dr Michael Bange to help deliver our key IPM messages. It was particularly special to have Lewis with the team as he is retiring in the very near future. The workshops highlighted the context specific nature of IPM, with great value being seen in the ability of growers and consultants being able to discuss their particular situations with industry experts. This is an advantage that face to face interaction has over more generalised industry recommendations.

Results from the evaluation sheets were very positive and indicated that participants felt increasingly confident to either understand or implement an IPM approach. As shown in the above information and figures, the majority of participants agreed that IPM is the best strategy.

The CCA survey will also provide interesting insights into the pesticide management practices implemented this season and will be used to inform our extension strategy.