CROP SCIENCE SOCIETY OF S.A. INCORPORATED

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INCORPORATING THE WEED SCIENCE SOCIETY

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Next Meeting	**'Student Trip to India'**
Venue	**Stefanson Theatre, Roseworthy Campus**
Date	**WEDNESDAY 21st March**
Time	**7.30 pm**

Speakers

Bevan Addison: National Technical Manager, Imtrade

'Reducing emissions from livestock research program'

Student Report on India Trip – Tom Blake and Claire Gutsche

Anthony Pfitzner will be available to make a few comments and answer questions during the open session at the beginning of the meeting

Book review
The Biggest Estate on Earth
(How aborigines made Australia)
By Bill Gammage

At last! A classic study of the Australian landscape and will become to be regarded as one of the most important books written about Australia.

Gammage, a major historian at the Australian National University has studied three sources:

- Writing and art depicting land before Europeans changed it
- Anthropological and ecological accounts of Aboriginal societies today, especially in the Centre and North
- What plants tell of their fire history and habitats

And he notes this is 'only a fraction of what exists..... so that one day Australians might see more clearly the great story of their country'.

The first section of the book, of about 50 pages, discusses the pictorial record from early landscape painters with two of the images being reproduced in this newsletter. When one asks, it becomes clear that most believe that the Adelaide Plains were cleared by the first Europeans. This is clearly wrong as the many landscape and writings of the time attest, with the reproduction from Berkeley an example here (see first picture following article). Gammage in his comments at Writer's Week claimed that he had about 20 such examples and most of us would be aware of the St Gill paintings. With no difficulty, I found a drawing by FR Nixon from the mines at Glen Osmond which could have been drawn last week from the hillside behind the Waite of the scattered large Grey Box.

The second image is a photograph of a hillside near Canberra which is how one could imagine the Adelaide Hills when Hahn described the country around Hahndorf.

An amazing facet arises from this section. How often, how similar are the landscapes across Australia! Generally scrub both on the ridges and patches on the plains between with quite sharp boundaries between scrub and park like landscapes with scattered trees. A total contrast to the landscape shaped by uncontrolled fire where the trees on the slopes and ridges are most vulnerable.

The second section asks the question 'Why was Aboriginal land management possible?'.

The three chapters examine specific matter, with the first looking at aspects which have changed. The first and probably the most significant of these being the soil compaction and consequent increased water shedding, reduced swamps and springs, and increased gully erosion. This is followed by a perceptive section on Aboriginal religion - especially in respect to land. The third documents the incontestable evidence for land ownership by the Aboriginal clans. Locally this was not recognized until 1840 when there was a major rumpus at the time Teichelmann and Schurmann published their Dictionary of the Aboriginal Language of South Australia (actually the Adelaide region), giving the word Pangkarra for the tract of land belonging to an individual which he inherits from his father. The Government then began reserving sections from current surveys for Aborigines.

The third sections the actual land management in extraordinary referenced detail from the earliest sources, especially explorers including Eyre, Sturt and Grey well known locally and very gifted and observant recorders and others including Robinson of Tasmania, who had an ambiguous role. The overall effect is an overwhelming cascade of evidence for Gammage's thesis, even to the point of being repetitious which is excusable in view is the entrenched mythology that European descendant farmers where responsible for destroying Australia. (No doubt you, as have I, cringed with the accusation of environmental vandalism). Of course the main instrument was fire which was astonishingly well managed to achieve remarkable results, in contrast to some recent efforts particularly in WA.

The timing of the burning was critical in view of its objectives, so different intensities favoured different species and weather conditions had to be considered with wind, evening dews, previous burns, fuel loads and vegetation patterns requiring consideration. In this respect, it is worth noting that the recent control burns in Belair National Park which would be regarded as successful by current standards did result in the felling of a few large trees.

So we have nothing like the skill of the Aborgines in managing burns.
The aim of much of this activities was to manage what Gammage calls Templates. Juxtapositions of grassland and scrub and various vegetation associations for their lifestyle. Narrow corridors into scrub or into swamps were an asset for hunting, vegetation surrounding swamps help preserve these from drying winds.

After what I regard as the least interesting Chapter entitled 'A Capital Tour' there comes one of the most interesting. Gammage concludes that the Aborigines ' farmed in 1788, but were not farmers'. You need to read this yourself to make up your own mind on this matter!

This book amazed me. While I was aware of some of the detail, when it is presented in such a concentrated and detailed referenced form, I found the case totally convincing and has forced me to move on from wondering whether the word farm should be applied to the Aboriginal food collection to the position where I think that we should describe the totality of their activities as Gardening and Herding, rather the derogatory hunting and gathering.

