CROP SCIENCE SOCIETY OF S.A. INCORPORATED

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INCORPORATING THE WEED SCIENCE SOCIETY
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NEWSLETTER No. 287 JULY, 2013

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Next Meeting	**'AGM and Controlling Crop Disease'**
Venue	**Richardson Theatre, Roseworthy Campus**
Date	**WEDNESDAY 24th JULY**
Time	**7.30 pm**

****** PLEASE NOTE MEETING BACK ON WEDNESDAY******

Speakers

Rohan Kimber: SARDI
'Pulse disease issues'

Craig Davies: AW Vater
'Rust control in cereals, cheaper chemicals, new formulations?'

PLEASE TAKE NOTE THIS MEETING IS THE AGM

Don't miss your chance to have your input into the next 12 months of the CSS!

Also, stay tuned for some exciting scientific results coming up soon

Editorial

Discs or Tynes?

Our most important changes in cropping technology usually have their origins in astute observations by those actually on the spot - farmers. So the original observations of herbicide resistance were at Bordertown by Robert Mock. Intense efforts towards the control of Cereal Cyst Nematode (CCN) followed an amazing demonstration near Paskerville of the effect on growth of wheat following a crop of CCN-resistant Festiguay in the previous year. And continuing interest in subsoil constraints followed the widespread observations by many farmers of the superior adaptation of the old variety Halberd compared with the potentially higher yielding semi-dwarf varieties.

So many of our new and most interesting observations of moisture conditions and crop yields in heavy, tall stubbles are coming from the group at Mallala - Paul Lush, Ashley Robinson and, I suspect others. These heavy, tall stubbles can only be handled by disc seeders. Plant-water relations promises to be the major topic for the foreseeable future.

I was fortunate to see an excellent comparison between tynes and discs in the Wakerie district on the students' tour last year and in the subsequent TV documentary. Under those managed conditions and environment it seemed to me that the tyned machines were clearly superior. Paul and his colleagues are, however, concerned with an entirely different management system involving the retention of stubble.

Our understanding of crop water relations did not attract much attention until recently when a few, with commendable initiative, installed soil moisture meters. Along the way, however, there have been some very astute observations. Ray Fisher commented many years ago on the disappointing outcome from a dry spring that "there weren't any fogs or dews to sap up the stems". And at a fascinating meeting somewhere near Robinvale in NSW a farmer remarked that if one were to go out at midnight on a dewy night with a torch a ring of wet soil would be seen around the base of the plants. In a heavy fog east of Mt Pleasant, and having to go back after forgetting something, I realised that I switched the windscreen wipers each time under large pine trees - the road under the trees was wet but dry elsewhere. Most recently Clyde Hazel made some most interesting comments on maturing barley crops in circumstances like those of last spring.

We need a better understanding on the mostly good cropping outcomes last year which occurred despite the lack of rainfall and soils being dry to about half a metre (see Alison Millar's article in the last newsletter).

No doubt the tall, stripped stubble of our Mallala group both shades the soil surface and, perhaps at least as importantly, reduces wind speed and thereby evaporation. But we do not know whether more water is collected by the stubbles and there are some really significant observations on the wetting of soil at depth. So we have important questions regarding the hydraulic conductivity of old root lines. Hmm!

We have been running historical articles not only for their intrinsic interest but because there is, coincidentally, illumination from these articles on the discs vs tynes debate. Much of the landscape at the time of settlement by Europeans was often, at least in higher rainfall districts, compared with an 'English Park' with scattered trees and an understorey of Kangaroo Grass nearly a metre tall. A spectacular landscape like this is described in Bill Gammage's book. The landscape was much wetter then - remember Millie Nicholls' and Marcus Cooling's articles? What lessons can we draw from this?

As we move into autumn and with an increasing frequency of dewy nights, but soils dry at depth, what can we expect for this year?

Trifluralin resistance increasing in South Australia

Dr Peter Boutsalis, Dr Christopher Preston, Dr Gurjeet Gill

Since 2005, the GRDC has funded the University of Adelaide's Weed Science team to conduct random weed surveys across SA and Vic. Different regions are surveyed every year (Figure 1). Each region is surveyed on a 5 year rotation. The 2012 survey randomly sampled paddocks for weeds every 5 km in mid-November. At each location, the weeds and the crop present were identified and samples of ryegrass, brome, wild oats, wild turnip, milk thistle and Indian hedge mustard were collected. Previous surveys have shown that the level of trifluralin resistance in ryegrass differs between regions. In western Victoria between 2005 and 2010 there was a 5-fold increase in resistance to trifluralin (5% of paddocks exhibited resistance in 2005 compared to 25% in 2010). In contrast, no resistance to trifluralin was detected in northern Victoria in 2006 or 2011. Here, we report the findings from the latest survey conducted prior to grain harvest in 2012.

