Office Use Only	
Project Code	
Project Type	

FINAL REPORT 2013

It is recommended that applicants read the *SAGIT Project Funding Guidelines 2013* prior to completing this form. These guidelines can be downloaded from www.sagit.com.au

Final reports must be submitted via email to mbuckby@adelaideshowground.com.au as a Microsoft Word document in the format shown ***within 2 months*** after the completion of the Project Term.

PROJECT CODE :	SANF1201

PROJECT TITLE (10 words maximum)
UHP injection to increase fungicide efficacy.

PROJECT DURATION

*These dates **must** be the same as those stated in the Funding Agreement*

Project Start date	**01/07/2012**
Project End date	30/06/2013

PROJECT SUPERVISOR CONTACT DETAILS

The project supervisor is the person responsible for the overall project

Title:	**First Name:**	**Surname:**	
Mr	Greg	Butler	
Organisation:			
SANTFA			
Mailing address:			
Telephone:	**Facsimile:**	**Mobile:**	**E-mail:**

ADMINISTRATION CONTACT DETAILS

The Administration Contact is the person responsible for all administrative matters relating to the project

Title:	**First Name:**	**Surname:**	
Mr	Grant	Goodwin	
Organisation:			
SANTFA			
Mailing address:			
Telephone:	**Facsimile:**	**Mobile:**	**E-mail:**

PROJECT REPORT

Provide clear description of the following:

Executive Summary (200 words maximum)

A few paragraphs covering what was discovered, written in a manner that is easily understood and relevant to SA growers. A number of key dot points should be included which can be used in SAGIT communication programs

The Ultra-High Pressure injection of fungicide to improve fungicide efficacy on rhizoctonia in wheat did not reduce lesions on seminal or on crown roots relative to a seed dressing treatment of fungicide.

The Ultra-High Pressure injection of fungicide to improve fungicide efficacy on rhizoctonia in wheat did not improve the yield of wheat, with a marginal and biometrically insignificant reduction in wheat yield observed from the UHP application method compared to the fungicide seed treatment.

Neither fungicide treatment produced biometrically significant differences from the untreated control.

Project Objectives

A concise statement of the aims of the project in outcome terms should be provided.

The objective of the trial was a preliminary investigation of the relative Rhizoctonia control achieved when fungicide was injected into the soil at ultra-high-pressure compared to traditional fungicide application via seed treatment.

The concept was designed in conjunction with Dr Alan McKay of SARDI whom had reported increased efficacy on Rhizoctonia with fungicide placement below the seed bed in previous years.

Overall Performance

A concise statement indicating the extent to which the Project objectives were achieved, a list of personnel who participated in the Research Project including co-operators, and any difficulties encountered and the reasons for these difficulties.

The activities including fungicide application, crop sowing, Rhizoctonia root score assessments and final yields were all performed.

<u>Personnel</u>

The site was selected by Alan McKay and Jack Desibolles, and sighted adjacent to a larger Rhizoctonia experiment.

Figure 1: Trial site location, east of Karoonda, SA.

The trial was sown (2.6.12) by Andrew Bird (SANTFA) and Greg Butler (SANTFA) using a Serafin Ulti-sow single disc seeder and, where applicable, the FLOW 55psi UHP Pump and injection nozzle.

Figure 2 (LEFT): Andrew Bird (SANTFA) driving the tractor towing the FLOW 55,000psi injector in front of the Serafin Uti-sow disc-seeder at Karoonda.

Figure 3 (BELOW): Crop emergence of L to R: 'Untreated seed', 'Treated Seed + UHP Injection', 'Treated Seed', 'Untreated Seed + UHP Injection'.

Rhizotonia Root scores were perfomed by Paul Bogacki of SARDI.

The site was managed and harvested by Rob Wheeler's team at SARDI.

The trial results were discussed with Alan McKay of SARDI.

Difficulties encountered

Disc-seeders do take time to calibrate properly from site to site and many farmers report that they do not feel that they really understand their disc-seeder until the 3rd year of operation. This can make the use of a disc-seeder for trial purposes in 'one-off' plantings a higher risk than using a knife-point seeder.

Nevertheless, a disc-seeder was chosen for this trial for two reasons:
1) A knife-point seeder would 'throw out' the injected fungicide from the crop-row.
2) Growers wanting to undertake disc seeding in the Mallee region were at potentially higher risk of Rhizoctonia.

