SRDC Grower Group Innovation Project
Final Report

SRDC project number:	GGP019
Project title:	Increasing Productivity and Profitability in Soldier fly effected crops in the Pioneer Valley.
Group name:	Cattle Creek Soldier fly Group
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Due date for report:	1st August 2008
Funding Statement:	This project was conducted by [*Cattle Creek Soldier fly Group*] in association with the Sugar Research and Development Corporation (SRDC). SRDC invests funds for sugar R&D derived from the sugar industry and the Australian Government.

Australian Government
Sugar Research and Development Corporation

The [*Cattle Creek Soldier Fly Group*] is not a partner, joint venturer, employee or agent of SRDC and has no authority to legally bind SRDC, in any publication of substantive details or results of this Project.

Body of Report

Executive Summary:

(An overview of the aim, conduct, key results and learnings from the project. Maximum 500 words)

The aim of our project is to find a way to reduce the effect soldier fly has on a sugar cane crop and to reduce soldier fly numbers. On farm trials are being conducted after consulting entomologists that have experience with soldier fly as well as researching past research conducted on soldier fly. The group then decided on what would have the best chance of reducing soldier fly numbers and reduce there effect on sugarcane crops. Of the chemicals trialed in ratoon crops by the group Clothianidin was the only chemical that showed any real promise. In 2006 Clothianidin was trialed in old ratoons at a rate of 10Lt/ Ha and 5 Lt/ Ha . Only the 10 Lt/Ha rate produced a reduction of soldier fly numbers. It was then decided to engage Peter Samson (BSES) to conduct more detailed trials with the chemical Clothianidin, to see if the results could be replicated from the initial trial. Four different rates, and 2 different application methods were trialed. Results from these trials so far do not demonstrate any efficacy of Clothianidin against soldier fly, except perhaps at 10Lt/Ha rate. This was not statistically significant. Further sampling of these trials is required. Another trial conducted was maize and soyabean seed treated with different chemicals. Results of these trials show there was a highly significant difference in the number of live soldier fly among treatments. In the absence of insecticidal seed treatment, there was no significant difference in the number of soldier fly among plots with sprayed-out sugarcane, maize or soyabean. Among the crop/insecticide combinations, the lowest number of live soldier fly was in plots planted with maize or soybean treated with clothianidin, imidacloprid, or with thiamethoxam (Cruiser). However, results of seed treatment with imidacloprid were inconsistent. Although soldier fly numbers were reduced it did not eradicate all soldier fly. Variety trials were established, no results from these trials yet. Ecolock Plus (Growth enhancer) trials did not show any increase in crop yields. The group now knows how to take core samples from trials, have learnt how to establish trials that produce creditable results, and has learnt more about the habits of soldier fly. Additionally, the group has learnt what will not control soldier fly.

Background:

- (Why did you need to do this project?)

To Increase productivity and increase length of crop cycle in soldier fly affected fields, as Soldier fly greatly reduce productivity. To find a control method for soldier fly in sugar cane affected fields. Soldier fly reduce crop yields and greatly reduces the number of ratoon you can get from a crop cycle.

Aims:

(Include the Aim and the expected benefits that were listed in Section 2 of your original Application)

- Increase length of crop cycle, increase number of ratoons.
- Identifying new & promising Sugar cane varieties tolerance or susceptibility to solider fly.
- Trial different products or chemicals that will help increase number of ratoons in a crop cycle.
- Reduce solider fly numbers in fallow.
- Reduce build up of numbers of solider fly in ratoons.
- Monitor crop yield in trials.
- Improve sugarcane plants health and vigour to overcome effects of solider fly.
- Identify any increase or reduction of larvae numbers.
- Investigate any opportunities for a study tour, of other districts affected by solider fly and how they are dealing with the problem.
- Identify any effect trials have on nematodes and pachymetra or if they effect the trials results.
- Develop member's skills by, Fact sheets, Farm walk to inspect trial sites, communicating at local cell group meetings.
- Identify new ways of controlling the effects soldier fly has on sugar cane, by engaging an expert (eg. entomologist).