Figure 1: Regions surveyed across south-eastern Australia since 2005

Distribution of crops

Over 80% of the crops surveyed consisted of cereals, with wheat being the most dominant crop. Weeds were also collected from canola paddocks.

Distribution of weed species

The most prevalent weed across the three regions was ryegrass with brome being almost equally prevalent in the northern Mallee. Brome was also found often in the southern Mallee, whereas in the south-east wild oats were more common than brome. Broadleaf weeds were also identified and sampled during the survey, but they were present at lower frequencies than grass weeds. The most common broadleaf weed in the northern Mallee was wild turnip, wild radish was only encountered in the south-east and milk thistle was occasionally encountered across all regions.

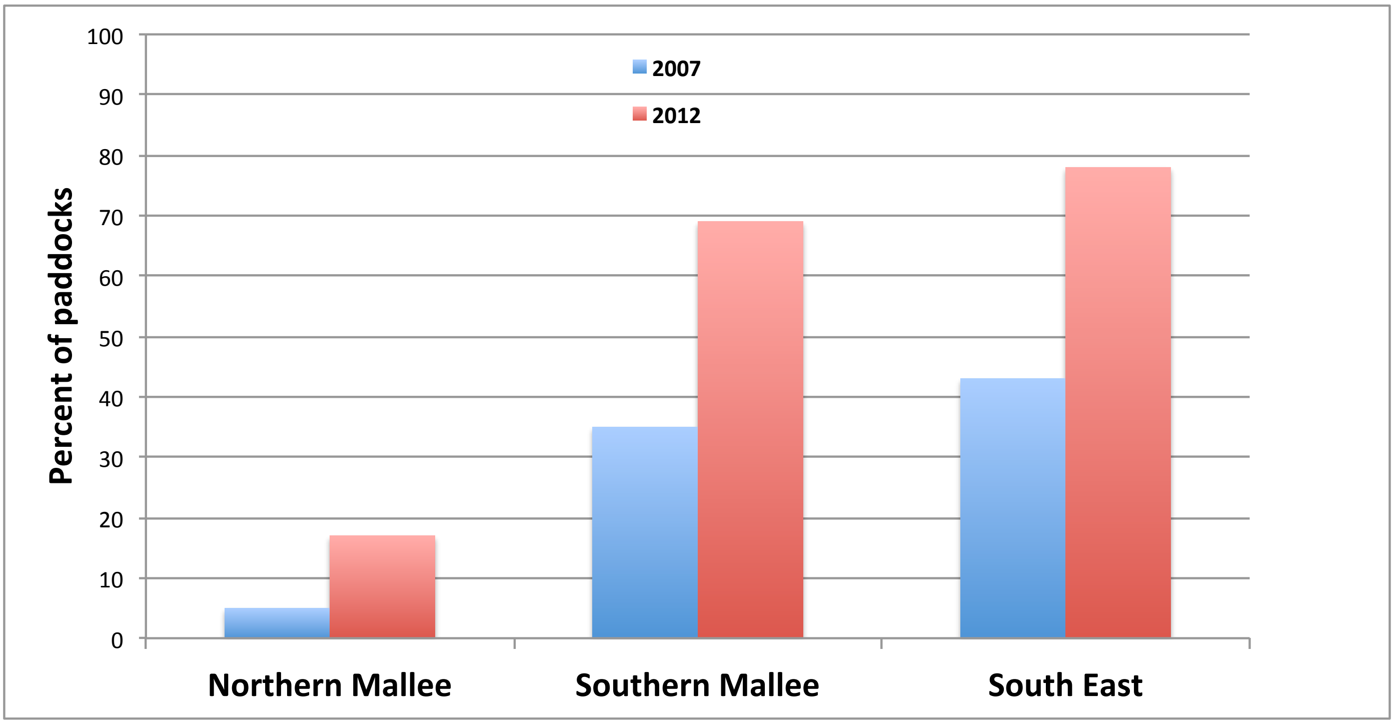
Table 1: Percentage of crops that weeds were collected from and the incidence of weed species in 2012 across south-eastern South Australia.

