CROP SCIENCE SOCIETY OF S.A. INCORPORATED

C/- WAITE CAMPUS
P.M.B No 1, GLEN OSMOND, SOUTH AUSTRALIA 5064
INCORPORATING THE WEED SCIENCE SOCIETY

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EDITOR – Tony Rathjen, articles welcome; fax: (08) 8303 6735 Ph: 0408 816 533
email: cropsssa@yahoo.com

TREASURER – Subscriptions
Susan Fuss
gsfuss@bigpond.com
Ph: 0407 900 055

SECRETARY – Correspondence
Larn McMurray
PO Box 822
Clare 5453
Ph: (08) 8842 6265

Next Meeting	**'A (Happy) New Year'**
Venue	**Richardson Theatre, Roseworthy Campus**
Date	**WEDNESDAY 20th FEBRUARY**
Time	**7.30 pm**

Speakers

Dr Robert Norton, International Plant Nutrition Institute,
Robert will speak on what IPNI do and Global nutrition challenges to Agriculture

Mick Lines SARDI
Mick has some encouraging work inter-row sowing of pulses in low rainfall environments and some work on imi-tolerant Lentils

Rob Wheeler SARDI
Rob will be talking on the 2012 NVT results for Wheat and Barley, as well as what is making the money!

Please look for the advertisment for the ASPAC Travel award for 2013 at the end of the Newsletter – applications due by end of March.

Last year one of the winners was from the private sector – it would be great to get another!

Striving for simplicity in the field

Allan Mayfield, Clare SA

It is somewhat counter intuitive to our science training, which emphasises detail, to suggest that the best system for making recommendations is to condense our understanding and interpretation of biological processes into simple "rules of thumb" or quick tests.
There are many good examples of this

1. The French-Schultz Water Use Efficiency model
2. Reg French's clay content formula to store water in a fallow.
3. Using a push probe to assess soil water content
4. Looking at the crop to see if it needs nitrogen – aiming for "John Deere green"!
5. Thresholds for disease or insect control in crops.

The first reaction of many, especially those one step or more back from giving advice in the field is that these rules of thumb are too rough and don't take account of a wide range of variables.

In a typical day in winter or spring an agronomist could make something like 40 different recommendations, and so no wonder practicing agronomists need a relatively simple framework for making decisions in the field. These could be what herbicide mixes and timing for each crop, depending on the weed mix and relative importance, crop stage, growing conditions and even grain yield potential. At the same time they may also assess the need for control of diseases and insects and the need for post emergent nitrogen fertiliser. At other times of the year, for example during crop planning, many decisions, such as what crop variety and fertiliser rate for each paddock, are made in a relatively short space of time. Experienced agronomists do this in their head far better than could be done using a computer. Charts, ute guides and other reference material are a handy back-up especially for less experienced agronomists and also in the first few days of the season.

It is of interest that many of the charts comparing products or varieties that we still often use were developed by agronomists or communication specialists rather than by researchers. I can recall that these proposals were met with some resistance from researchers, who thought that the charts were an over simplification! Examples are the Cereal Weed Spraying Chart (Andy Michelmore), the Cereal Variety Disease Guide (Tom Yeatman) and the Nitrogen and Phosphorus Calculators (Jon Lamb).

Simple tests that can be done in the field are also popular with field agronomists. Examples are the "acid test" for bicarbonate to see if lupins will grow or not, sodicity tests for response to gypsum and soil texture tests to work out the type and rate of triazine herbicides to use. There is also now an on-the-go soil pH test using a Veris probe. Developments in other tests, such as MIR for phosphorus buffer index, more accurate sensors for organic matter and soil nutrients will also be very useful for agronomists. Crop varieties that fluoresce when nutrient deficient is also on the drawing board of several researchers. With advances in plant breeding and instrumentation there is likely to be more practical and relatively cheap instruments and tests for crop and soil factors in the not too distant future. Some of the best advances in this area have been made when research agronomists team up with physicists.

It is interesting to reflect on what tests have not stood the test of time. These are especially tests involving too much preparation and chemical mixes. Examples are Adelaide & Wallaroo Fertilisers' box of reagents for testing soil fertility and the various plant sap tests for nitrogen. A colour chart with shades of green is a much quicker and simpler way or assessing the nitrogen status of crops.