At the trial site, the Serafin disc sowed a little deeper than ideal however the vast majority of the seed germinated and emerged.

The trial was sown in a timely manner relative to the rest of the farmer's paddock. However, by being some of the first green plant to emerge in the area, and being located on the edge of the trial site, the first replicate suffered crop damage from pest animals, most likely rabbits and kangaroos.

Key Performance Indicators (KPI)

*Please indicate whether KPI's were achieved. The KPI's **must** be the same as those stated in the Application for Funding and a brief explanation provided as to how they were achieved or why they were not achieved.*

KPI	***Achieved (Y/N)***	***If not achieved, please state reason.***
UHP injection to increase fungicide efficacy trial sown.	Y	
UHP injection to increase fungicide efficacy trial harvested, data analysed.	Y	
Information disseminated to farmers	Y	

Technical Information (Not to exceed **three** pages)

Provide sufficient data and short clear statements of outcomes.

Rhizoctonia solani AG8 was the predominant soil-borne pathogen at the site as determined by PredictaB DNA analysis of soil samples. Data below shows average DNA levels of five common soil-borne pathogens from 12 soil samples taken on 26/04/2012 (33 days pre-sowing):

Rhizoctonia solani AG8: 138 pg DNA/g soil (range: 9 – 539 pg DNA/g soil)
Pratylenchus neglectus: 4 nematodes/g soil (range: 1 – 12 nematodes/g soil)
Fusarium pseudograminearum: below detectable level
Bipolaris sorokiniana: 191 pg DNA/g soil (range: 32 – 504 pg DNA/g soil)
Pythium clade F: 17 pg DNA/g soil (range: 9 – 32 pg DNA/g soil)

The soil type was a red sand with both free limestone and non-wetting patches.

Trial sowed: 2/6/2012

Assessment dates

Plant counts	6/07/2012
Plant sampling**	23/07/2012
Harvest/yield	4/12/2012

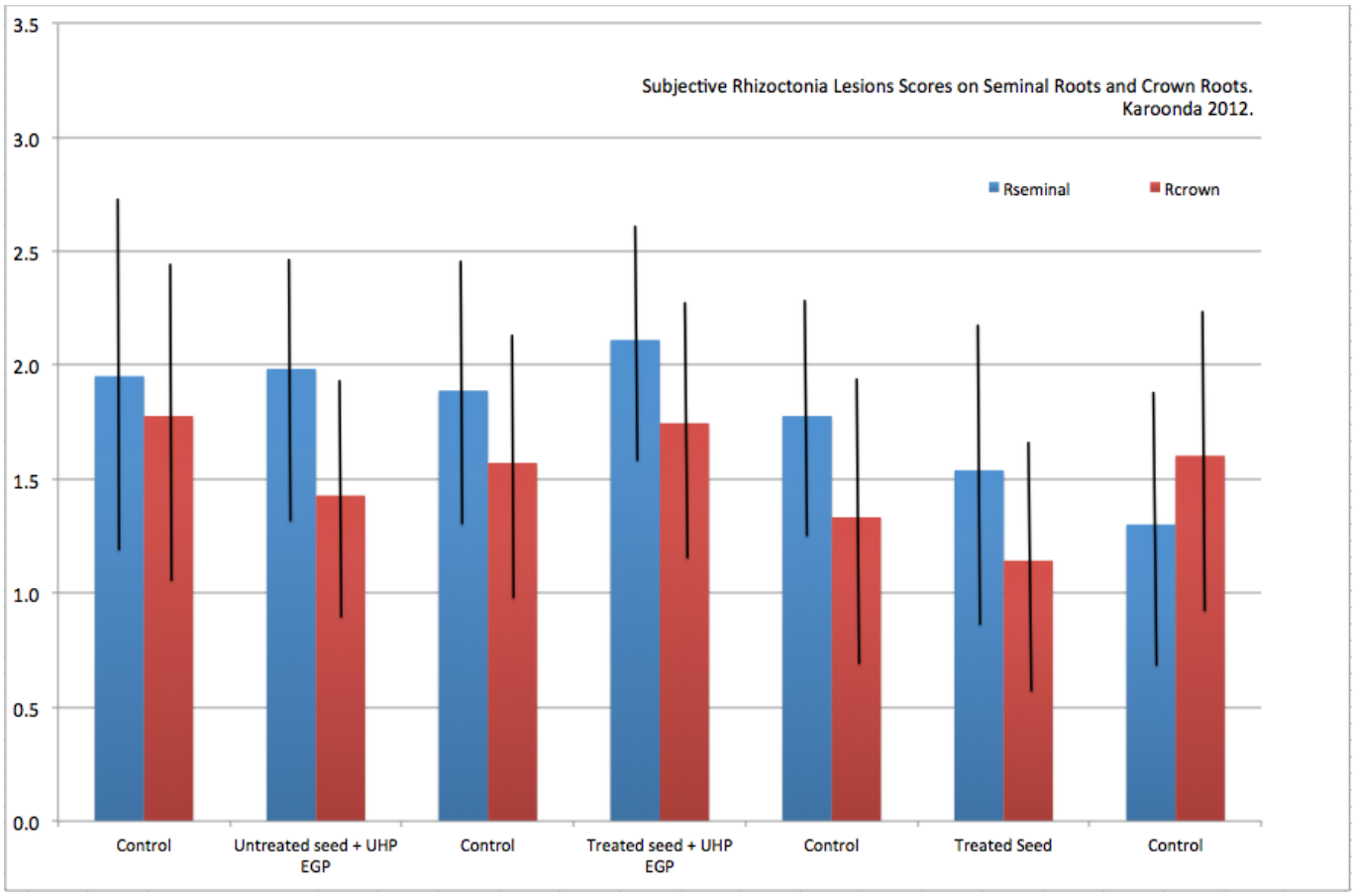
** 21 plants per plot in each bay were rated for disease on the seminal and crown roots (0-5 scale: 0 = no disease, 5 = severe disease), as well as ratings for internode length (cm), tiller number, root dry weight (g), and shoot dry weight (g). Crop stage of plants sampled on 23/07/2012 for Rhizoctonia assessment = early tillering.