	South East (%)	Southern Mallee (%)	Northern Mallee (%)
wheat	53	58	63
barley	23	26	24
cereal rye	10	15	7
canola	11	1	5
oats	3	0	1
Ryegrass	54	53	42
Brome	12	33	39
Wild Turnip	1	5	9
Wild oats	22	4	3
Milk thistle (Sonchus)	6	5	6
Wild radish	5	0	0
Total Paddocks sampled	122	75	168

Resistance to trifluralin in ryegrass
In 2012, 365 paddocks were surveyed in eastern SA in an area spanning from Loxton in the upper Mallee to Naracoote in the lower south east. The survey was divided into three regions, northern Mallee, southern Mallee and south-east. Seeds were tested in a pot trial in May 2013. A paddock was classed as possessing trifluralin resistant ryegrass if there was 20% survival or greater in the pot test. Where 0 to 19% survival was recorded, this was not scored as resistant.

Resistance to trifluralin increased in all the survey areas. In the northern Mallee the incidence of resistance increased 3.5-fold from 5% in 2007 to 17% in 2012 (Figure 2). In the southern Mallee (Lameroo/ Pinnaroo area) the incidence of resistance had doubled from 35% to 69% of paddocks between 2007 and 2012 (Figure 2). A heavy reliance on trifluralin is the most likely cause of the increase in resistance. Resistance to trifluralin also increased in the south-east region to 78% compared to 43% in 2007. In cases where poor efficacy with trifluralin is obtained in a paddock in this region, it is likely that resistance is responsible for poor performance. Use of other pre-emergent herbicides such as Boxer Gold and Sakura will become more important in these regions.

Figure 2: Percent of cropping paddocks identified with resistance to trifluralin in the SA Mallee and South East regions in 2007 and 2012. Resistance represented by the percent of paddocks where ≥ 20 % survival was identified in pot trials. The rate of trifluralin used was equivalent to 1.5 L/ha of a 480 g/L product.



Acknowledgement: this study was fully funded by the GRDC Project number UA00121

The response of ryegrass to 1.5L/ha of trifluralin in each region. Each pot represents one paddock. The last 4 rows in the back of each photo represent untreated pots.

Cereal varietal herbicide tolerance – 2012 results

Michael Zerner and Rob Wheeler, SARDI – New Variety Agronomy.

Key outcomes

- Dicamba was the most damaging herbicide in wheat and oats in 2012.
- Emu Rock was found to be more sensitive to Sakura than other varieties tested, further evaluation is required for confirmation.
- AGT Katana was significantly sensitive to Ally, incurring a 6% yield reduction when applied at label recommended rate and timing.
- No yield reductions were found in barley from any herbicide tested in 2012.
- Oat varieties, Dunnart and Wombat were sensitive to dicamba, with Wombat severely affected suffering a 67% yield loss.

Background

Australian cereal varieties are extensively tested to determine level of tolerance to commonly used herbicides in South Australia as part of a GRDC funded national program. All newly released varieties are tested to identify any potential herbicide sensitivity to provide additional information to cereal growers for the agronomic management of new varieties. Varieties are first tested in preliminary trials at higher than recommended rates of the herbicides to identify any sensitivity to specific herbicides. Once a significant variety and herbicide interaction has been identified, the variety is tested with the specific herbicide in more advanced trials using recommended and higher than recommended herbicide rates to determine the severity of the yield reductions caused by the herbicide.

Trial Results

Preliminary screening trials were conducted at Mallala, SA and advanced herbicide tolerance trials were conducted at Kybunga, SA during 2012. Trials were sown relatively late in order to achieve a high weed germination to provide best possible weed control, prior to trial commencement. All herbicide treatments were applied with good levels of soil moisture available to the crop early in the growing season. All cereal variety and herbicide entries selected in advanced trials were based on results in preliminary trials from previous years. Preliminary screening in cereal crops included the use of the following herbicides; Boxer Gold, Sakura, diuron + MCPA, Affinity, Hussar, Decision, bromoxynil + MCPA, Achieve, Ally, Axial, Conclude, Glean, Eclipse, dicamba, dicamba + MCPA, Tigrex, Broadstrike and 2,4-D amine.