Painting of Mt Lofty from East Terrace, Adelaide c1840 by Martha Berkeley.

Photograph of Kangaroo grass near Berridale, NSW in late summer 2008

Stubble Phosphorus: Form and fate in cropping soils

[1]Sarah Noack, [1]Mike McLaughlin, [1]Ronald Smernik, [2]Therese McBeath, [3]Roger Armstrong

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Key messages:

- **Crop stubble sampled in 2010-2011 and 2011-2012 contained 1-5 kg P/ha.**
- **Most of the P contained in stubble is orthophosphate which is water soluble and readily available to plants and microorganisms.**
- **Field leaching experiments indicate that a small amount of stubble P is released by summer rainfall events**

Background

A key consideration for growers when deciding their fertiliser management is how much phosphorus (P) will stubbles supply, and when will this P be available to plants during the growing season. Many previous studies suggest that the timing and quantities of P release vary and are not well explained by the total amount of P or the ratio of carbon to P (C: P) in the stubble. Stubble type, size, placement, moisture supply and amount can all influence the timing and amount of P released from stubbles to the soil. Our research aim is to better identify P forms in crop stubble, understand how these forms influence P release and breakdown from stubble and provide a better estimation of the contribution stubble P makes to subsequent crop P uptake. Phosphorus within the stubble can be released directly to soil as soluble P (where it can be used immediately by the crop or chemically fixed onto the soil) or be absorbed by microorganisms which can subsequently be released back into the soil sometime in the future (Fig. 1). The chemical composition of crop stubble plays an important role in the rate of nutrient release. Currently, the quality of crop stubble is assessed using the C:N:P ratio of the stubble. The thinking here is that this ratio influences the proportion of P that follows pathways of immediate release or incorporation by microorganisms and subsequent release back to the soil. This occurs because the microbial population requires a C source for 'energy', which is provided by the stubble, as well as certain amounts of nutrients such as N and P in order to have energy to continue to grow (similar to animals). How crop stubble affects soil P availability will therefore depend on the balance between direct release of P (and C and N) from stubble and microbial uptake and release. The presence of different chemical P forms in the stubble is likely to influence the proportion of P that undergoes direct release or microbial uptake and decomposition.

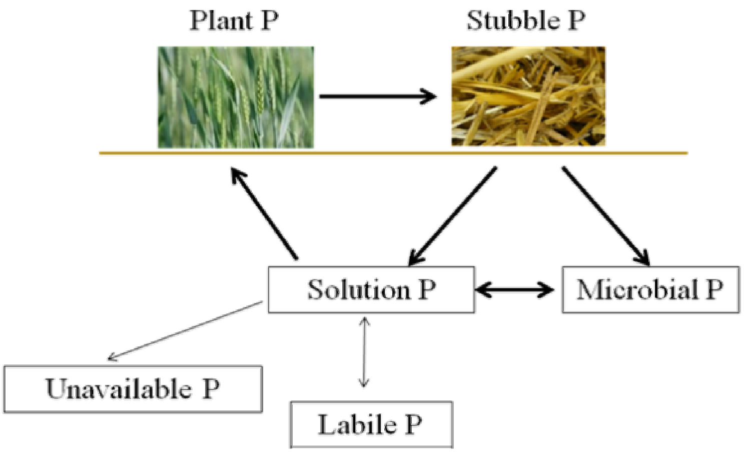

Fig 1. Simplified version of the soil P cycle highlighting the fate of stubble P in soils.

Phosphorus forms in crop stubble

Following harvest in 2010-11, stubbles from eight different crop types (grain yield range 1-4 t/ha) in the Mid-North and Mallee regions were sampled. These stubbles contained between 1-5 kg P/ha. Nuclear magnetic resonance (NMR) spectroscopy was then used to determine the different forms of P present in the stubble. On average, 52% of stubble P was identified as orthophosphate, which has the potential to be returned directly to the soil in a readily available form (Fig 2). This source of P would be immediately available for uptake by plants (via root uptake), but also available for uptake by microorganisms, as well as sorption (chemical fixation) onto soil minerals. The remaining forms of P included P associated with phospholipids, ribonucleic acid (RNA) and pyrophosphate. These forms are not directly available to plants, but are considered 'labile', i.e. readily available for uptake and decomposition by microbes which can potentially provide P to plants through this pathway.