Methodology:
(How was the project conducted?)
The group discussed trial preparations with Peter Samson BSES, Les Robertson SRDC, in the best way to conduct and monitor field trials and received advice on the best time to sample trials, and the best time to apply treatments to trials. Assistance was given from Brad Hussey, BSES, in trial design of a variety trial. Assistance was received from Joe Muscat, BSES, in designing record and valuation sheets. Peter Samson (BSES) demonstrated to Group members on how to take core samples from trials. BSES washed, counted core samples and analysed the trial results. The group purchased a three row stool splitter chemical applicator, which was use to conduct and apply chemicals to trials in ratoon cane crops. The group borrowed the BSES's corer when taking core samples from trials. Mackay Area Productivity Services took pachymetra samples for the group, assisted in taking core samples from trials and transported soil samples from the paddock to the BSES station. With assistance from Joe Muscat, BSES, a power point presentation, of the groups' project results was presented at the 2008 GIVE conference. Slides from the GIVE presentation were displayed at the 2008 BSES field day. Group members shared project information to growers at local shed meetings conducted by BSES and MAPS. Peter Samson, BSES, Les Robertson, SRDC and John Hughes,DPI, provided research done on soldier fly.
Chemicals used in trials were selected in the following ways, what group members thought might work from the chemicals commonly used in sugarcane, chemicals that had not been trialled before on soldier fly and chemicals that had previously been trialed on soldier fly and reduced soldier fly numbers. High chemical rates were used so if the chemical did not reduce soldier fly number at the higher rates, the group could be confident the chemical was ineffective on reducing soldier fly numbers and could conclude that there was no need for further trialling if the chemical. Some sugarcane varieties are less affected by soldier fly than others. Varieties trials were established to find out the tolerance or susceptibility of new or promising varieties to soldier fly.

Results and Outputs:
(What results were produced by the Project? The results should include data collected, articles or reports written, events held and anything else you see as relevant to the industry. Relevant files including photographs should be provided on a CD.)
Data from trials provided on CD, summary of results provided in Outcomes section of report below.

Intellectual Property and Confidentiality:
(If there is any protected Project Technology, eg information that has been kept confidential, such as equipment specifications, patentable knowledge please outline. Is there anything in this report that should be treated as confidential, and if so under what circumstances? N.A.

Capacity Building:
(How has the Group's capacity to conduct R&D and implement better farming systems been enhance?)
The group is now aware on the necessary procedures to conduct replicated trials that produce creditable results and the information that needs to be collected to analyse trials results. The group has more knowledge on the habits of soldier fly. The group is aware of does not reduce soldier fly numbers.

Outcomes:
(What benefits have been achieved or are expected from the project, and what more has to happen to get the full benefit from the project? How do the expected benefits compare with those predicted at the start of the project, as outlined in the Application?)

The project the group conducted has not found anything or any farming method that the group can confidently say reduces the built up of soldier fly numbers or increases the number of ratoons or

crop yield in soldier fly affected fields. From the different chemicals trialled by the group, clothianidin did reduce soldier fly numbers at 10Llt/Ha .At this rate it is not economical to use. More sampling of trials is required before making a final conclusion on clothianidin.
A seed treated with chemical trial in fallow ground was conducted and results showed treatments did reduce soldier fly numbers but did not eliminate the soldier fly. There is a need for new trials with larger plots to see if the reduced soldier fly numbers from treated seed in fallow ground continues into the follow cane crop cycle, and to replicate the results from the original trial.
A crop of sugarcane treated with ecolock (growth enhancer) has not shown any improvement in crop yields over untreated crop. The ecolock trial has not yet been harvested and yields recorded.
A Variety trial was established in April 2006 Varieties prior to smut being found in the Mackay region. In this trial are not smut resistant Yield and CCS was collected. The trial has not been going long enough to determine if varieties are resistant or susceptible to soldier fly Another variety trial was established in August 2007 with varieties resistant to smut. This trial has not been established long enough to know if varieties are resistant or susceptible to soldier fly. The group met with BSES in 2007 and requested BSES to put some of there variety trials in fields effected by soldier fly, so information could be collect on whether new varieties are susceptible or resistant to soldier fly instead of having to find out the hard way. BSES rejected the request for various reasons.
The group met with and discussed soldier fly issues with personal from QDPI, BSES and SRDC.
The group researched, Soldier fly research conducted in the past, than decided what was the best opportunities that would reduce soldier fly numbers in on farm trials.

