



Office Use Only

Project Code	
Project Type	

FINAL REPORT 2022

Applicants must read the *SAGIT Project Funding Guidelines* prior to completing this form. These guidelines can be downloaded from www.sagit.com.au

Final reports must be submitted by email to admin@sagit.com.au as a Microsoft Word document in the format shown **within two months** after the completion of the Project Term.

PROJECT CODE	SAN 220
PROJECT TITLE (10 words maximum)	
Pre-emptive flame retardant as a new tool for SA Grain Growers	

PROJECT DURATION <i>These dates must be the same as those stated in the Funding Agreement.</i>			
Project start date	1/09/2020		
Project end date	31/12/2021		
SAGIT Funding	2020/21	2021/22	

PROJECT SUPERVISOR CONTACT DETAILS <i>(responsible for the overall project)</i>			
Title:	First Name: Greg	Surname: Butler	
Organisation:	South Australian No-till Farmers Association (SANTFA)		
ACN / ABN:			
Mailing address:	PO Box 670, CLARE SA 5453		
Telephone:		Email:	
Mobile:			

ADMINISTRATION CONTACT DETAILS <i>(responsible for all administrative matters relating to project)</i>			
Title:	First Name:	Surname:	
Organisation:	South Australian No-till Farmers Association (SANTFA)		
Mailing address:	PO Box 670, CLARE SA 5453		
Telephone:		Email:	
Mobile:			

PROJECT REPORT:

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 demonstration found that the pre-emptive flame retardants Did Not prevent the passage of a significant fire front.

Pre-emptive flame retardants did however,

- decrease the transmission rate of the fire relative to the rate applied.
- reduce the heat intensity radiating from the fire relative to the rate applied.
- result in less combustion of stubble in the paddock relative to the rate applied.
- leave more soil cover (albeit charred) relative to untreated areas.
- The residual capacity of the product to offer efficacy over time appears to be reliable.

The pre-emptive flame retardants that were applied along the edge of windrows that were subsequently burnt; showed that the control of lesser fires and ember attack may be achieved at appropriate rates.

Project objectives

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

The aim of this project is to evaluate how a new flame retardant may be incorporated into a farm's fire management plan.

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 project objectives were achieved with a strong focus on fire safety and containment.

The project was delivered Greg Butler (SANTFA R&D Manager) and Andrew Bird (SANTFA Technical Officer).

Farm sites for the flame-retardant trials were supplied by Maurice Weich (Blyth) and Callum March (Balaklava).

The Fire Control Unit of the SA Department of Environment and Water was present to support the main burning trial.

Covid hampered a public field day on the day of the main burning trial, however images and video were collected and disseminated, including through SANTFA webinars, the SANTFA Annual Conference and on Channel 7 evening news on the 23rd of May 2020.

KEY PERFORMANCE INDICATORS (KPI)

*Please indicate whether KPIs were achieved. The KPIs **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	If not achieved, please state reason.
Pre-emptive flame retardant applied at trial site	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Controlled burn at trial site	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Pre-emptive flame retardant materials developed and disseminated	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

TECHNICAL INFORMATION (Not to exceed **three** pages)

Provide sufficient data and short clear statements of outcomes.

Two trial sites were established:

Blyth Trial Site:

Wind row burning and preliminary ember attack evaluation.

Windrow Burning:

A 30cm sideband of Phoscheck™ Fortify®, a new pre-emptive flame retardant, was applied along both edges of a 65m wheat windrow at two rates of 0.41l/ha and 0.82l/ha.

Each treatment was applied for 5 meters and replicated 3 times on the upwind and downwind sides of the windrow. Every treatment was separated by an untreated section of 5m.

30cm sideband	Nil	T1	Nil	T2	Nil	T1	Nil	T2	Nil	T1	Nil	T2	Nil
WINDROW													
30 cm sideband	Nil	T1	Nil	T2	Nil	T1	Nil	T2	Nil	T1	Nil	T2	Nil
	5m	5m	5m	5m	5m	5m	5m	5m	5m	5m	5m	5m	5m
Treatment 1	Fortify	0.41 L/m ²											
Treatment 2	Fortify	0.82 L/m ²											
Fortify W/V = 13% APP2 Active, 2% Adjuvant, 85% water.													

The subsequent windrow burn showed that the spread of lesser fires could be achieved.



The pre-emptive flame retardants showed capacity to inhibit the spread of lesser fires away from windrows.

Preliminary Ember attack suppression.

