CROP SCIENCE SOCIETY OF S.A. INCORPORATED

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Next Meeting **'Planning for the New Year with New Challenges'**

Venue **Stefanson Theatre, Roseworthy Campus**

Date **WEDNESDAY 17th FEBRUARY**

Time **7.30 pm**

Speakers

Cereal variety selection for 2011 - Rob Wheeler (2010 NVT results)
Hugh Wallwork (disease predictions)
With a very different season from the last few years, how do the varieties which have performed well in the dry years compare to 2010? Be prepared for some interesting discussion and some surprises with the new NVT results.

Seed quality - avoiding another 'Flagship'

Grain testing and storage – Speaker TBA

Panel of 2 farmers and 2 agronomists - Q&A on plans for 2011 (sowing times, best use of stored moisture, rotation planning, planning for crop disease, stubble and summer weed management etc)

- The website is now updated and we now have the recent meetings (in Powerpoint format). So if you've missed a meeting you can now download the presentations from each speaker.
- We are now making it searchable so you can look for specific articles from the Newsletter archive.
- **Time to give it a go – this will be an integral and convenient method of obtaining information from the CSS, so learn how to use it!**
- If you wish to receive a sms reminder and are not already doing so, please sms 0408 816 533.

APVMA visit to SA by Subbu Putcha 9th and 10th November 2010
Report from Peter Cousins

Visit to Andy Byrne member of SA Ground Sprayers Association and Contract Sprayer Adelaide Hills
Andy spoke about the difficulties spraying in the Adelaide Hills and adjacent areas. He explained the equipment that he uses to reduce drift and the need to monitor weather to avoid inversions. As he sprays a lot of the road side verges in the Adelaide Hills he felt that buffer zones would be largely unworkable and increase costs. He also sprays a lot of small acre farms and has never had a problem with drift. He would like to see some sort of accreditation scheme for sprayers and those who qualified would be able to operate under reduced or nil buffers.

We met with John Both, Nufarm and President of Crop Science Society of SA, Yorg Kitt, Nufarm Technical Advisor and Dr Chris Preston Adelaide University at Croplands Premises. Excellent discussion took place and the report below is from John Both
As I see it there are three sources of spray drift:
1. Vapour - in my opinion this can only cause damage over short distances. The restrictions on high volatile esters now removes this as probable cause of crop damage.
2. Direct droplet drift - this is the sort of drift the likely buffer zones appear to be targeting. My argument with the APVMA would be when users follow the guidelines for 2,4-D products for droplet spectrum (coarse to very coarse - spray between 3 and 15 km/hr winds) these droplets would only travel short distances downwind. Subbu admitted they used a model that has data on standard flat fans - which in theory you can't use with 2,4-D. To me they seem to be assuming users are not following the label.
3. Inversions - these occur when there are calm conditions (ie outside the label). The buffer zones the APVMA may propose are insufficient to avoid damage from inversions when growers are using fine to medium droplets.

I suspect, as does Chris Preston, that the majority of damage cases in cotton and probably in vines result from summer spraying in inversion conditions (early morning and calm). **It wouldn't be unreasonable to ask the APVMA what is the evidence they have of the types of drift that are occurring into cotton, vines and other susceptible crops.** This should have been a prerequisite before determining the remedy - comes within their guideline of making decisions on the basis of scientific information. I'd be surprised if they could confidently answer that question.

My own conclusion is that drift problems are caused by some growers using nozzles producing fine to medium droplets (off-label) and exacerbating the problem by spraying in inversion conditions (again off label). The real remedy is to find a way for all growers to spray according to the label (the 2,4-D label that is). Standardising all herbicide labels to the 2,4-D statements would be simpler and more effective than reviewing dozens of individual labels with a suspect model.

The real issue is changing user behaviour, in particular sprayer set up and decisions about spray timing. Changing labels by adding buffer zones won't change behaviour of people who don't read labels

I asked the question of Yorg about how many primary producers were purchasing Flat fan nozzles now compared to a few years ago. He replied that 6 years ago 80 % of the nozzles that Croplands sold were flat fans and 20 % were some form of drift reducing nozzles, now it is 80% AI or drift reducing nozzles and 20% flat fan. The interesting part was that it was not broadacre farmers purchasing the flat fan nozzles, it was vegetable growers. He said that every broadacre boomspray sold in the last year or so was fitted with AI nozzles at the farmer's request. He also spoke about the Drift reducing agents like LI 700.