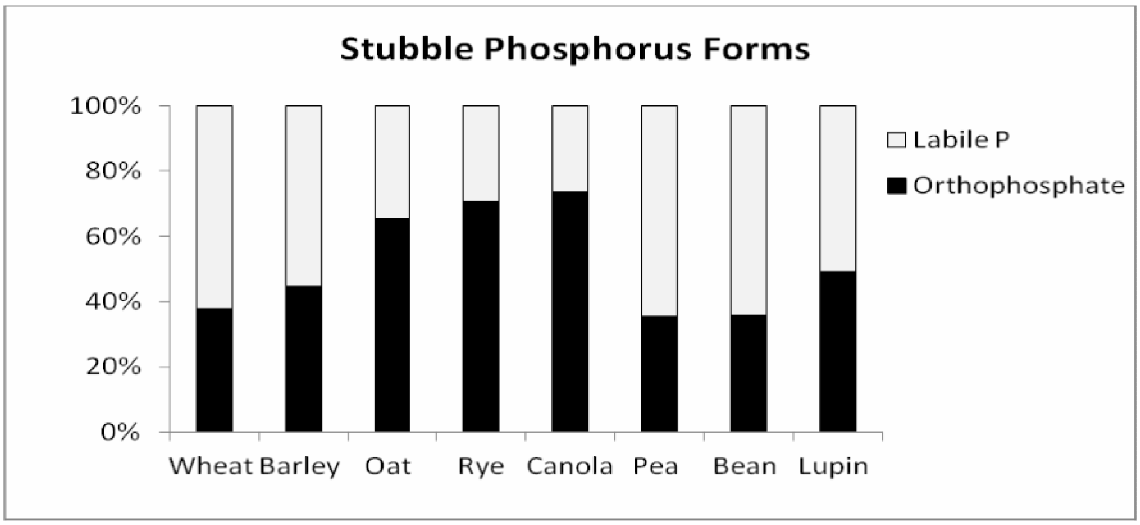

Fig 2. Forms of P identified in crop stubble. Labile P includes P associated with phospholipids, RNA and pyrophosphate.

The large variation in orthophosphate concentrations among stubble appears to be related to differences in the total P concentration of stubble samples (Fig 2). Crop stubble with higher total P concentrations had higher orthophosphate concentrations. Previous work indicates that as plants take up 'luxury' P they store this as orthophosphate. Phosphorus deficiency has also been shown to alter how P is partitioned among plant organs. More P is stored in the reproductive organs (seeds) at the expense of P accumulation in vegetative organs (stem and chaff) in deficient plants. This results in a reduction of the amount of P remaining in the stem component of crop stubble. Crops with higher total P concentrations are not only going to return larger quantities of P back to the soil but will return more P as orthophosphate, which is the more plant-available form.

Relationship between P forms and solubility

After successfully identifying the P forms in stubble we investigated the water solubility of these forms of P. We found that for finely ground stubbles, the large majority (average 85%) of stubble P was water soluble and detected in the form of orthophosphate. It would appear that during the water extraction enzymes converted some of the non-orthophosphate P forms to orthophosphate. Consequently, we found 85% orthophosphate in the water solution compared to only 52% orthophosphate in the original stubble. At first glance, these results suggest that following the first significant summer rainfall event, the majority of stubble P would be released from the stubble. However, when this experiment was repeated in the field using conditions that better represented paddock conditions, very different results were obtained. We measured the release of P from large pieces of stubble (5cm) at a rate of 2 t stubble/ha when exposed to summer rainfall. Preliminary results show that between 0-13% of the total stubble P has been lost from various crop stubble (from 12.6 mm of rainfall Dec-Feb), and samples from more recent rain events are still being analysed. This indicates that crop stubble in the field can release some orthophosphate into soil solution which could be accessed by plant roots if present. However, the slower release of stubble P in the field compared to the laboratory suggests that stubble potentially plays a more important role as a longer term P supply to subsequent crops.

Current Work

A glasshouse experiment is also being established to measure how stubble size and placement affect release of stubble P. In addition we will test whether stubble P is an important long term supply of P to subsequently grown crops. As is well known, fertiliser P has a major role in the establishment of crops, but in our experiment we ask is the breakdown and release of stubble P potentially an important longer term in-season supply of P to crops?

SPAA Precision Ag EXPO

Port Lincoln Hotel, SA, February 2012

Changes in soil phosphorus with different cropping seasons. How can PA make the most of the situation?

Therese McBeath, CSIRO Ecosystem Sciences, Waite Campus, 83038455
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Key Findings/Take Home Messages:

- Where soil phosphorus (P) has accumulated beyond the soil test critical value it is possible to reduce P inputs.
- Reduced P inputs following poor seasons for soils with adequate P will produce good crops, but will decrease soil P reserves and needs to be monitored to avoid P deficiency.
- The amount of added P fertiliser that is used by the crop increases with increasing rainfall and is likely to decrease soil P reserves, potentially increasing the requirement for fertiliser P in subsequent seasons.
- Soil testing for P can increase the profitability of fertiliser management decisions.