Methods for plant sampling/Rhizoctonia assessment:

Plant sampling procedure:
3 Plants were sampled at 7 equidistant locations along a plot within a bay (21 plants total) and pooled into one bag
Therefore, there were 21 x 3 (63) plants sampled per plot for the SANTFA trial (as there were 3 bays)
Plants were sampled using the already established sighting pegs in the SARDI trial (Bay1, Bay2, Bay3)
Plants were sampled from the middle row (3) only
Plants were sampled 23/7/2012 - 51 days after sowing
Plants were not sampled/assessed from the buffer plot 8 (except Bay 3 Plot 8 which was sampled by mistake)

Root/plant assessment procedure:
Roots/plants from plants sampled on 23/7/2012 were assessed on 27/7/2012
Roots were assessed for:
1. Rhizoctonia incidence on the seminal roots using a 0-5 scale (0 = no infection, 5 = all seminal roots infected)
2. Rhizoctonia incidence on the crown roots using a 0-5 scale (0 = no infection, 5 = all crown roots infected)
Plants were also assessed for:
1. Sub-crown internode length (cm)
2. Number of tillers

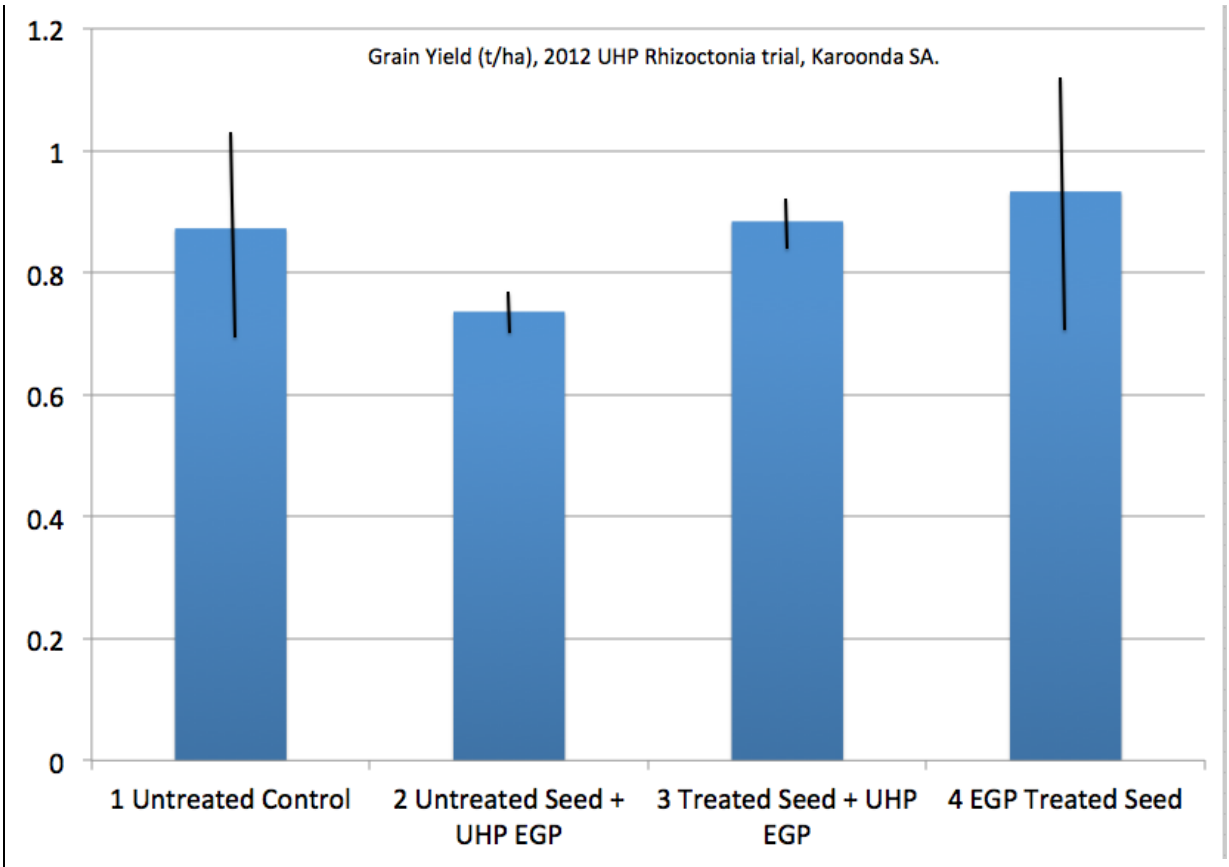
Rhizoctonia lesion scores on Seminal and Crown roots.



Graph 1: Average Seminal and Crown root lesions. The data deviations were large and none of the differences between treatments were biometrically significantly.

On a trend basis, the seminal roots were more infected with rhizoctonia that the crown roots.
On a trend basis, the seed treatment had the fewer lesions than the UHP treatment. Unusually, the combination of both UHP and seed dressing had the most lesions.

<u>Yield Results.</u>



Graph 2: The standard deviations indicate some trends however, with only two viable replicates included in the data set, the statistical production of a 95% confidence error bar could not be achieved with the statistical software package, and no meaningful differentiations can be drawn. On an average trend only basis, the UHP treatment produced the least yield, even compared to the untreated and the seed treatment appeared to provide the best average yield.

Conclusions Reached &/or Discoveries Made (Not to exceed one page)

Please provide concise statement of any conclusions reached &/or discoveries made.