We also spoke about current farmer training eg ChemCert and the need for the course content to be changed to focus more on machinery application techniques, weather conditions and how to identify inversion conditions.

Peter and Bev Grocke Farmer Barossa Valley

Peter spoke about the difficulties the proposed buffer zones would make to him with Vineyards on nearly every corner of his property or adjoining paddocks. He showed us a map of the current buffers which has been applied in the Barossa Valley by PIRSA which is 100 metres for part of the year and 1000 metres in the months when vines will be affected. We had a quick tour of the Grocke's farm which highlighted the problems faced by all broadacre farmers there. There is very little forward planning done by councils and so when a vineyard is set up next to you or within the buffer zone distance, your rights disappear. No restrictions are placed on anyone else. When spraying Peter and Bev constantly monitor the weather conditions and will cease spraying if conditions change. In all the years that they have been farming they have had two minor spraying mishaps, one when the weather conditions changed (an inversion) and the other when their boomspray malfunctioned.

Mick Faulkner and John Mitchell and his son Andrew Farmers Mintaro

We first had a look at a paddock on the south east of Mintaro with Mick which was sprayed with roundup. The paddock was irregularly shaped and could not have been sprayed without the wind blowing onto another susceptible paddock without drift management. It was an excellent example of what farmers can do with current technology. We then looked at other examples of spraying against crops and roadsides for fire breaks and crops right up against vines. John and Andrew gave an excellent description of the methods of drift control that they use on their farm to avoid any damage to the vines and other susceptible crops.

Grant Roberts Hart Field Site Committee Past President and current committee member, Viterra Agronomist

I took Subbu to the Hart Field Site and we had a quick look around the site looking at the various sites, with susceptible crops alongside, that had been sprayed without any drift problems before meeting with Grant. We discussed the problems that the buffers could have on the field day site. Grant used to work with Subbu in the Cotton industry and the discussion was very topical to say the least

Met with Kendall Jackson ABC Breakfast Reporter.

Kendall spent about an hour with us going over the various details of the proposed buffer zones and conducted two interviews with Subbu for the Breakfast Programme. Subbu clarified many points of the proposed buffer zones

Met with Rob Heaslip Farmer Gladstone, Huddleston and Crystal Brook

Probably one of Subbu's trip highlights. I had arranged for him to have a ride in a Case Patriot self propelled boomspray. He was very impressed with Rob's operator skills, the drift control and accuracy of the spraying which was spray topping Faba Beans with gramoxone for Ryegrass control. Rob gave him a complete rundown on his spraying operations and the various techniques that he uses for drift control against susceptible crops just a few metres away. He studied the GPS and Auto shutoff and sprayer controls and just about had to be prized out of the cabin for the next visit

Rocky River Ag-Rob Dingle

Rob explained the AIM spray system that is fitted to the Patriot Boomspray. Subbu asked for more information on the wind tunnel data that would have been collected when testing at the development stage. Rob also told us that they only sell about two sets of flat fan nozzles a year the rest being AI Nozzles or other forms of drift reduction nozzles.

Balco Pat Guerin and Michael Tonkin
Pat and Michael explained the random chemical residue testing of the hay that they purchase. No unexpected problems have been found but they only test for three herbicides so the information was not as helpful as we would have liked to further our case against the buffer zones.

John and Clinton Tiller
Another good visit for Subbu with the Tillers showing their chemical shed (very impressive) and Nitro Boom sprayer with drift reduction nozzles. The Tillers explained that they grow lots of Lentils against wheat crops, and spray right up to them with 2,4-D and MCPA products even when they have a breeze towards the lentils with no problems. They also have lots of native vegetation along their roadsides and have no problems spraying right up to it. They suggested that if the buffers were bought in there would be very little tree planting around and in some cases thought that some farmers would remove some of the native vegetation that they had planted. Apparently it is the Environment and Heritage Department that has asked for this buffer.