Wheat

Of the set of 12 herbicides screened against new wheat cultivars in preliminary evaluation at Mallala, only dicamba and Sakura caused significant yield losses compared to the untreated controls (figure 1). Dicamba was the most damaging treatment causing significant yield reductions in four varieties including, Cobra, Justica CL Plus, Phantom and Dart. Sakura only caused a significant yield reduction in one variety which was newly released Emu Rock. Further testing of these herbicide and variety interactions will occur in 2013, to verify and determine the severity of any sensitivity detected in this experiment.

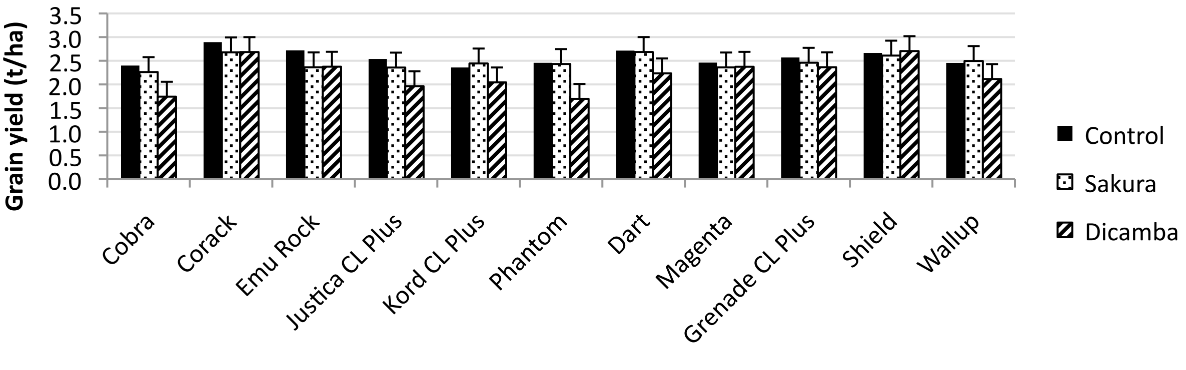


Figure 1. Comparison of grain yields of wheat cultivars to the application of twice the recommended rates of Sakura (236 g/ha) and dicamba (400 g/ha) at Mallala, 2012. LSD (p<0.05) shown on herbicide treatments.

The advanced evaluation experiments included varieties that were found sensitive to a specific herbicide in 2011. Of the combinations of herbicides and varieties tested very few were found to be significantly affected by herbicides, those that were, are shown in figure 2. AGT Katana was found to be sensitive to Ally (metsulfuron), as it incurred a significant yield loss of 6% when applied at the recommended rate. AGT Katana has been found to suffer yield reductions at increased rates of Ally in previous years, but this is the first incidence of yield loss at label rate. This would suggest AGT Katana has a mild sensitivity to Ally.

Another sulfonylurea herbicide, Glean (chlorsulfuron) caused a significant yield loss in Estoc at the high rate, but was unaffected at the label rate. Cobra and Justica CL Plus were also shown to suffer yield losses at high rates to dicamba. These interactions indicate a narrow safety margin exists when these variety and herbicide combinations are used. In these situations if label rates are adhered to than yields are unlikely to be affected.