Environmental Impact:
(Outline any adverse or beneficial environmental impacts of conducting the Project and/or implementing its findings)
As the were no positive outcomes in reducing soldier fly number in cane fields , the project has had no adverse impact or benefit to the environment.

Communication and Adoption of Outputs:
(Outline any communication activities that have been conducted and any that are planned. How has SRDC been acknowledged or involved? Have any lessons from the project been applied by members of the Group, or others?)

Updates of groups trials were given at a local grower shed meeting conducted by BSES and MAPS. Conducted a shed meeting with group members and other growers with soldier fly effected fields, and discussed soldier fly issues and the best way to combat them. BSES, MAPS and SRDC personal as well as chemical reps were in attendance. Presented a talk on the group's project at the 2008 GIVE conference. Had a display of group's trials at the 2008 BSES field day.SRDC has been acknowledged for the contribution they have made towards the groups project, whenever the group was communicating the group's activities.

Recommendations:
(What recommendations would you make as a result of the project, including suggestions for further research and development?)
As a result of trials conducted by our group, we see a need to sample Clothianidin trials further to see if Clothainidin can reduce soldier fly numbers economically and effectively. To continue variety trials and sample these trials for soldier fly to confirm if varieties are susceptible or resistant to soldier fly. With results showing reduced soldier fly numbers in the trial were maize and soyabean seed was treated with chemicals, there is a need to conduct more trials in larger plots, in fallow ground, to replicate initial results ,and to find out if reducing soldier fly number in fallow will continue into the sugar cane crop cycle. As a result of reviewing past research on soldier fly, there is a need to trial brassicas as a fallow crop to see if the brassicas will reduce soldier fly numbers. Need to get BSES to put some for there variety trials into fields that are ed by soldier fly.

Publications:

(List and attach copies (electronically if possible) of all articles, newsletters and other publications from the project.)

Presented project findings at the Give conference 2008 and had a display of group's trials at the Mackay BSES field day 2008. (Give Presentation on CD)

Elevator modifications deliver in safety

Contributed by Gordon Collie

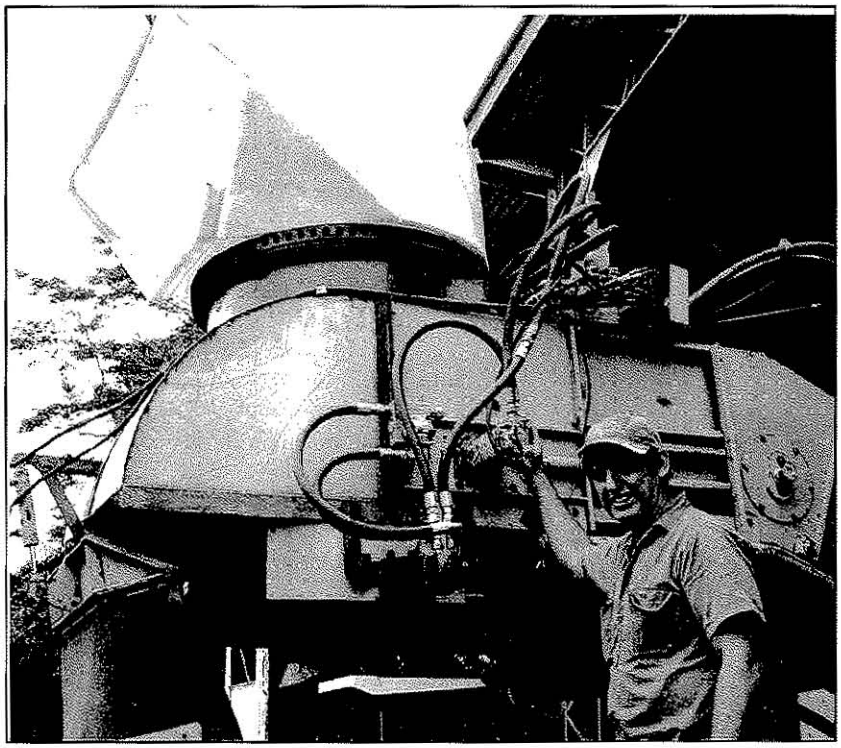
Bryan Baker bought a cane harvester last year, but he has no intention of cutting his own cane.

The Sarina farmer invested in the machine to improve commercial modifications for wide row harvesting.

The work is part of a major research project being undertaken by Plane Creek Sustainable Farmers.