Richard Konzag Farmer, Advisory Board of Agriculture and GRDC Member
Richard explained to Subbu that he owned land on four sides of the Mallala Township and sprayed right up to the back fences of his township neighbours and had never had a complaint from anyone. He has low drift AI nozzles on his boom and only sprays when the wind is blowing away from the town. He also sprays right up to his susceptible crops and has no damage. Subbu clarified some of the concerns that were raised especially about downwind and Lee wind which were causing concern. There is definitely only one wind that applies to buffer zones, and that is downwind. If the wind changes you can go back and finish the paddock spraying right up to the edge. It was discussed about credits for the people who have drift reduction technologies on their boom sprays and the latest plan is for that to happen.

Paula Thompson Stock Journal
I had contacted the Stock Journal to see if they would like to interview Subbu and they were keen so we met at the airport and the interview took place which was subsequently reported in the Stock Journal. Where to from here. -Obviously we have to wait until the review is completed but more information is required from Machinery and nozzle manufactures on the science and technology behind their products to be submitted to the APVMA for their review. As the buffer zones are based on maximum label rates, the question must be asked if these are common use rates or not and the possibility of reducing the maximum rate to something that is more commonly used, so that the buffers are reduced even further. The higher rates could be still used under a permit system if applied for, which should be readily available as the APVMA have all the relevant data. My personal opinion is that we still have a lot of work to do especially with the Dept of Environment and Heritage.

So after 1200 kilometres and safely home there are still some issues to be resolved but at least we have had some input and hopefully have shown why the buffer zones should be dramatically reduced. I would like to thank those people who helped in any way, it was certainly worth the effort and with the latest information on the APVMA website, just quietly we may have made some impact.

Measuring Soil Carbon in Calcareous Soils

Aaron Schmidt, Therese McBeath and Ron Smernik
School of Agriculture Food and Wine, Waite Campus, University of Adelaide

Why do the Trial?

Soil organic matter has an important role in soil health and fertility. Soil organic carbon (OC) is the simplest way to measure soil organic matter. Farmers and researchers have been perplexed by high soil test OC values recorded for highly calcareous soils of South Australia. High soil OC test values are taken as an indicator of good soil fertility, yet these soils are renowned for their infertility and lack of yield potential. This contradiction alerted us to the need for testing the accuracy of the soil OC test for these soils. One important farm management consequence of an overestimated soil OC test value is that N fertilizer requirement will be underestimated because the OC level is used in calculators of N fertilizer requirement.

It is known that dry combustion methods used to measure OC, will also detect the C from the carbonate in calcareous soils unless it is completely removed during pre-treatment, whereas wet oxidation techniques should be unaffected by the presence of carbonate. The aims of this experiment were to determine if the carbonate carbon in calcareous soils interferes with the techniques used to determine OC in Australian soil laboratories, and which method is best to accurately measure OC in calcareous soils.

How was it done?

Measurements were made on nine calcareous and nine non-calcareous soils. The majority of the soil samples were from South Australia, but soils from Queensland, New South Wales, Victoria and Western Australia were also included. The majority of the soil samples were from cropping systems, but a few were from pastoral and viticultural systems.

What happened?

The most promising methods for determining OC content in calcareous soils were the Walkley Black method and dry combustion following exhaustive pre-treatment with hydrofluoric acid. Pre-treatment with other acids followed by dry combustion resulted in over-estimation of OC due to incomplete removal of carbonate.

However, comparison between the Walkley Black and the combustion method suggested that the Walkely Black was still overestimating the soil OC level in calcareous soils. Figure 1 shows that there is a 1:1 relationship between the two soil tests in the non-calcareous soils, while the combustion method is predicting a much lower amount of soil OC than the Walkley Black test in calcareous soils. This cannot be due to direct interference by carbonate, since Walkley Black values are not affected by the presence of carbonate itself. The mostly likely explanation is that calcareous soils contain an abundance of sorbed OC that appears to be associated with the carbonate. This association is likely to make this sorbed OC not readily available for involvement in nutrient cycling. Sorbed OC would be liberated and lost during pre-treatment with hydrofluoric acid and hence would not be detected by the dry combustion method used here, but would be detected by the Walkley Black method. There are two possible forms of sorbed OC in calcareous soils. The first is OC contained in shelly material that is present in some South Australian Calcarosols that are close to the coast. The second likely form is OC sorbed to carbonate minerals – previous research in our group has shown that organic chemicals, such as pesticides, can have an unusually strong affinity for carbonate, and this study indicates that carbonate may also have a strong affinity for dissolved OC. Further research is needed to confirm the mechanisms responsible for this effect, and to test over a wider range of calcareous soils.