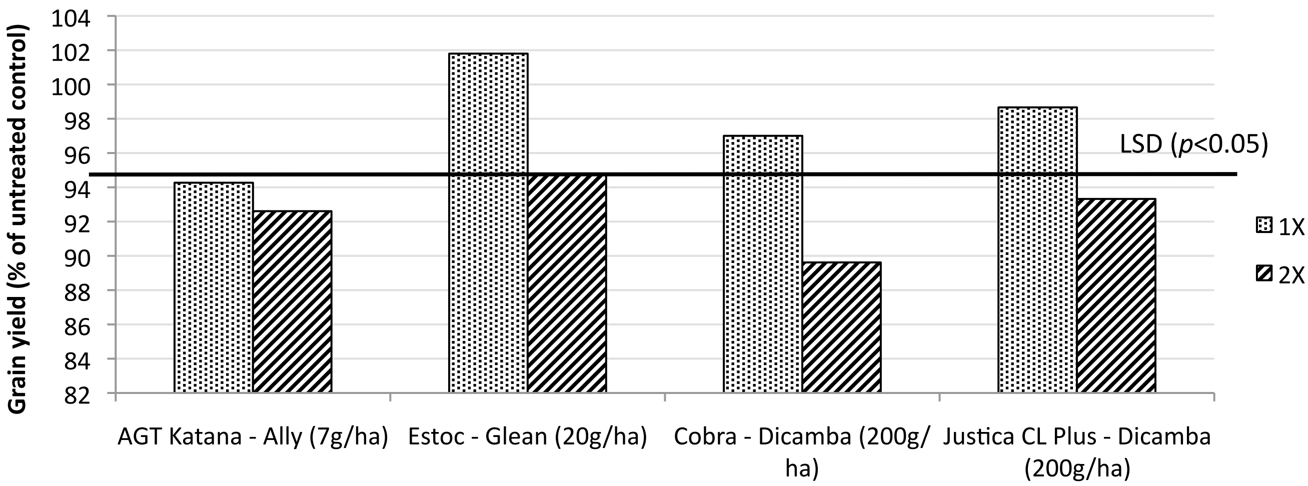


Figure 2. Grain yields (% of untreated control) of wheat varieties incurring a significant yield loss caused by a specific herbicide at either recommended (1X) or higher (2X) rates at Kybunga, 2012.

Barley

In both the preliminary and advanced evaluation experiments there were very few significant yield reductions caused by any herbicide. Only newly released variety, Flinders suffered a yield penalty from the application of Tigrex at twice the recommended rate in preliminary trials. This interaction will now be investigated in more detail during 2013. No varieties showed any yield reductions in advanced evaluation trials. Therefore it is important to refer to the long-term summaries for varietal herbicide sensitivity as also found on the NVT website.

Oat

Four oat varieties were evaluated in preliminary trials during 2012 and of the range of herbicides they were tested against, only Banvel M (dicamba & MCPA) and Tigrex (diflufenican & MCPA) caused yield reductions. Late maturing varieties Forester and Tammar were able to avoid any significant yield penalty, unlike Dunnart and Wombat where penalties occurred (figure 3).

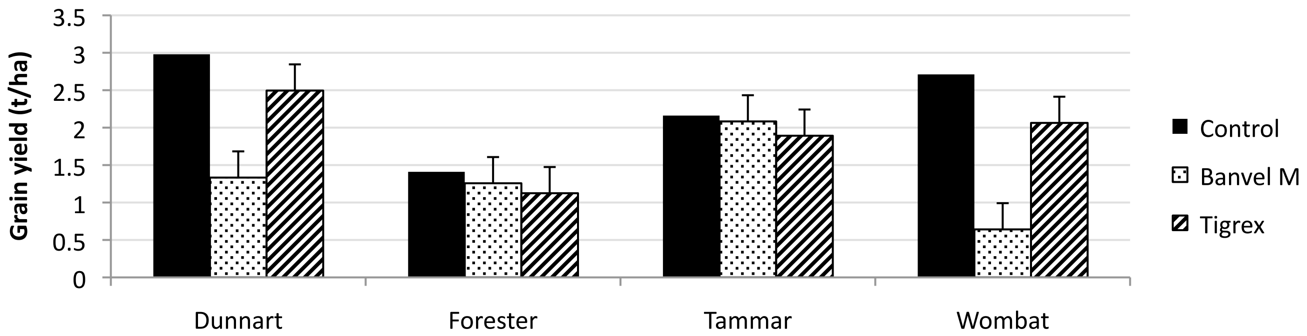


Figure 3. Comparison of grain yields of oat cultivars to the application of Banvel M (Dicamba + MCPA, 2.8 L/ha) and Tigrex (Diflufenican + MCPA, 2 L/ha) at twice the recommended rates at Mallala, 2012. LSD (p<0.05) shown on herbicide treatments.

Both Dunnart and Wombat appear more sensitive to Banvel M than Tigrex as the yield losses were much greater. This is likely in response to sensitivity to dicamba, as both these varieties also showed yield losses in advanced trials also in response to dicamba (Figure 4). Dunnart incurred a 10% yield loss at the label recommended rate, but Wombat was more severely affected with a yield loss of 67%. Forester also suffered a yield loss, but was only significant at twice the recommended rate. Dunnart and Wombat appear sensitive to dicamba, with Wombat being more severely affected. Damage symptoms in this experiment included stunted growth and delayed maturity. This was the first year of advanced evaluation of these variety and herbicides, testing will continue in 2013 to provide further evidence of the sensitivities found during 2012.