Decisions made by agronomists are like traffic lights, either green, red or orange.

Green – applying a treatment is very likely to be the right decision. This could be applying nitrogen to a paler green wheat crop coming out in head in a good growing environment and with above average grain prices.

Red – not doing it is very likely to be the right decision. This could be the same colour green wheat crop but in a much drier environment and/or with lower grain prices.

Orange – when in between we either need more information or, more typically, wait for a trigger point. In the case of applying nitrogen, this could be to apply it if we get 20mm within the next two weeks. If not, don't apply it.

Putting decimal places on a measurement is usually overly accurate when taking into account uncertainties around the decision, such as follow-up weather conditions. As Peter Hayman has said "Why measure it with a micrometer when you are going to cut it with an axe!"

Even Churchill had something to say about this: "I would have written you a shorter letter, but I didn't have the time!"

Bacterial blight in field pea

Jenny Davidson (SARDI), Tony Leonforte (DPI Vic), Peter Hooper and Simon Honner

This disease is very sporadic and often unpredictable. It is caused by the bacterium *Pseudomonas syringae* consisting of two pathovars (pv), *P. syringae* pv *pisi* and *P. syringae* pv *syringae*. Frost damage followed by wind and frequent rain encourages the development and spread of the disease. This highly infectious disease can be easily spread by movement through the crop of machinery, people and animals.

P. syringae survives on both seed and infected plant material and these two sources are the main means of transmission of the disease to new crops. Therefore, seed harvested from infected crops should not be used for sowing. Infected crops should be harvested last of all pea crops on the property, to prevent infected stubble in the harvester moving over the property and to prevent small pieces of infected stubble remaining in the header and infecting other pea seed. Likewise, movement of pea stubble from these crops should be closely monitored, particularly when baled for hay as this is a ready source of infective bacteria. Also be aware that crops having no obvious signs of disease may still carry the bacteria at low levels.

Bacterial blight will often develop in frost prone, low lying areas first. Be aware that frost events can trigger development of this disease and check these areas first for symptoms. Avoid sowing field pea crops in paddocks prone to frequent frost events.

Operations favouring rapid breakdown of pea trash can greatly reduce the length of survival of the bacterium. Control of volunteer pea plants is equally important for control of this disease between seasons. Survival can be up to three years on seed in storage.

Field pea variety screening for bacterial blight is regularly undertaken at Wagga Wagga in NSW for the Pulse Breeding Australia – Field Pea Breeding Program. The varieties PBA Oura and PBA Percy were released in October 2011 with significantly improved resistance to *Pseudomonas syringae pv syringae*. In the older varieties, Morgan, Parafield, Sturt and Yarrum display the best field tolerance.

In 2012 agronomists first reported bacterial blight on field peas in late September near Hart, Burra and Jamestown in PBAOura, PBAPercy and Kaspa crops; in some cases with large patches in the paddock. Both PBAOura and PBAPercy can develop symptoms as patches but the disease does not spread as much as in Kaspa.

Agronomists observed a crop of PBAOura peas near Black Springs planted next to Kaspa and both were very badly affected in late September. Most of the PBAOura plants had disease symptoms, and there were patches within the crop the size of a card table where the peas were only 6 inches high. Initially it was very difficult to see any difference in disease levels between the two crops but a couple of weeks later the PBAOura peas had 'grown away' from the disease compared to the Kaspa. Another infected crop of Kaspa in the Jamestown region was adjacent to PBAPercy. The Kaspa was not reaped, while Percy lost about 30% of yield. It is possible that the proximity to the diseased Kaspa crop increased the level of infection in the crop of PBAPercy.

Plant samples from these crops were sent to DPI Vic and *Pseudomonas syringae* pv *syringae* was isolated; this was consistent with the Victorian bacterial blight samples in 2012.

In one of the crops agronomists noted the timing of the appearance of bacterial blight followed a grass herbicide application. The herbicide applications could be implicated through damage of the crop by running over plants. This would lead to bacterial blight hotspots appearing in wheel tracks. Alternatively a wetter may prolong droplet formation on leaves and stems, which may interact with frost events and exacerbate freezing injury.