The 2 rates (0.41l/m² and 0.82l/m²) of Phoscheck™ Fortify® were applied over the top of a windrow in a 3m x 3m plot on the 25th of March 2020.

A flame was applied to the windrow using a diesel applicator fix to a tractor.



Phoscheck™ Fortify® was applied on the 25th March 2020



The diesel flame applicator fired the windrow two days later.



The flame retardants suppressed ignition.



Monitoring was conducted on the 31st of March.



Untreated windrows were burnt to ash.

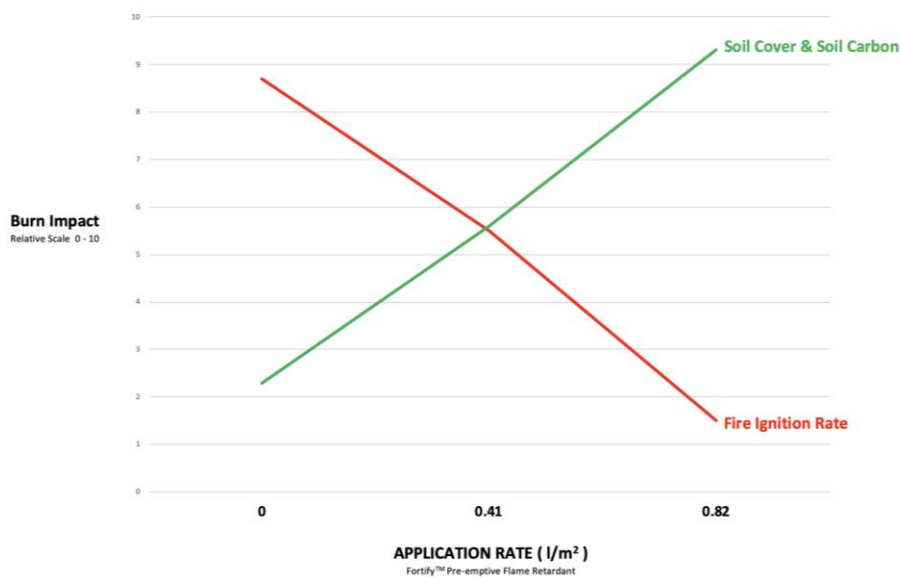


The 0.41l/m² rate showed some suppression.



The 0.82l/m² rate showed meaningful suppression.

The relative impact on windrow burning of cereal straw sprayed with the pre-emptive flame retardant Fortify™.



This evaluation was conducted at Kybunga, SA on the 27th of March 2020 by the South Australian NoTill Farmers Association with support from the South Australian Grains Industry Trust.



Balaklava Trial Site:

A trial site was established at Balaklava to test the ability of two new flame retardants to control a significant fire front.

The fire front control trial included two pre-emptive flame-retardant products, Phoscheck Fortify® and Repella.

Phoscheck Fortify® is an ammonium polyphosphate type, and Repella is an organic potassium type.

Both were applied at three different rates and at three different timings.

Each treatment was applied to a 2m x 2m plot and nil treatments were incorporated into the design. All plots were replicated 3 times.

Application Rates:

- Phoscheck™ Fortify® (at 0.41l/m², 0.615l/m² & 0.82l/m²)
- Repella (at 0.5l/m², 0.1/m² & 1.5l/m²)

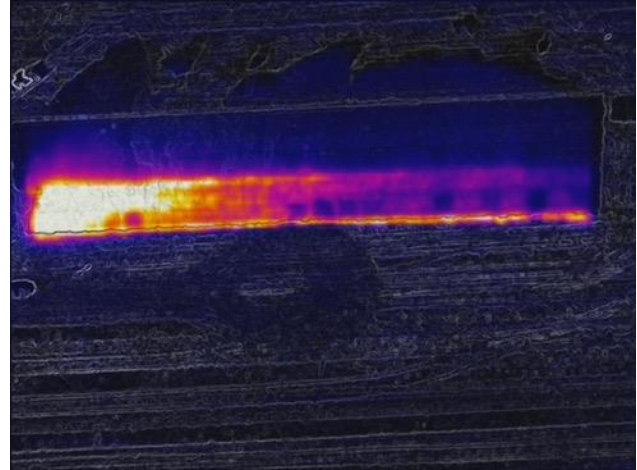
Application Timing:

- > 2 months prior to burn (31st January 2020).
- > 1 month prior to burn (20th March 2020).
- 1 day prior to burn (4th May 2020).

The burn was conducted on the 5th of May 2020.

Approximately 60mm of rain fell on the site in the time between the first application and the burn.