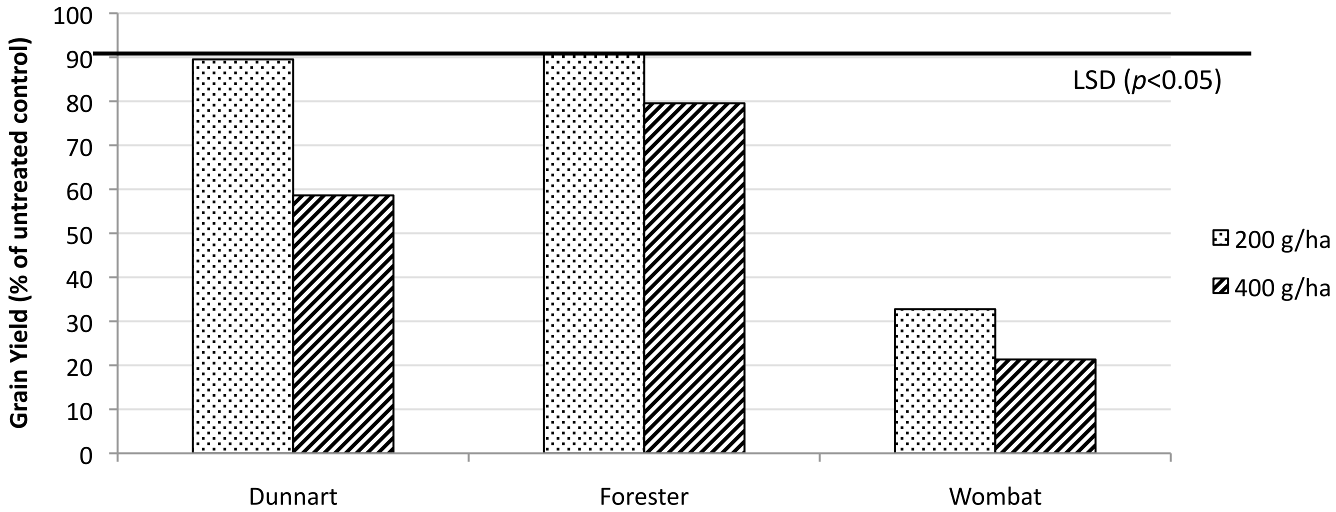


Figure 4. Grain yields (% of untreated control) of oat varieties incurring a significant yield loss caused by dicamba at either recommended or higher rates at Kybunga, 2012.

Conclusion and into the paddock

This long running research has identified cereal varieties can differ substantially in their sensitivity to commonly used herbicides when applied at registered label rates and timings. Therefore it becomes important to check the safety of various herbicide and variety combinations prior to sowing and spraying. Long-term summaries should also be used to identify herbicide and crop varietal combinations for potential grain yield penalties, as herbicide tolerance is strongly influenced by seasonal conditions (Tables 2-4). Information pertaining to varieties, which have been tested in one year only, should be treated with caution pending further trials over multiple growing seasons as environmental conditions can strongly influence herbicide interactions. Long-term summaries of herbicide tolerance testing for all crops can be found online from the NVT website (www.nvtonline.com.au).

This project is jointly funded by GRDC and the South Australian Government and is supported by cooperating farmers (Richard Konzag, Mallala and Dennis Dall, Kybunga.

Ten Years On

It's now ten years since the devastating wind storm on the Murray Plains on June 6th 2003, when NW winds were directed down from the E Mt Lofty Range by an inversion layer as a finger over the end of a hose. Winds were sufficiently strong to blow one of the large green directional signs off its mountings and all the smaller yellow road signs were either bent or destroyed. The impact was strongest about 8 kms from the foot of the range, so the photos below come from the most intense area of damage. Almost immediately after the storm, no till methods were adopted widely in the area, not only as a result of the storm, but also with the fortuitous availability of suitable machinery and accompanying technologies including herbicides and fertilizers. There has been a remarkable transformation of the landscape and in its reduced vulnerability to wind erosion within the decade.