"I've been mucking around with changes for the last three years but it's frustrating working on other people's machines," said Mr Baker, the Plane Creek group treasurer.

A relative newcomer to cane growing in the last 10 years, Mr Baker is use to thinking outside the square when it comes to designing an optimal farming system.



Bryan Baker with the cane harvester he bought last year.

"The harvester has always been the big stumbling block when it comes to putting new farming systems into practice," he said.

He has almost completed the transition to 1.8 metre dual row cropping over the last five years with only a small 8 ha block still growing on a 1.5 metre layout.

Mr Baker has been a key member of the Sustainable Farmers team working on harvester elevator modifications to deliver cane to the haulout without having it compact the cropping area.

The group carried out extensive research on various elevator modifications to increase the cane throwing distance and concluded that fitting a powered paddle was the best option, despite the potential for increased cane loss through the secondary extractor.

From this work, two prototypes were built for commercial evaluation during the 2006 season.

Mr Baker is confident the modifications to his harvester are close to achieving the goal of extending the cane delivery distance without compromising machine safety.

He had the concept firmly in his mind when he bought the machine and went to work with a local engineering firm to turn it into reality.

The extractor assembly was moved back up the elevator about half a metre and powered paddles fitted to propel it the extra distance to the haulout.

"The issue has always been having too much weight at the end of the elevator creating safety issues with a wheeled machine. Bolting on a conveyor extension adds considerable weight. The modified machine is probably more stable than it was before."

"It's close to the way we want it, but modifications are always a work in progress," Mr Baker said.

He cut about 11,000 tonnes of cane with the demonstration unit last season. As part of the research grant agreement, the modifications will be promoted and working drawings made available.

It has created a lot of grower interest with some farmers already signalling their intent to adopt the concept and Mr Baker said his harvesting contractor would be fitting a version.

He will use the demonstration machine to cut planting material.

Mr Baker said he was experimenting with planting the dual rows closer together, adjusting in from 500mm to 350mm.

"Growing the cane in what is effectively a wide single row rather than separate rows would help overcome problems with lodging," he said. ■

Estimating crop size is an example of change. Using remote sensing, Mackay Sugar can collect in one day data that previously took four people four weeks.

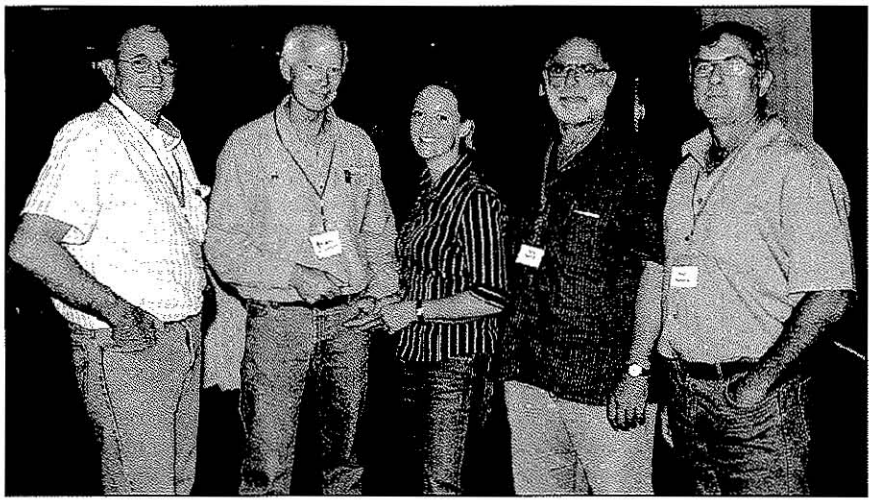
Comparisons of images over time enable farmers to identify areas of yield volatility, assist soil mapping and give early warning of pests/diseases. Satellite monitoring is limited by cloud cover so automatic monitors in 46 of the district's 160 harvesters measure the area cut and generate other useful data for 45% of the cane supply area.

Six machines have yield monitors that record hydraulic pressure loadings. Data on harvester performance, analysed weekly, helps operators improve operating efficiency. Last season over 10 million reports recorded harvested area and machine efficiency.

Tony Deguara, Homebush Innovative Farmers, showed that more is not better when it comes to planting. A planting density trial showed that after 180 days there was no significant difference at 3.7, 5.5 and 7 t/ha in 1.8 m rows. He was surprised at how many plants are being wasted.