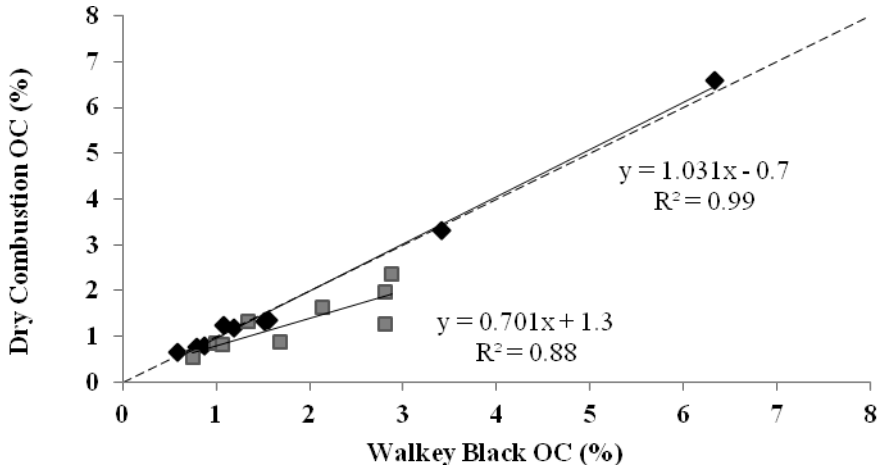

Figure 1: Hydrofluoric acid (HF) pre-treatment followed by dry combustion resulted in lower OC values than the Walkley Black method. There are two distinct linear relationships for non-calcareous soils and calcareous soils. (♦) Non-calcareous soils, (■), (- - -) 1:1 line (——) observed linear relationships for non calcareous and all calcareous soils.

What does this mean?

The results from this study suggest that while the commercially available Walkley Black method for measuring soil OC does not suffer from direct carbonate carbon interference, it detects a different form of OC which may not be readily involved in nutrient cycling and therefore the apparent fertility of the soil. This different form of OC is sorbed OC which is made up of compounds sorbed to carbonate minerals (in calcic calcareous soils) or are incorporated within the structure of shells (in shelly calcareous soils). This would explain the existence of calcareous soils with high OC contents, but low fertility.

This study shows that careful consideration is needed when analysing soil OC in calcareous soils. The end-use of the OC measurement will affect the choice of method. The Walkley Black method would be the best method for determining OC for the purpose of carbon storage, as it is measures all OC (sorbed OC and OC involved in nutrient cycling). The hydrofluoric acid pre-treatment followed by dry combustion may be the best method for determining OC for the purpose of evaluating the potential contribution of OC to crop productivity, as it primarily measures the available OC, but excludes OC strongly associated with carbonate minerals (sorbed OC). However, hydrofluoric acid pre-treatment is not a commercially practical method, as hydrofluoric acid is very toxic and requires special equipment to be safely handled. It is therefore recommended that a very large and representative set of calcareous soils are analysed using this technique in a specialist laboratory. The outcome of this experiment would be the development of a correction factor that could be used to convert the OC content determined using the Walkley Black method on a Calcarosol to give a value that is comparable, in terms of predicting the fertility effect of OC, to Walkley Black values for non-calcareous soils.

We have determined such a correction factor using the data from this study (Equation 1), but we emphasise that this is based on a limited set of soils and it is likely that more data is required to provide a reliable equation.

$$\text{Corrected soil OC} = 0.39 + (0.97 \times \text{Walkley Black OC}) - (0.09 \times \text{CaCO}_3\ \%\ \text{content}) \quad (1)$$

$$R^2 = 0.99$$

Acknowledgements

Thanks to Colin Rivers and Steve Szarvas of the CISRO for their analytical support. Thanks to the GRDC, The Ranson Mortlock Trust, The Commonwealth Hills and Phil Watters Memorial for the award of scholarship to AS.

New Herbicide Management Solutions

Christopher Preston, Peter Boutsalis, Jenna Malone, Sam Kleeman and Gurjeet Gill
School of Agriculture, Food & Wine, University of Adelaide, John Broster E. H. Graham Centre, Charles Sturt University

Herbicide resistance in Southern Australia

Recent surveys of southern Australia have identified high levels of herbicide resistance in annual ryegrass. In most areas resistance to Group A fop and Group B sulfonylurea herbicides is very high. More concerning is the increase in resistance to clethodim and trifluralin herbicides (Table 1). There are variations between regions, for example trifluralin resistance is much higher in South Australia than elsewhere. These regional differences largely reflect differences in cropping practices and hence herbicide use patterns.