Field pea varietal resistance categories for bacterial blight

Variety	Bacterial blight
PBA Percy	MR
PBA Hayman* (*Forage type)	MR
PBA Oura	MS-MR
Morgan	MS
Parafield	MS
PBA Pearl	MS
Sturt	MS
Kaspa	S
PBA Gunyah	S
PBA Twilight	S
Excell	S
Maki	S
SW Celine	S
Walana	S
Yarrum	S

Kaspa on the lower frost prone area is affected by bacterial blight. Less disease occurred on Kaspa in the distant higher ground. PBAPercy is in the foreground.

Bacterial blight in Kaspa peas (Left) and PBA Percy (Right)

WHEAT VARIETY UPDATE FOR 2013

Prepared by Rob Wheeler
Leader, New Variety Agronomy, Waite Precinct, SARDI

2012 wheat variety performance review

In 2012, wheat variety trial yields across 27 South Australian NVT, averaged 2.69 t/ha, which was slightly below the 5 year (2007-2011) average of 2.97 t/ha. The individual trial site yields ranged from 0.61 t/ha at Nunjikompita to 6.0 t/ha at Conmurra, with all trials sown between May 4th and June 15th. Conmurra was a new site for NVT in 2012 and contained a range of wheat cultivars including red and winter wheats sown either early or later appropriate to maturity groups. All SA trials were successfully harvested.

Generally low winter temperatures and low rainfall across the State, reduced the incidence and severity of wheat fungal diseases, with a result that rusts and yellow leaf spot did not influence yields to the extent seen in previous years. It must be noted that 2012 wheat NVT's were additionally managed for disease control, using up-front (Impact®) and in-crop fungicides where diseases were detected and had the potential to cause yield losses. The very low winter rainfall conditions, experienced State-wide, continued into spring, but mild temperatures prevailed to produce surprisingly good yields and acceptable grain quality at most trial sites. Crown rot was observed at sites with heavier soils on Eyre Peninsula and was particularly severe at Minnipa. Overall, 2012 seasonal conditions tended to favour early and mid flowering and maturing varieties. Yitpi and Kord CLPLUS were excluded from trial results due to seed contamination and germinability issues.

Across all NVTs in SA, the early flowering, new APW variety, Corack produced the highest average yield of 2.95 t/ha across sites, just 1% above both Mace and Emu Rock, 6% above Espada, 8% above Scout and Estoc and 9% above Wyalkatchem. These top yielding varieties were also among the highest yielding in 2011. The relative grain yield and grain receival quality performance of selected commercial varieties in 2012 NVT is summarised in Table 1. The grain yield for each variety is expressed as a percentage of the regional individual trial mean yields. The mean values are a guide to the general performance of varieties across the state however results in individual trials do vary and this detail can be found at www.nvtonline.com.au or within the harvest report inserted in the autumn edition of Viterra 'Grain Business' magazine.

Corack and Emu Rock ranked among the top four varieties in all regions, with Mace also in the top four in all regions except the South East where it was largely restricted by a poor yield at the stripe rust affected, Conmurra site. Other varieties including Espada, Wallup, Peake, Dart, Shield and Wyalkatchem were among the top performers within individual regions while Scout, which has performed well in previous wetter seasons, was less dominant under the drier conditions of 2012. The new imidazolinone tolerant variety, Grenade CLPLUS demonstrated that it is a good alternative to Justica CLPLUS, showing equal, or superior yields in all trials, coupled with improved test weights.

When averaged across trials, varietal market receival quality in terms of test weight, grain protein and grain plumpness were generally very good, with moderate protein averaging

11.5% across sites, low to moderate screenings averaging 2.7% and high test weights averaging 82.9 kg/hl. These compared with 11.3% protein, 1.6% screenings and 80.8 kg/hl test weight averages recorded in 2011. The issues with white grain, sprouting, and black point seen in recent years were general not seen as a problem in 2012 NVT.

Within trials, Mace, continues to show relatively low grain protein while Scout and Estoc continue to provide a benchmark with high test weight. Correll, which in previous years has shown a propensity for low test weight, was again the lowest ranking along with the biscuit wheats, Barham and Orion. Despite the low test weights averages, Correll did not produce an individual site test weight below 76 kg/ha, being the new minimum milling wheat standard, proposed to be introduced by GTA for the forthcoming 2013/14 harvest.