Current Phosphorus Management Issues

It has been observed across the dryland cropping region of Australia that soil P is accumulating beyond the adequate range for crop production. This was particularly the case in the dry seasons of the Millenium Drought where blanket approaches to fertiliser use resulted in application rates in excess of P removal and an accumulation of soil P levels. There are a number of management questions that arise from this situation:

1. What is the interaction between season and fertiliser use efficiency?
2. What is the residual value of added fertiliser and how do I measure this?
3. Can I reduce my P inputs?

There are two main risks to the bottom line when it comes to fertiliser management, the first being loss of profit through loss of yield and second being loss of profit through use of fertiliser above crop requirement. There are several ways to monitor whether P fertiliser management is at optimal efficiency and they include fertiliser response trials, modelling of the interaction between soil nutrient reserves and crop production, and the use of soil testing to monitor soil fertility. Fertiliser response trials tend to be quite accurate, but are intensive in cost and labour, and are specific to the site and season of the testing. Modelling enables consideration of response to different management strategies over a longer timeframe, but when it comes to phosphorus, it is very much a work in progress and not ready for use of on-farm prediction of soil nutrient reserves. For P, soil testing is a monitoring tool that can have varying levels of accuracy in the prediction of the relationship between the soil test value and the responsiveness of the paddock to P addition, especially when using Colwell P on calcareous soils.

1. **What is the interaction between season and fertiliser use efficiency?**
2.

Crop P uptake comes from both freshly applied fertiliser, from residual fertiliser and native P throughout the soil profile, and is controlled by both soil and climatic factors. Drying the soil surface can reduce the availability of fertiliser P when it is banded in the topsoil, while a wet soil profile will provide increased access to soil P through enhanced root growth and diffusion (movement) of P to growing roots.

In 2010, the effect of above and below average rainfall on crop fertiliser P uptake was measured using radioisotopes of P at seven sites in Southern Australia. The amount of P fertiliser used by wheat increased with increasing rainfall but was not directly related to whether the soil was initially deficient or sufficient in P. The fertiliser efficiency was in the order of 3-30% of P added. At P application rates of 10-20 kg P/ha this equates to 0.3-6 kg P/ha being used in the year that the fertiliser is applied. The remaining (unused) fertiliser will also have residual value to crops grown in subsequent seasons (depending on climate and soil conditions).

When sufficient P was present in the subsoil, the use of subsoil P increased with the addition of P fertiliser to topsoil, suggesting that the P fertiliser stimulated root growth into the subsoil. The banding of P fertiliser is an important fertiliser management strategy in both wet and dry seasons. In dry seasons the fertiliser is co-located with moisture arising from small rainfall events, and in wet seasons the fertiliser band stimulates early root growth to enable the crop to better exploit fertility in other parts of the soil profile. From a PA perspective the important information to know is that P removal will increase in high production years and fertility will need to be monitored to ensure the system is maintained at the level that the landholder desires.

3. **What is the residual value of added fertiliser and how do I measure this?**
4.

In order to assess the P response from current and residual fertiliser applications, a 4 year replicated trial was established at Minnipa Ag Centre (MAC) measuring crop response to fresh and residual P addition, with the changes in soil P fertility measured annually. The Colwell P measurements have been declining following three above average production seasons with a reduction from 36-37 mg/kg at sowing in 2010 to 27-31 mg /kg at sowing in 2011. There was no soil Colwell P response measured at sowing in 2010 in response to P applied in 2009. In contrast, at sowing in 2011, soil Colwell P was greater in response to additions of 10 and 20 kg P/ha compared to additions of 0 and 5 kg P/ha in 2010 (Figure 1). The same relationships were observed using the DGT-P soil test.