If all Mackay growers reduced planting rates from the current average of 8 t/ha to 5.5 t/ha an extra 55,000 t cane could be milled, worth around $1.65 m at $30 a tonne. Lower rates would also minimise nutrients, moisture and less wear-and-tear.

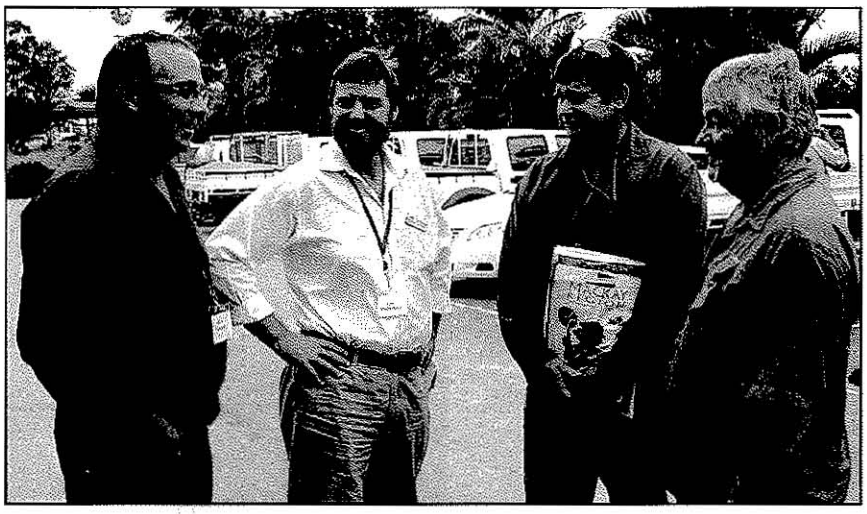
Another trial examined whether all plant nutrients can be supplied as biodunder prior to planting. Not having to top dress produced substantial savings in time and labour during planting, less pressure during harvesting and there was no yield loss.



Pictured at the Give 08 conference in Mackay were *(l to r)* Brian Stevens, Plane Creek grower; Brian Robotham, GPS-Ag consultant, Bundaberg; Kalya Abbey, BSES Mackay extension officer; Serg Berardi, Plane Creek grower, and Neil Walpole, chairman, Plane Creek Sustainable Farmers.

Greater minimum tillage in cane will probably increase farm chemical costs so there was keen interest in Andrew Lashmar's 4-row optical spot spraying unit. Similar to units already used by grain producers, the unit uses WeedSeeker sensor technology. The gear is costly but growers can pay it off in several years from herbicide savings of 50-80%. It may even have potential for use in fertilising.

Ingham's Total Concept Sugarcane Planting System Group modified a planter to form beds as it plants, reducing hilling-up problems from heavy rain and helping alleviate chronic labour shortages. Last year Daryl Morellini planted 60 ha this way and saved 149 hours compared with conventional planting and an estimated $8400 in wages, fuel, and wear and tear.



Discussing the GIVE 08 program in Mackay were *(l to r)* Gary Sandell, mechanical engineer, Mackay, Les Robertson, SRDC investment manager, Brisbane, Michael Zamparutti, cane grower Wagoora, and Ross MacKenzie, cane grower Calen.

Growers were reminded that they are caught in a worsening severe cost-price squeeze. Eton farmer John Ross said growers get the same cane price now as in 1981 but they have to pay $1250 a tonne or more for DAP fertiliser and diesel fuel now costs $1.40/L compared with .04 cents in 1967.

The Ross, Werner, Walker and George families have formed a company to trial composting of cane trash and mill wastes, as a means of reducing costs, restoring soil health and minimising dependance on commercial fertilisers and chemicals.

Edward Blosser, President of Midwest Bio-Systems, Illinois, USA, discussed the potential gains that cane be achieved by using humus compost.

Bus tours took growers to see new farming systems and supplementary crops such as kenaf and sunn hemp although muddy conditions limited farm access.

Innovative machinery on show included hooded sprayers, variable rate fertiliser boxes, bean planters, dual row hilling-up and zonal tillage units, a rear steerable axle cane transporter, a centre pivot with GPS controlled swing arm, and a compost turner and spreader. ■