The high yielding varieties, Corack and Emu Rock produced good receival quality, on average, as did Cobra, Phantom and Wallup. Shield was not evaluated within the South East trials but elsewhere it produced moderate test weights with generally lower than average grain size. Grenade CL Plus averaged more than 1.5 kg/hl higher test weights than Justica, cementing its role as a suitable replacement for Justica CL Plus.

Durum wheat

Across the 6 central region durum NVT sites, average site yields were 3.0 t/ha, yielding similar to adjacent bread wheat trials in the Mid North but 13% below in Yorke Peninsula where winter and spring rainfall was much lower.

Yawa (formerly WI803) continues to top trials and in 2012, was more than 12% above the now outclassed but formerly widely grown variety, Tamaroi when averaged across all 6 NVT sites. Yawa was trailed by WID802 (3% lower yield), Saintly (6% below) with Hyperno, Tjilkuri and Caparoi 7 to-8% below. The durum NVT sites generally produced acceptable quality with DR1 protein specifications met at Turretfield, Paskeville and Spalding. Only Turretfield produced high screenings within varieties and Yawa, again showing an increased propensity to produce small grain. The average, across sites, receival quality data is presented in table 1.

Table 1: Mean grain quality and yield from 2012 NVT. Yield expressed as a function of TRIAL mean yield is shown for each region. The highest four ranked varieties in each region are highlighted with bold and underlined text. (varieties omitted from means were not tested at all locations)

		SA Agricultural Region						Statewide 2012 trials mean		
Variety	**Grade**	**LEP**	**UEP**	**YP**	**MN**	**SE**	**MM**	**protein**	**Testwt**	**Screen**
								%	**kg/ha**	**%**
AGT Katana	AH	101	103	102	95	101	99	11.8	84.2	2.5
Axe	AH	98	102	98	100	99	97	11.8	83.4	1.9
Catalina	AH	93	93	94	100	94	96	11.3	84.8	2.3
Cobra	AH	102	97	105	103	102	96	11.8	81.3	2.8
Correll	AH	97	98	98	99	98	96	11.6	80.3	3.7
Derrimut	AH	96	102	99	98	100	102	11.4	83.9	3.2
Emu Rock	AH	**112**	**113**	**108**	**104**	**108**	**109**	11.5	82.4	2.6
Gladius	AH	95	98	98	94	101	94	12.0	82.0	2.7
Grenade CL Plus	AH	100	104	100	101	96	99	11.5	82.5	2.3
Lincoln	AH	93	84	90	87	96	92	11.4	81.8	3.6
Mace	AH	**109**	**113**	**114**	**113**	102	**109**	10.8	83.2	2.0
Peake	AH	99	105		**104**	99	101			
Phantom	AH	99	93	100	103	101	93	11.7	82.3	2.6
Scout	AH	100	97	104	103	106	98	11.3	84.0	2.6
Shield	AH	100	103	105	101		**111**			
Wallup	AH	98		99	101	**108**	95			
Young	AH	97	97	96	91	97	90	11.8	83.3	3.2
Corack	APW	**104**	**115**	**112**	**107**	**110**	**111**	11.0	83.0	2.0
Dart	APW	**103**	101	98	101	101	97	11.5	83.2	3.5
Espada	APW	100	**106**	103	103	**108**	103	12.0	81.2	2.5
Estoc	APW	99	101	102	101	105	99	12.1	84.6	2.1
Justica CL Plus	APW	96	95	96	96	98	96	12.1	80.9	2.0
Magenta	APW	100	98	95	98	98	99	11.9	81.7	2.7
Wyalkatchem	APW	102	97	**109**	103	98	100	11.4	82.3	1.8
Impala	ASFT				97	97				
Orion	ASFT				96	87				
Site Mean (t/ha)		3.42	1.38	3.68	2.70	4.45	2.18	11.6	83.1	2.6
Trial Number		3	7	3	4	4	6			
Caparoi	durum			99	96			12.6	82.7	2.0
Hyperno	durum			96	102			12.6	81.3	5.1
Saintly	durum			97	103			12.3	82.2	2.3
Tamaroi	durum			94	93			13.0	80.4	2.8
Tjilkuri	durum			97	98			12.4	80.1	3.3
WID0802	durum			105	101			12.6	79.1	5.5
Yawa	durum			106	106			12.0	81.5	5.9
Site Mean (t/ha)				3.20	2.77			12.5	81.0	3.8
Trial Number				3	3					