Table 1. Percentage of paddocks with herbicide-resistant annual ryegrass in cropping regions of southern Australia

Region	Year	Trifluralin	Hoegrass	Glean	Achieve	Axial	Select
			Populations resistant (%)				
SA- Mid North	2008	40	76	73	64	59	40
SA- Mallee	2007	19	6	67	2	2	2
SA- South East	2007	39	60	69	50	53	41
SA- Eyre Peninsula	2009	5	30	78	29	30	11
Vic- Western	2005	5	35	57	28	30	12
Vic- Northern	2006	2	40	43	nt	34	11
Vic - Southern	2009	0	79	81	84	68	23
NSW - SE	2008	6	81	70	nt	nt	21
Tas	2009	0	11	23	nt	nt	0

New pre-emergent herbicides

The increasing extent of trifluralin-resistant annual ryegrass makes alternative herbicides vital for the continued use of no-till seeding systems. Over the past 6 years we have conducted many trials with several pre-emergent herbicides in an attempt to identify possible replacements for trifluralin. Below are our comments about how these products have behaved in our trials on trifluralin-resistant annual ryegrass and where we see the products fitting into the cropping rotation.

Trifluralin (Group D). Trifluralin is a well known herbicide that has an excellent fit in knife-point and press wheel cropping systems in most cereals and many break crops. Trifluralin is tightly bound to stubble and organic matter and performance will be reduced in high-stubble conditions. Trifluralin is damaging to wheat if it gets into the crop row, so good separation is necessary between the herbicide and the crop seed. Incorporation by seeding is essential to good annual ryegrass control. Unfortunately, resistance to trifluralin has evolved and is increasing in many cropping regions. Increasing the trifluralin rate or the addition of triallate provide some additional control of resistant annual ryegrass, but are not effective management strategies.

Boxer Gold (prosulfocarb + S-metolachlor Group J + K). Boxer Gold controls trifluralin-resistant annual ryegrass. Boxer Gold is registered in wheat and barley. Barley is more tolerant of Boxer Gold than wheat. Boxer Gold is water soluble and some incorporation can occur with rainfall, but the herbicide is most reliable when incorporated by sowing. Boxer Gold can be damaging to wheat if it gets down to the crop seed. We have also seen damage to wheat when herbicide treated stubble gets incorporated into the seed row. Because Boxer Gold is more soluble, some damage can occur on light soils and with shallow seeding depths. Separation of seed and herbicide is important. Boxer Gold does not bind to stubble as much as trifluralin, but performance decreases with high stubble loads. Boxer Gold has less soil persistence than trifluralin, so in long growing seasons annual ryegrass will emerge after the herbicide has dissipated.

Triallate (Group J). Triallate has traditionally been used for wild oat control, in some cereals, some pulses and canola. Some annual ryegrass suppression occurs with the higher label rates, but insufficient for triallate to be a stand-alone annual ryegrass herbicide. Our trials have always found addition of triallate to any of the other pre-emergent herbicides provides extra control of annual ryegrass. Triallate needs incorporation by sowing to achieve the best results as a mixing partner.

Pyroxasulfone (Group K). Pyroxasulfone is due to be released as Sakura in 2012 and controls trifluarlin-resistant annual ryegrass. It will initially be registered in wheat and barley. Wheat is more tolerant than barley. Pyroxasulfone is quite water soluble and some will be incorporated by rainfall; however, incorporation by seeding is more reliable. Separation of herbicide and crop seed, particularly for barley, is important to avoid crop damage. Pyroxasulfone has longer soil persistence than trifluralin. This means annual ryegrass emergence will be controlled until later in the season, but also that rotation options to sensitive crops will be reduced.

Dimethenamid-P (Group K). Dimethenamid-P is due to be released as Outlook in 2012 and controls trifluralin-resistant annual ryegrass. It will be initially registered in pulse crops. Dimethenamid-P is very damaging to wheat and barley, so will not be registered for these crops. The best weed control results with dimethenamid-P occur with incorporation by sowing.