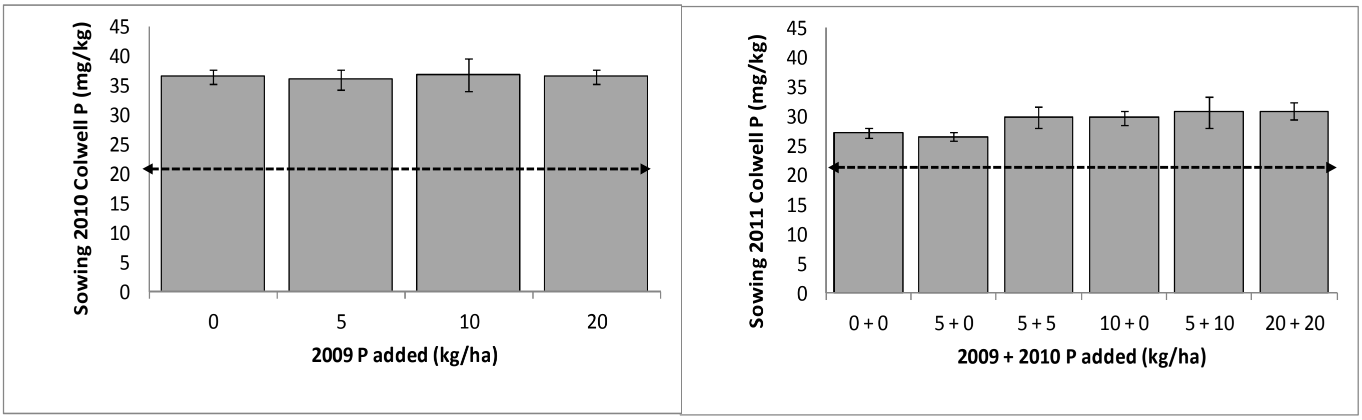


Figure 1.a (left) Colwell P values measured at sowing in 2010 and 1.b (right) measured at sowing in 2011 in response to P fertiliser added in 2009+2010. The dashed line represents the critical Colwell P value for this trial corrected using the PBI measurement.

There has been no crop yield or quality response to applied P at this site for three seasons now. Due to the lack of response to added P in this soil it is not possible to assess the residual value of P fertiliser in subsequent seasons as all treatments have had the same yield in every season of the experiment. However, the soil test value for P is nearing the critical value for the DGT-P soil test, so we may start to see some treatment effects in 2012. In the absence of yield data to help us evaluate the residual value of fertiliser, monitoring of soil fertility is proving the best tool to monitor how fertility and fertiliser requirement is responding to season type.

5. Can I reduce my P inputs?

6.

A replacement P trial comparing conventional fertiliser rates with replacement P rates (replacing the amount of P removed in the previous grain harvest) is based at MAC on two soil types. Both sites had starting soil P levels well above the adequate range and in the first year there was no response to P, however this was following three years of drought where the fertiliser input would have exceeded the crop requirements, allowing a build-up of residual phosphorus. In the above average rainfall seasons of 2010 and 2011, there was a response to added P but due to high yields the replacement P rate was similar to or higher than the district practice of 10 kg P/ha at 8-13 kg P/ha, and there was no yield advantage of using a replacement P rate compared to using the district practice rate. This resulted in the district practice rate of 10 kg P/ha being the economic optimum rate. While it was possible to achieve equivalent yields for the first year following drought with no P inputs, the high yields of 2009 and 2010 resulted in a decline in soil P fertility and a response to added P fertiliser. Shifting fertiliser inputs in response to changes in to the seasonal effects on soil fertility would be of benefit to fertiliser use efficiency.

At Karoonda, a fertiliser trial tested wheat response to four rates of P at five rates of N, on three separate soils for the growing seasons of 2010 and 2011. All three soil types had starting Colwell P levels twice the critical level for deficiency and the soil test P levels did not decline from 2010 to 2011. Wheat showed a very flat response to P addition on all three soil types in 2010 following several dry years. However, in 2011, following the high yields of 2010, there was a response to P addition on the sandy topsoils of the dune and mid-slopes, but not in the heavy swale soil. This response was not predicted by the soil test values and while the P effect was significant the data had some variability, and the significant difference was between 0 and 20 kg P/ha. These three soil types exist in one paddock. The returns on fertiliser input for each soil type at this site are shown in Table 1 and suggest that significant gains in fertiliser use efficiency would be made by cutting fertiliser inputs on the swale and using P fertiliser on the responsive dunes and swales.

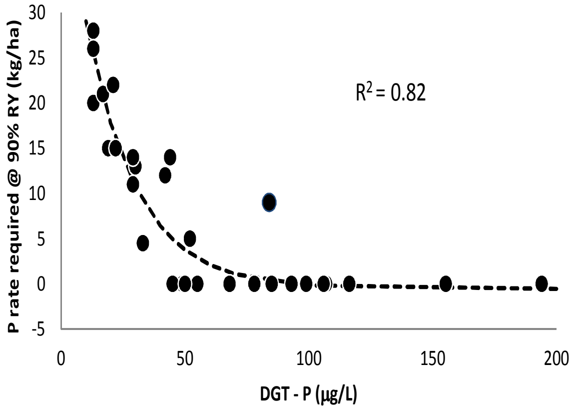
Table 1. Estimated return ($/ha) on P fertiliser (cost used was $750/t DAP, Jan 2011, and return was $210.85/t APW grain ex-Pt Adelaide, average of prices 21st November, 2011) including only fertiliser cost and grain prices. Note that DAP was used as the P fertiliser source which also contains N.