Disc seeders & pre-emergence herbicides

Sam Kleemann[1], Jack Desbiolles[2], Gurjeet Gill[1] & Chris Preston[1]
[1]School of Agriculture, Food & Wine, University of Adelaide [2]Agricultural Machinery Group, Barbara Hardy Institute, University of South Australia

An increasing proportion of no-till farmers are making the transition to disc-based zero-till cropping. Disc seeding systems can create significantly less soil disturbance than narrow-point seeding systems, enable greater residue retention, allow faster sowing and can result in more uniform crop establishment (Desbiolles, 2011). However, due to crop safety concerns most pre-emergent herbicides are not registered for use with disc seeders. Even where herbicide labels do not specifically prohibit use with disc seeders, chemical companies will often not support their use with disc seeding equipment, due to lack of reliable results and some limited understanding of the processes involved in securing crop safety. A situation complicated further by the huge range of disc seeding system technology available which can differ enormously in both the level and type of soil disturbance they create.

Herbicide safety at sowing is often obtained by creating “positional selectivity”, that is the physical separation of seed and herbicide. Under high soil disturbance, knife-point and press wheel systems, a satisfactory separation and good crop safety are typically achieved with herbicide treated surface soil thrown clear of the furrow onto the inter-row, especially under a controlled speed of sowing. However, disc seeding systems present a different challenge, with often a lack of adequate separation between the herbicide and germinating seedlings resulting in a significant risk of crop damage.

The movement of herbicide treated surface soil and the physical herbicide incorporation can vary greatly with different disc seeders and configurations, and this can also affect the efficacy of volatile pre-emergence herbicides such as trifluralin and pendimethalin. These herbicides require mechanical incorporation with soil throw at seeding to reduce losses from sunlight degradation and volatilisation. In contrast, new pre-emergence herbicides Boxer Gold® and Sakura® have low volatility and are much more stable in the soil. However, little is known of the behaviour of these new pre-emergence herbicides under disc systems.

Consequently field trials have been undertaken over the past 5 years at the University of Adelaide’s Roseworthy Campus, to investigate the behaviour of pre-emergence herbicides with disc seeders. More specifically the range of trials have been designed to evaluate the effect of different seeding systems on pre-emergence herbicide control of annual ryegrass and their phytotoxicity to wheat. The systems evaluated over the period have included: KHart and Bertini triple discs, Austil (MT3500 series), John Deere (90 series), NDF (650 series) and DayBreak (Duodec) single discs, and a double shoot (DS) knife-point and press wheel system.

In these field trials, wheat seedling establishment was consistently affected by the interaction between herbicides and seeding system (Figure 1). Trifluralin significantly reduced wheat emergence under single discs (37 to 64%), whereas little or no reduction in wheat density was recorded for the DS knife-point system (≤23%). Boxer Gold also reduced wheat establishment with single discs, however the level of damage was far more variable and ranged between 8 to 56%. This variation in damage with Boxer Gold was probably related to post-sowing rainfall which may have influenced the movement and concentration of this soluble herbicide in and around the crop root zone. In contrast, no crop damage was observed for Sakura, which appears to be the safest pre-emergent option for use in wheat sown with discs.

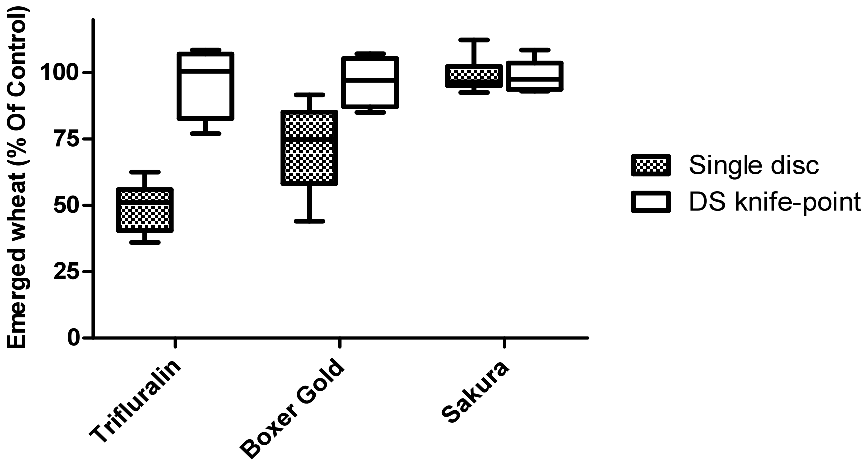

Figure 1. Box plots showing the effect of pre-emergence herbicides on wheat emergence (% Of Control) under single disc & DS knife-point & press wheel seeding systems. Data were sourced from 6 trials undertaken at Roseworthy in the years from & including 2008 to 2012.