How to get the best out of new pre-emergent herbicides. Over-reliance on a single pre-emergent herbicide will inevitably lead to resistance to that mode of action. Within the pre-emergent herbicides discussed there are only 3 different modes of action. None of these herbicides will be registered in all crops in the rotation. For example, neither Boxer Gold, nor pyroxasulfone will be available for canola. Therefore, if trifluralin resistance is not yet present, it will be important to use these new herbicides for some crops in the rotation so that trifluralin can be saved for use in crops like canola.

Glyphosate and paraquat resistance in annual ryegrass

Glyphosate resistance has occurred where there has been intensive use of glyphosate over a long period of time and where few or no other weed management has been employed. To date in Australia five weed species have evolved resistance to glyphosate: annual ryegrass, barnyard grass, liverseed grass, windmill grass and fleabane. Glyphosate resistance in the last four species has evolved from summer fallow uses of glyphosate.

Glyphosate resistance in annual ryegrass has been documented from 134 sites across NSW, Vic, SA and WA (Table 2). Of particular concern is the number of un-cropped sites around the farm, such as fence lines, where glyphosate resistance is occurring. This is a concern because glyphosate-resistant weeds can move off fence lines and into the cropped area.

Table 2: Situations where glyphosate-resistant annual ryegrass has occurred.

Situation		Number of sites	States
Broadacre cropping	Chemical fallow	29	NSW
	Winter grains	32	Vic, SA, WA
	Irrigated crops	1	SA
Horticulture	Tree crops	4	NSW
	Vine crops	17	SA, WA
Other	Driveway	2	NSW, Vic
	Fence line /Firebreak	36	NSW, SA, Vic, WA
	Irrigation channel	10	NSW, SA
	Airstrip	1	SA
	Railway	1	WA
	Roadside	1	SA

Recently, we detected paraquat resistance in several populations of annual ryegrass from South Australia. These populations had been treated with paraquat for a long period of time. One population was resistant to both glyphosate and paraquat. We don't yet know the extent of paraquat resistance, but this finding demonstrates that over reliance on any herbicide can result in resistance.

As glyphosate-resistant weeds are occurring along fence lines due to intensive use of glyphosate, no competition and no other effective weed control, it should be possible to reduce the risk of glyphosate-resistant weeds by changing some of these practices. For example, where fences are no longer useful, removing the fence and cropping the area will provide both competition and a change in weed management practices. Other practices that could be employed would be mowing or slashing the weeds along the fence line, with herbicide employed only for the area immediately under the wire. Cropping as close to the fence as possible and cutting a fire break late in the season will reduce the area treated solely with glyphosate.

Many growers will continue to want a herbicide option to keep fence lines clean of weeds, so we have been exploring herbicide options for controlling glyphosate-resistant annual ryegrass on fence lines. An experiment was conducted to examine a range of herbicide options to control a large population of glyphosate-resistant annual ryegrass along a fence lines. Glyphosate even at high rates provided little control (Figure 1). Mixtures of Amitrole T and diuron at high rates to glyphosate provided about 60% control. SpraySeed mixed with diuron and SpraySeed double knock were the best treatments. This population was very large and high rates of residual herbicides were essential to get control. In smaller populations, lower rates of residual herbicides may be effective. Generally we have found the addition of residual herbicides to fence-line sprays improves control of glyphosate-resistant annual ryegrass. However, care needs to be taken with residual herbicides to ensure they are not used in situations where damage to desirable plants, such as trees, might occur. Further research continues to develop new options for fence line weed management.