P rate (kg/ha)	5	10	20
	Return ($/ha)= $ for Grain above zero P Fertiliser-Fertiliser Cost		
Swale	-24.88	-50.59	-61.87
Mid-slope	37.48	30.74	54.19
Dune	16.29	6.23	82.88

In most trials measuring the sustainability of reducing P inputs, the monitoring of soil fertility is providing clues as to the rundown or maintenance of soil P fertility relative to the critical value. A well calibrated soil test can be used to develop a relationship between soil test value and P addition required to achieve maximum yield (see Figure 2.a as an example with DGT-P). When this relationship works well, there is a significant pay-off from investment in soil testing, because soil testing provides reliable information to guide the selection of P rates which will keep soil P reserves at or above the critical value. A well calibrated soil test can provide significant economic savings as illustrated in Figure 2.b. In this example, returns were calculated using the following:

1) If a soil test correctly predicted a site is deficient in P – the positive $ return is the yield gained with P addition minus the cost of the P input; and
2) If a soil test correctly predicted the site is sufficient in P – the positive $ return is the savings is not applying P above a starter rate of 5kg P/ha.

The return made on the extra yield obtained with P application in a deficient soil is of greater $/ha benefit than the cost savings of not applying P in a sufficient soil. The counter balance is that getting the P rate right when managing a responsive situation requires investment up front whereas for a sufficient situation, the $$ can stay in the bank. Getting these costs, benefits and risks in the right balance for you, or your client, is the key. Soil testing can get you closer to that balance.



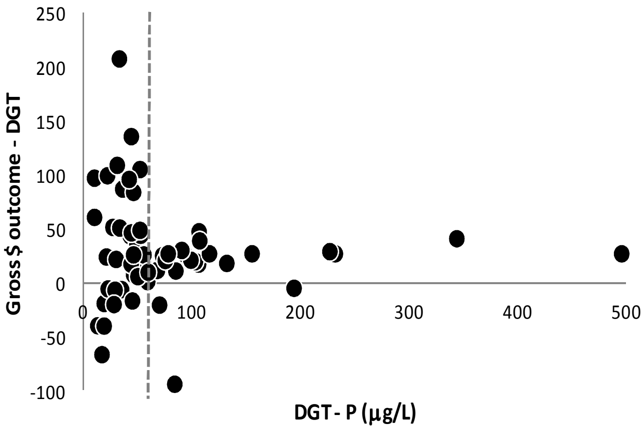


Figure 2.a (left) Relationship of DGT P soil test measurements (soils had PBI in the range 10-200) with the P rate required to maximise yields. Data is obtained from replicated field trials performed during 2006-2010 across Southern Australia and 2.b. (right) potential returns using the DGT-P soil test under both deficient and sufficient conditions (dashed vertical line represents the critical value). Data used is from a replicated P response field trial database generated 2006-2010. Parameters used – Wheat @ $200/t, DAP/MAP @ $750/t, DGT-P @ $22/test.

Acknowledgements

Funding for the topsoil-subsoil work was from South Australian Grains Industry Trust and Australian Research Council (LP0882492). Phosphorus is funded by GRDC project UA0017 on EP, project CSA 00025 in the Mallee and CSA020 nationally. Thanks to Nigel Wilhelm and Mike Robertson for useful comments on this article.

Populations of glyphosate resistant annual ryegrass on the rise

Peter Boutsalis and Chris Preston, University of Adelaide

The latest update of the Glyphosate Resistance Register, available from the Australian Glyphosate Sustainability Working Group website www.glyphosateresistance.org, has shown a dramatic rise in the number of glyphosate resistant annual ryegrass populations in the past year (Figure). Some of this rise is the result of a survey conducted of roadsides, irrigation channels and other non-agricultural areas. However, a large rise in the number of populations identified in winter grain cropping has also contributed to the increase (Table).

In the past 2 years, Peter Boutsalis and I at the University of Adelaide have taken an increasing number of telephone calls from farm advisors and growers who have noticed patches of annual ryegrass remaining green several weeks after knockdown herbicides have been applied (picture). In 2010, the problem was concentrated in the Victorian Wimmera. In 2011, the problem was concentrated in the South East and Mid-North of South Australia. When tested, most of these patches were established to be resistant to glyphosate.