The higher soil disturbance knife-point system has been shown to create enough soil throw to remove herbicide treated surface soil out of the furrow (Solhjou et al, 2012) and this is the likely reason for the observed low or no phytotoxicity to the wheat crop. Conversely, the single disc systems appear to leave herbicide treated surface soil in the furrow where it is in close proximity to crop seeds. The greater herbicide phytotoxicity observed under single discs was not the result of shallower seed placement as measurements determined the wheat seeds had been placed at a similar depth to the comparative knife-point system (data not presented). Movement of herbicide treated surface soil into the furrow slot from entrainment by the disc blade and/or gathering by the closing furrow wheel appears to exacerbate crop damage under single disc systems.

Preliminary results from trials undertaken last year showed that disc seeding system setup also has a critical role in the level of wheat crop damage from pre-emergence herbicides. Disc seeding system design and setting up, including operating and sowing depth, travel speed and whether or not residue managers are used all appear to influence the behaviour of pre-emergence herbicides in disc systems. For example, a comparatively aggressive soil throw arising from the seed banding boot deflector of the DayBreak Duodec disc seeding system resulted in significantly better crop safety than that achieved with other single disc configurations, likely due to a more effective herbicide separation process.

Disc seeders are often operated at fast travel speeds (i.e. in a 2007 disc seeder survey, 50% of 31 SA farmers surveyed operated between 11-13 kph, with reported speeds of up to 16 kph), with research and industry evidence showing that higher speeds reduce seed placement uniformity. Variable or shallow seed placement can often increase the risk of herbicide damage where furrow surface soil has not been cleared and limited vertical separation may not secure the required positional selectivity. In the 2012 trials, increasing sowing depth minimised herbicide damage when a double shoot version of NDF 650 disc seeding system was used which created greater soil disturbance and achieved deeper seeding depth, and thus increased the likely separation between the herbicide and germinating seed (Figure 2). A shallow sown seed is more likely to be closer to herbicide on the soil surface and less rain is required to move soluble chemicals (i.e. Boxer Gold) from the surface down to the seed.

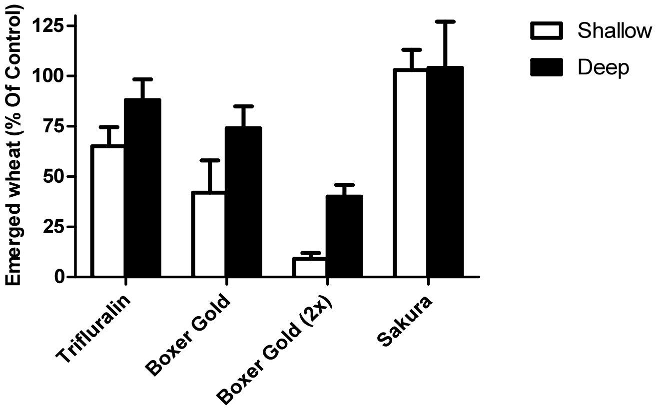

Figure 2. Influence of disc operating depth (shallow vs. deep) on wheat emergence (% Of Control) with different pre-emergence herbicides. The single disc seeding systems used were NDF 650 (single vs double shoot). Mean shallow & deep sowing depths were 25.2 & 40.5 mm respectively. Control wheat emergence = 168 plants m^{-2} (shallow) and 159 plants m^{-2}, (deep). Bars represent SE of mean.

Herbicide damage was especially reduced by the use of residue managers on single disc seeding systems in the 2012 trial (i.e. John Deere 90 series + Aricks wheel - data in Figure 3 - and NDF 650 + Ndf wheel - data not shown). The residue managers were set to clear a 3 to 4 cm band of surface residue and herbicide ahead of the disc opener, limiting the interaction between treated soil and the germinating crop.