The burn was monitored using infrared imaging and following the burn, each plot was scored for the retention of straw, char and ash.



Infrared drone imaging clearly showed distinct plots that were cooler than the untreated areas however, the product did not prevent fire transmission.



Even though the pre-emptive flame retardants did not prevent the transmission of the fire front, the amount of combusted material between the untreated (Left) and higher rates of flame retardant (right) was demonstrated.

The demonstration found that the pre-emptive flame retardants Did Not prevent the passage of a significant fire front.

They did however,

- decrease the transmission rate of the fire proportionally to the rate applied.
- reduce the heat intensity radiating from the fire relative to the rate applied.
- result in less combustion relative to the rate applied.
- leave more soil cover relative to untreated areas relative to the rate applied.
- The residual capacity of the products over time appears to be reliable.

CONCLUSIONS REACHED &/OR DISCOVERIES MADE (Not to exceed one page)

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

When used to control a Significant Fire Front:

Pre-emptive flame retardants Do Not prevent the passage of a significant fire front.

They do however,

- decrease the transmission rate of the fire.
- reduce the heat intensity radiating from the fire.
- result in less combustion.

- leave more soil cover relative to untreated areas.

When used to control Lesser Fires:

Pre-emptive flame retardants can inhibit the spread of lesser fires and there may be applications when wind-row burning over areas that are sensitive to drift, such as sandy rises.

When used to control Ember Attack:

Pre-emptive flame retardants may inhibit ember attack from taking hold.

INTELLECTUAL PROPERTY

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

N/A

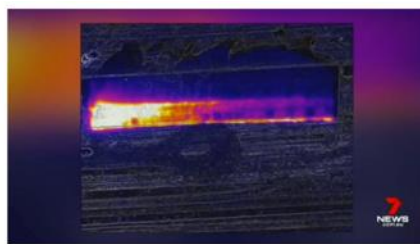
APPLICATION / COMMUNICATION OF RESULTS

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.

The project information has been disseminated via SANTFA social media and webinars during 2021 and at the 2022 annual conference.



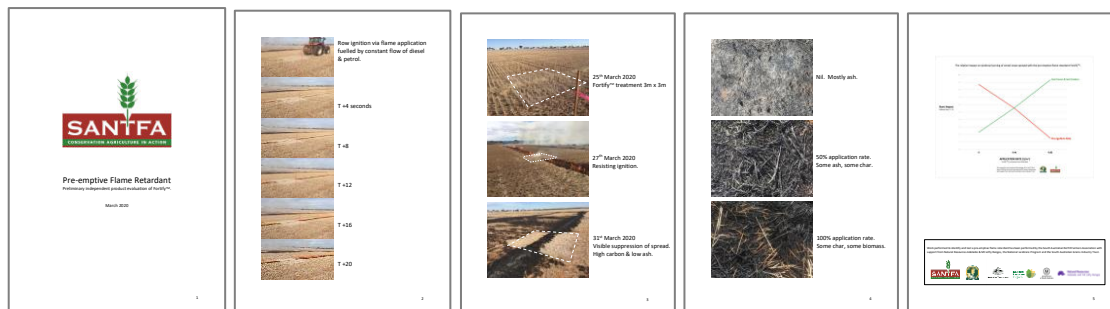
Montage 1: The demonstration was shown on Channel 7 evening news.



Montage 2: Social media posts were used to update the public about progress of the project. The video posted of the ember attack suppression attracted over 1,400 views.



Montage 3: A series of slides that were presented as part of the SANTFA webinar series during the covid peaks of 2020 & 2021.



Montage 4: A fire suppression report based on the Blyth trial site that was included in the SANTFA newsletter.



Montage 5: *SANTFA R&D Manager presenting visual and infrared imagery from the burning trial. (SANTFA 2022 Conference)*

Key Points as above:

Significant Fire Front:

Pre-emptive flame retardants Do Not prevent the passage of a significant fire front.

They do however,

- decrease the transmission rate of the fire.
- reduce the heat intensity radiating from the fire.
- result in less combustion.
- leave more soil cover relative to untreated areas.

Lesser Fires:

Pre-emptive flame retardants can inhibit lesser fires from spreading and there may be application when wind-row burning over areas that are sensitive to drift, such as sandy rises.

Ember Attack:

Pre-emptive flame retardants may inhibit ember attack from taking hold.

POSSIBLE FUTURE WORK

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

The SAGIT project information was used to secure a subsequent Landcare grant to more comprehensively assess the flame retardant products specifically against ember attack.