Photo 1. The most serious damage took place in a paddock which had been cultivated twice before seeding to control onion weed. The sand in the fence line, which accumulated behind buck bush and turnip, was about 1-2 m in cross section and 1 km in length. A fan of sand extended about 200 m into the pasture immediately to the east. The sand has been graded out of the fence line and a grass/bush strip about 30 m wide left along the fence to arrest sand and thereby minimize damage from progressively more intense sand blast on cereal seedlings.

Photo 2. A new, 'station fence', with a light burden of turnip was buffeted by the wind so that about 40 of the 60 star droppers were ultimately snapped off at the top of the tight B horizon about 20 cms below the sandy A horizon.

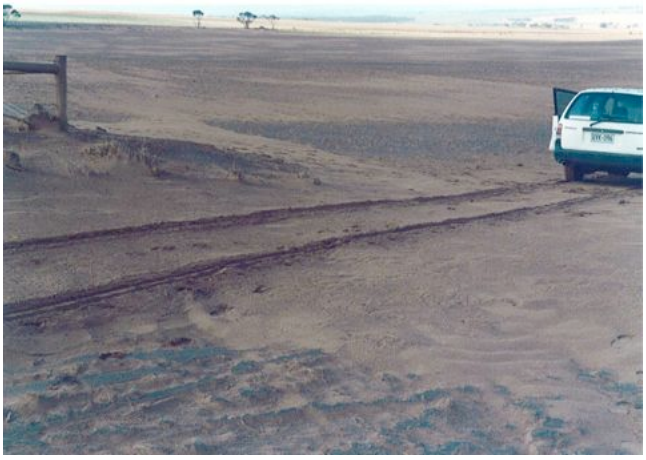


Photo 3. An unexpected phenomen. During the wind storm there were light showers of rain which resulted in the black organic deposit on the wind stripped soil surface over quite extensive areas. Possibly these have their origins in the organic matter solublised at > pH 9 or higher. This area remained highly infertile with a bleached sand A2 horizon until treated with biosolids.

Photo 4. The trough was virtually filled with sand. The mound against the fence in the background was alternative layers of sand and un-decomposed organic matter. Ridges of deposited sand were formed around and behind fixed objects such as this trough, like a set of cow horns wrong way up. These remained non-wetting for several years, presumably in association with the raw organic material.

2013 photos. Judy's intrepid explorer Daniel in the same area as that in photo 3, and the trough area in 2013, contrasting with photo 4.

CROP SCIENCE SOCIETY OF SA

TREASURERS REPORT END JUNE 2013

SUMMARY FOR NEWSLETTER

- CSSA is showing a profit for the year of $2745.17
- Subscription income has remained static
  - 11/12 $10,758
  - 13/13 $10,065

  There were 83 unpaid memberships for the year. Many however paid for this year and the previous year.
  There are 386 members on the data base, compared to 383 the previous year.
- A further $6000 was transferred in to the Term deposit.

Trial Balance

N Hannaford Crop Science Society of SA Inc
GST Inclusive
Months : Jul 2012 to Jun 2013
Cashflow accounts only : ANZ Cash Management A/c, ANZ Term Deposit

Category	Debit	Credit
SUBSCRIPTIONS		$10,065.00
INTEREST RECEIVED		$3,228.72
GST REFUND		$159.00
Returns to GST REFUND	$159.00	
AGM	$227.20	
MEETING COSTS	$148.15	
POSTAGE	$1,582.80	
STATIONERY	$482.90	
INVOICE EXPENSES	$79.00	
NEWSLETTER COSTS	$2,894.10	
BANK FEES	$99.70	
TRAVEL SCHOLARSHIP	$1,650.00	
SUNDRY EXPENSES	$40.00	
INSURANCE	$620.00	
GST PAID	$152.00	
Returns to GST PAID		$152.00
TRANSFER OUT	$6,000.00	
Returns to TRANSFER OUT		$6,000.00
TREASURER'S HOURS	$2,724.70	
GST Payments/Credits	$915.00	$942.10
ANZ Cash Management A/c		$6,468.01
ANZ Term Deposit	$9,220.18	
GST Control	$20.10	
Report Total	**$27,014.83**	**$27,014.83**

Account	Opening	Closing	Change
ANZ Cash Management A/c	$10,533.80	$4,065.79	($6,468.01)
ANZ Term Deposit	$67,745.96	$76,966.14	$9,220.18
GST Control	$104.39	$124.48	$20.10
Total	$78,384.15	$81,156.41	$2,772.27