In field trials over the period, triple disc configurations consistently provided greater crop safety relative to single disc systems and showed comparative wheat establishment to the DS knife-point system. Controlled soil throw with leading rippled coulters fitted ahead of Bertini and KHart double disc openers ensures that herbicide treated soil is thrown out of the furrow and concentrated on the inter-row, which provided excellent crop safety in the 2012 trials. Risk of herbicide damage is normally minimised by operating the furrow opening coulters side by side on the same rank to control furrow ridging and minimise residue pinning by rear rank coulters which could operate in looser soil when set at narrow row spacing. Illustrating this soil throw benefit in a different way, some significant herbicide damage resulted from both trifluralin and Boxer Gold when coulter skids were fitted to Bertini leading coulters. These skids are ‘soil throw controllers’ designed to limit the amount of soil movement out of the furrow by preventing soil from riding up the coulter and thus keeping herbicide treated soil close to the furrow, increasing the risk of herbicide damage.

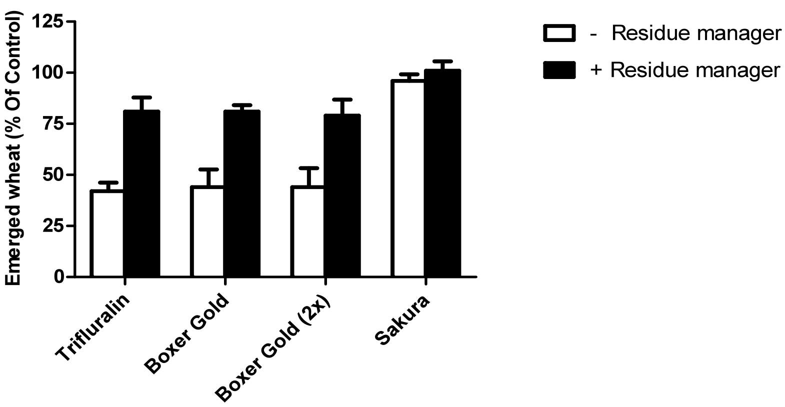

Figure 3. Effect of pre-emergence herbicides on wheat emergence (% Of Control) under John Deere (90 series) single disc opener with & without Aricks wheel residue manager. Control wheat emergence = 203 plants m^{-2} (+ residue manager) and 211 plants m^{-2} (- residue manager). Bars represent SE of mean.

At several field trials, annual ryegrass control was shown to differ between pre-emergence herbicides following disc incorporation (Figure 4). Even though most of the ryegrass seedbank was near or on the soil surface at these sites, control with trifluralin was on average consistently lower (39%) than both Boxer Gold (82%) and Sakura (84%). The low level of ryegrass control provided by trifluralin was likely a result of poor incorporation as well as herbicide resistance. Boxer Gold and Sakura are much more stable and show longer persistence in the soil than trifluralin and can be applied well before incorporation without significant loss in efficacy. Use of trifluralin under single disc seeding systems, where weed control failed due to poor incorporation and crop density declined due to phytotoxicity, often resulted in massive seed set by ryegrass (data not presented). Such high levels of ryegrass seed production would be expected to have serious effects on productivity of subsequent crops in the rotation.