Following discussion with Dr Alan McKay, no biometrically significant conclusions have been drawn from the trial.

The results show that the untreated seed performed similar to the treated seed, either as a traditional seed dressing, or as a UHP injection application. Although, the UHP application was marginally lower in performance.

Intellectual Property

Please provide concise statement of any intellectual property generated and potential for commercialisation.

None has been claimed.

Application / Communication of Results

A concise statement describing activities undertaken to communicate the results of the project to the grains industry. This

should include:

- *Main findings of the project in a dot point form suitable for use in communications to farmers;*
- *A statement of potential industry impact*
- *Publications and extension articles delivered as part of the project; and,*
- *Suggested path to market for the results including barriers to adoption.*

Note that SAGIT may directly extend information from Final reports to growers. If applicable, attach a list of published material.

SANTFA has published a general update on the UHP technology and has simply claimed that no increasing in fungicide performance was achieved by UHP injection compared to traditional seed dressing application.
SAGIT is recognised in the article for their support of innovation.

POSSIBLE FUTURE WORK

Provide possible future directions for the research arising from the project including potential for further work and partnerships.

A trial that better manages the inherent spatial and seasonal variability of Rhizoctonia is a possibility.

In the first instance, using the UHP in a controlled 'pot trial' at the Waite (managed by SARDI) might provide an indication of relative efficacy of the UHP injection compared to traditional seed treatment application.

AUTHORISATION
Name: Greg Butler
Position: SANTFA R&D Manager
Signature:
Date: 02/05/2013

Submit report via email to mbuckby@adelaideshowground.com.au as a Microsoft Word document in the format shown ***within 2 months*** after the completion of the Project Term.