What appears to be happening is that these patches of uncontrolled annual ryegrass are often noticed when there is a period of a few weeks between application of knock down herbicides and seeding the crop. All the other weeds have been controlled and these patches of green ryegrass stand out. In the past, we have seen glyphosate resistant annual ryegrass creep into paddocks from fence lines, but these patches were different, often being scattered across paddocks.

These observations suggest that glyphosate resistant annual ryegrass may be present in small numbers in many cropping paddocks, but it is only noticed as a problem when the situation allows it to stand out. This can include circumstances where there are longer periods between knockdown herbicide application and sowing the crop, in crops that are poorly competitive with ryegrass, such as lentils, or in Roundup Ready canola crops. Failure to manage these patches of annual ryegrass creates a risk of the patches spreading and causing further problems.

One explanation for why these patches may have been missed is that the normal practice in cereal cropping of sowing soon after application of knockdown herbicides has masked the appearance of resistance. Research on glyphosate resistant annual ryegrass populations conducted at the University of Adelaide and funded by the Grains Research and Development Corporation (GRDC) has identified a fitness penalty associated with many glyphosate resistant populations. This fitness penalty is large enough to enable populations to be driven down through competition from the crop.

Growers can take several steps to manage any incipient glyphosate resistant annual ryegrass in their paddocks. Typically, the glyphosate resistant individuals carry a fitness penalty, which typically makes them more susceptible to other practices employed to control annual ryegrass.

The first and simplest strategy would be to employ a double knock on the affected paddocks. The application of a paraquat-based product, like Gramoxone or Spray.Seed, will control the glyphosate resistant plants, as well as any other ryegrass that has emerged since the original knockdown herbicide was applied. It is important to remember that larger plants will require a higher rate of these herbicides for control.

In crop, the most effective strategies rely on crop competition and seed set control. For pulse crops, application of clethodim or clethodim plus butroxydim (Factor) early when the ryegrass is still fairly small and growing conditions are good, followed by crop topping is likely to be the most effective strategy. The glyphosate resistant plants are also resistant to glyphosate at seed set, so paraquat must be used to crop top in pulses.

In canola, the options for controlling glyphoate-resistant annual ryegrass are more limited. The only in-crop herbicide option is clethodim or clethodim plus butroxydim. As canola is sensitive to both of these herbicides, lower rates will have to be used for the mixture. Hybrid canolas, because of their increased early competition, will reduce the amount of seed production. Swathing, depending on the development stage of the annual ryegrass at the time, will also have some effect on reducing seed set.

In cereals, increased competition following a double knock is likely to be the best strategy to manage glyphosate resistant annual ryegrass, especially where resistance to the cereal selective Group A herbicides is already present. Our research shows this will reduce seed production of glyphosate resistant annual ryegrass. Cutting the crop, or the worst section of the crop, for hay with a follow up application of paraquat to control re-growth should also be considered where annual ryegrass numbers remain high in the crop. Hay cuts need to be timed early, before any ryegrass seed is formed, for best effect. Resent research in south-eastern Australia, funded by GRDC, has shown that a single, well-timed hay cut reduces annual ryegrass seed banks by more than 80%. Other seed reduction tactics, like chaff carts, will also be effective.

Growers need to be vigilant if they are to keep glyphosate resistant annual ryegrass at bay. Monitoring paddocks after knockdown herbicide application for patches of survivors will identify any potential problems when they are small. Growers should strongly consider testing of the patches to establish that glyphosate resistance is the problem and which other herbicides may still be effective on the population. An in-season whole plant resistance test is available from Plant Science Consulting. Quick action to control the surviving plants and to limit seed set of survivors will reduce the amount of resistant seed going into the seed bank.

Table: Situation where glyphosate resistant annual ryegrass populations occur in Australia

Situation		Number of known sites	States
Broadacre cropping	Chemical fallow	29	NSW
	Winter grains	82	Vic, SA, WA, NSW
	Irrigated crops	1	SA
Horticulture	Tree crops	5	NSW, SA
	Vine crops	21	SA, WA
	Vegetables	2	Vic
Other	Driveway	4	NSW, Vic, SA, WA
	Fence line /Crop margin	63	NSW, SA, Vic, WA
	Around buildings	1	NSW
	Irrigation channel /Drain	12	NSW, SA, Vic
	Airstrip	1	SA
	Railway	2	WA, NSW
	Roadside	70	SA, NSW