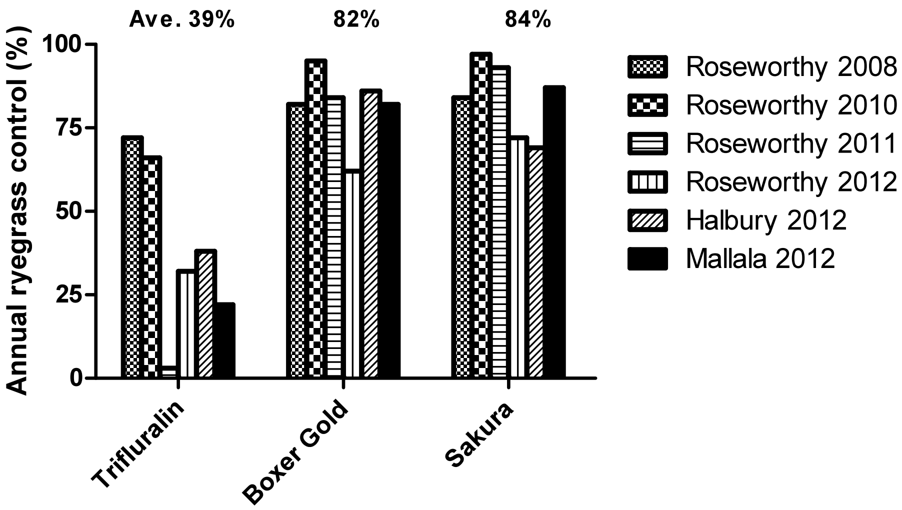

Figure 4. Performance of pre-emergent herbicides on annual ryegrass control (%) at 5 field trials sown with single disc seeding systems. It should be noted that inability of trifluralin to control ryegrass at Roseworthy in 2011 was most likely due to herbicide resistance rather than poor incorporation. Weed control is expressed as reduction in annual ryegrass plant density.

Acknowledgments
The financial assistance of GRDC (projects UA00105 & UA00113) and the collaboration of many disc seeder and accessory suppliers in loaning a range of seeding systems are gratefully acknowledged. We also wish to thank Dean Thiele from the University of South Australia for his assistance in trial preparation and implementation and Malinee Thongmee for providing technical support.

Contact details
Sam Kleemann, Waite Campus, PMB 1, Glen Osmond, SA 5064
samuel.kleemann@adelaide.edu.au
(08) 8303 7908

Jack Desbiolles, Mawson Lakes Campus, UniSA
Jack.desbiolles@unisa.du.au
(08) 8302 3946

Research and Extension Manager (Part Time)

The Hart Field-Site Group Inc is South Australia's longest running cropping field site, providing independent information to the agronomic industry.

Agronomic experience and a sound knowledge of research and extension is essential.

Responsibilities include but are not limited to:

- **Projects and funding**; applications, management, progress reporting; evaluation
- **Site Management**; planning, site selection & management; analysis, reporting and compilation of trial results
- **Extension**; organising / contributing to field days, group visits, workshops & publications
- Attend meetings, seminars, workshops
- Reporting to HFSG board

All applicants must be able to demonstrate a high level of self motivation and organisation, be thorough and precise, communicate effectively and show competence when using various computer based programs including email, excel, word and power point.

A competitive remuneration package will be offered to the successful applicant.

Expressions of interest are welcomed from applicants who can provide all or part of the described roles or who would consider a job share arrangement.

Applications and enquiries to:

Sandy Kimber, Secretary, HFSG, 0427 423 154,

HART
SA's premier cropping field site

admin@hartfieldsite.org.au.

Applications close:
Thursday 28th February, 2013, 5pm.

Application form for ASPAC's Leigh Sparrow Study Travel Award 2013

ASPAC
www.aspac-australasia.com
ABN: 82 792 475 282
Reg #: A0024099D

The annual ASPAC travel award is valued at up to $1500 AUD, plus 12 months complimentary membership of ASPAC, and is named after a member who has made a significant contribution to ASPAC or to the development of soil and plant analysis in Australasia. Each year, applications are invited from people who wish to further their knowledge of soil and plant analysis, or closely related field. A sub-committee of the ASPAC Executive assesses applications and decides the most worthy of receiving the award.
Please note that awardees will be expected to produce a short report on the value of the conference / meeting to them and science in general for inclusion in the ASPAC newsletter.
Complete the form below and send it, along with a copy of your CV, to the ASPAC chairperson, by *March 31st 2013. EMAIL: teresa.fowles@adelaide.edu.au*
Successful and unsuccessful applicants will be notified by the end of June.
The prize money will be sent at an agreed convenient time.
The winner will be announced at the ASPAC AGM in November and in the following newsletter.

Name: **Application Date:**

Address:

Postcode:

Phone Number: **Fax Number:** ( )

Email:

Employed by: **Or University Attending:**

- Conference / Meeting for which attendance support is required? (include location and duration)
  (type here)
- Aims / outcomes of the conference / meeting?
  (type here)
- How will the information gained by attending the conference / meeting be used by the applicant in the future?
  (type here)
- How would the information gained by attending be used to better the understanding and application of plant nutrition in Australasia, Asia or the south west Pacific region that you are from?
  (type here)
- By attending the conference / meeting, how would the application further the aims of ASPAC?
  (type here)

BUDGET	Australian Dollars
Travel	$
Accommodation	$
Registration	$
Publishing	$
Other	$
TOTAL (Max $1500)	$