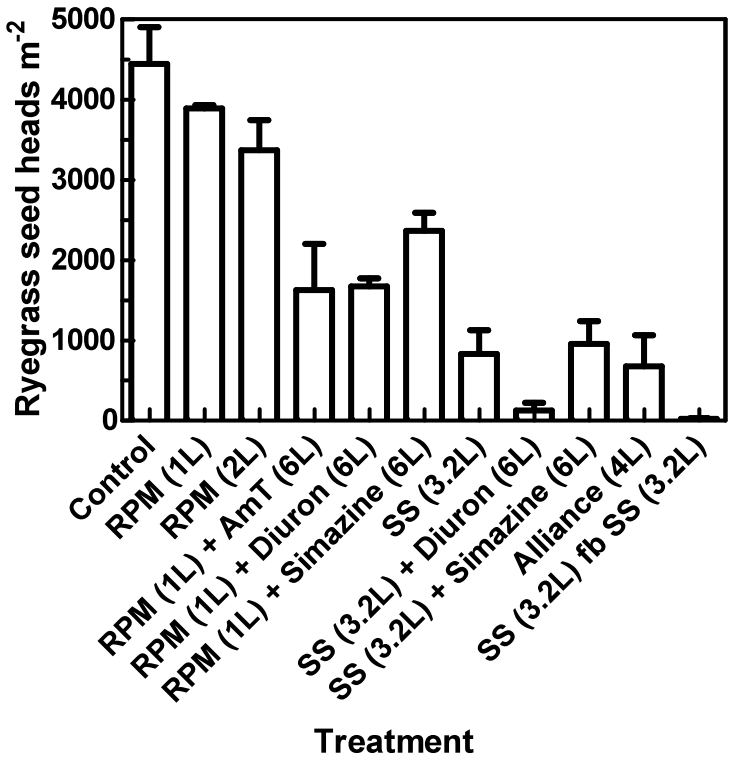

Figure 1: The efficacy of different mixes and rates of herbicides on glyphosate-resistant ryegrass. RPM = Roundup PowerMax, SS = Spray.Seed, AmT = Amitrole T, fb = followed by after 14 days.

Dr. Christopher Preston
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DO WE HAVE A BIGGER WINDOW FOR SUMMER SPRAYING THAN WE THINK?

By John Both, Nufarm R&D

Over the past two summers I have been curious about the use of Delta T as a guide to when is the best time of day to spray summer weeds. The conventional wisdom is that a Delta T figure of 2 to 10 is the preferred range – the assumption being that this is when the target weeds are not under excessive stress.

One factor Delta T overlooks is soil moisture. In the past two seasons I have conducted small-scale trials with Roundup DST on potato weed where these weeds have had access to moisture not far from the surface. As a consequence, even at Delta T readings above the optimum, the weeds did not have the appearance of being stressed.

Efficacy with Roundup DST in both years was not affected by Delta T.

Coomandook – January 2010

In this trial young, actively growing potato weed and caltrop was sprayed with 750 mL/ha of Roundup DST both with and without ammonium sulphate. This rate proved more than adequate and almost 100 percent control was achieved with every treatment within 7 days. Below are the spray timings:

	Timing 1	**Timing 2**	**Timing 3**	**Timing 4**	**Timing 5**
Time	8 am	9.15 am	11 am	12.30 pm	1.45 pm
Temperature	17.4^{o}C	21.5^{o}C	26.6^{o}C	30.2^{o}C	32.1^{o}C
Relative Humidity	65%	52%	41%	32%	27%
Delta T	***3.9***	***6.3***	***9.1***	***12.0***	***13.8***
Cloud Cover	20%	20%	10%	0%	20%
Wind Direction	W	S-W	S-E	E	E
Wind Speed (km/hr)	0.3	0.8	0.6	0.4	1.7

Coomandook – day of spraying

Clearly Delta T had no impact on efficacy and any benefit of ammonium sulphate could not be evaluated. We proved weeds could be killed at a Delta T of up to 13.8 if they were 'soft' enough. The challenge was to make the herbicide work a bit harder by choosing bigger weeds and lowering the herbicide rate. This is what was done with a trial nearing completion.