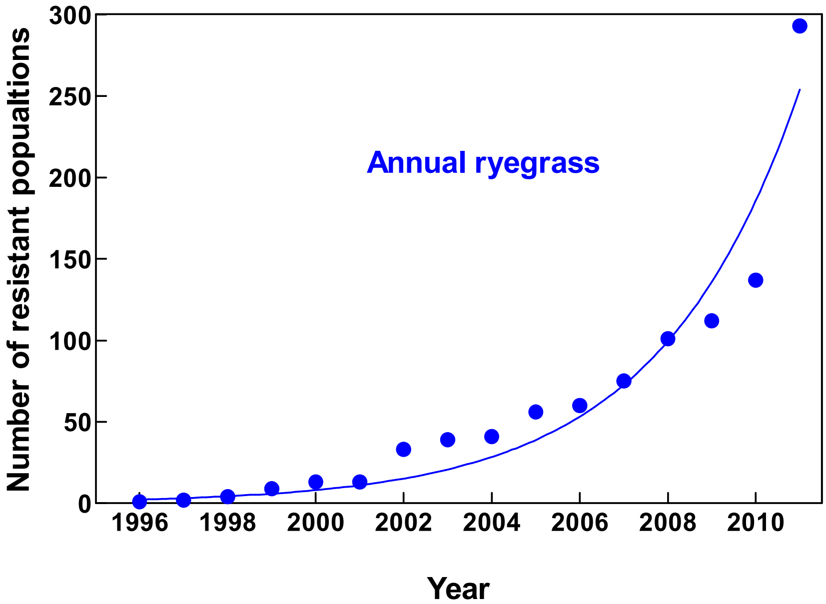


Figure. Incidence of confirmed glyphosate resistant annual ryegrass populations in Australia since 1996

Sources for Table and Figure: Preston, C. (2010) Australian Glyphosate Resistance Register. Australian Glyphosate Sustainability Working Group. Online. Available www.glyphosateresistance.org.au

More information about glyphosate resistant weeds and their management is available from the Australian Glyphosate Sustainability Working Group website, www.glyphosateresistance.org. The Australian Sustainability Working Group is supported by the GRDC and industry.

Cereal Disease Outlook 2012

By Hugh Wallwork, Principal Cereal Pathologist

The principal determinants of foliar disease severity in any one season are the presence of disease inoculum from the previous season, the timing and frequency of summer rainfall and therefore survival and development of inoculum prior to sowing, sowing dates of crops and which varieties are grown.

On this basis the main threats for 2012 must be the rust diseases. There has been a reasonable dry break over the summer in most of the southern cropping areas of the state but in some northern areas rains in January followed by late February rains has meant there is a good chance that one or more of the rusts that were widespread in 2011 will have carried over in the region. This risk will be greatly increased if as expected growers plant some wheat or barley early for feed or crops following another rain in the next few weeks.

Whilst the area of volunteers may be lower than in the previous two seasons the increased area sown to susceptible wheats will increase the risks of problems in 2012. Two principal changes have occurred in crop susceptibility; the area sown to Mace will be much larger than in 2011, and the area sown to wheats susceptible to leaf rust will have increased. Mace is particularly susceptible to stripe rust and whilst many growers will be using in furrow-fungicides and early sprays to manage this disease, there will be a proportion of crops that get missed and these will allow very large numbers of spores to develop and disperse. This will put increased pressure on sprayed crops particularly where conducive conditions for infection occur around flowering since Mace is prone to head infection which fungicides have a poor record in controlling. In 2011 a new strain of leaf rust virulent on Wyalkatchem developed. Given that this variety will still cover a large area this means that any surviving leaf rust will have ample crop area in which to develop. Several of the more recently released varieties (Justica CL Plus, Corack, Emu Rock) are also susceptible/moderately susceptible to leaf rust so growers with these varieties will need to be vigilant in monitoring them. Finally large areas of barley were heavily infected with leaf rust in 2011 and the area sown to very susceptible varieties will remain much the same in 2012 and this will again expose these crops to damage where early intervention is not organised.

The severity of the barley leaf blotch diseases will depend very much on the timing of sowing. Early sown crops will be at much greater risk of the net blotches and scald in barley.

Yellow leaf spot will be present in most wheat stubbles especially with the late spring rains which will have increased spore dispersal and infection of those stubbles. However, only crops sown into those recent stubbles will face serious early infection and growers should remember to avoid sowing the most susceptible varieties (Yitpi, Correll, Scout and other S varieties) into such stubbles.

Septoria in wheat is a lesser risk since inoculum levels are very low and most crops will have adequate resistance. However with early sowing this pathogen may again become more damaging so monitoring of the most susceptible early sown varieties is advised.

Powdery mildew has become an increasing problem, mainly in Wyalkatchem on the Lower EP and in 2012 in Gladius in the Mid-North. In-furrow fungicide treatments provided good early protection where used on the Lower EP in 2012 and these are to be recommended again on these varieties and in prone areas.