Templers – January 2011

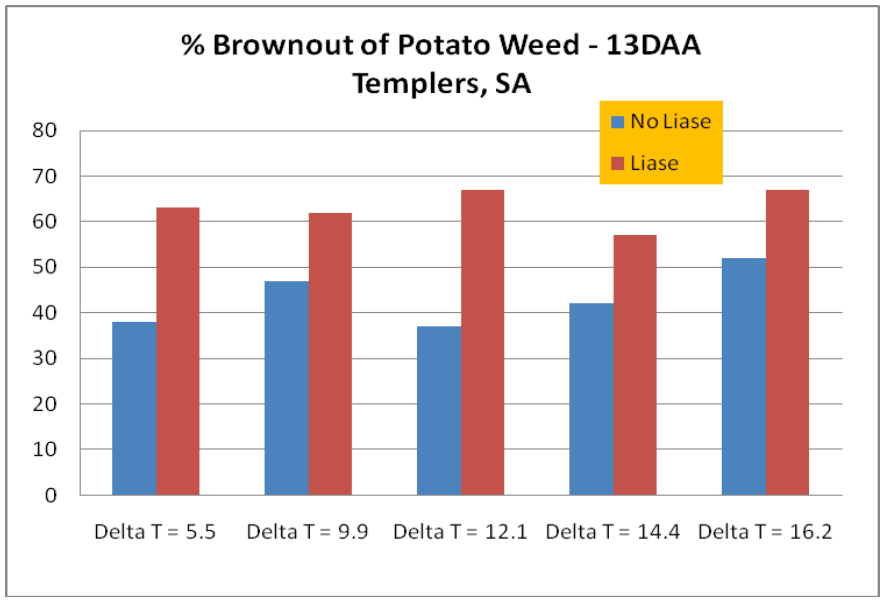
The Templers site had more advanced potato weed and a lower rate of Roundup DST (600 mL/ha) was used. Also the maximum Delta T sprayed at was higher (16.2).

	Timing 1	**Timing 2**	**Timing 3**	**Timing 4**	**Timing 5**
Time	7.30 am	9.20 am	11.00 am	2.00 pm	5.45 pm
Temperature	20.1°C	28.0°C	32.5°C	36.0°C	36.9°C
Relative Humidity	56%	38%	32%	27%	23%
Delta T	**5.5**	**9.9**	**12.1**	**14.4**	**16.2**
Cloud Cover	0%	0%	0%	0%	0%
Wind Direction	Nth	Nth	Nth	Nth	NW
Wind Speed (km/hr)	9.8 km/hr	7.8 km/hr	3.7 km/hr	10.0 km/hr	4.1 km/hr

Weeds at 7.30 am (Delta T 5.5; Temp 20 degrees; RH 56%)

Weeds at 2.00 pm (Delta T 14.4; Temp 36 degrees; RH 27%)

The plants did not to show signs of stress during the day, indicating they had adequate soil moisture to continue transpiring. While speed of kill and overall efficacy at Templers was less than at Coomandook the previous year, the pattern of efficacy at different spray times was the same – that is, Delta T had no impact. There was no significant difference between timings for Roundup DST alone and for Roundup DST plus ammonium sulphate. There was however a significant benefit in adding ammonium sulphate to Roundup



DST in this trial, even at the lowest Delta T. One further assessment will be made on this trial.

Work like this, while only a couple of trials, suggests that we may be giving up on spraying on some days when it would be safe to continue. For those near vineyards and horticultural areas it means they will be less inclined to spray in the early mornings when inversion conditions occur. It is worth pointing out that low drift nozzles producing a coarse spray were used in both trials.

Further trials may be conducted in future with more stressed plants and other common molecules.

Snails and summer weeds on the NYP

Sam Davies

Recently upon inspection of summer weeds across the northern YP, it came to my attention that snails, as well as causing thousands of acres of lost field pea yields this year:-(were going to limit substantially the opportunity for summer weed sprays to get contact, uptake and translocation through the weeds that they covered, see photo's of snail infested wild lettuce and onion weed plants. Consequently in heavily snail affected paddocks it will be worthwhile to consider contact sprays like Gramoxone and Sprayseed, as well it has been well noted that the addition of wetters at penetrating rates, i.e. for 100% weight/volume non-ionic actives, 250ml/100L water, as well acidifying adjuvant chemicals like LI-700 in addition to summer oils, will very likely increase summer weed control in these situations. It appears that from the large number of paddocks unable to be harvested last year, that the issues with snails and adequate control of snail numbers will require a multifaceted approach of burning, cabling, running stock over paddocks (those not prone to drift) and baiting in high quantities at first rains will be required to regain some manageable levels of snails for this coming season. I'm quite sure that many will be listening intently to the presentation from Gavin Ash, Charles Sturt University at the GRDC Updates, with regard to Snails, and new bacterial control options. However for now, it will be important to start the management planning, and perhaps budgeting for the expense of snail baiting this year. As well, it will be important to consider the implications of snails with summer weed sprays in badly infested paddocks.

These photos from Wanderah, illustrate the poor root system of a recent bread wheat, presumably a result of susceptibility to Root Lesion Nematode (***Courtesy Tony Rathjen and photo below***)

Photos showing the recent flooding in Cambrai. ***Courtesy of Marg Evans***