

Stubble Management Field Days

MNHRZ and YPASG in conjunction with Yeruga Crop Research, AgriLink Agricultural Consultants and Ag Consulting Co

Following the successful stubble field day in September 2014 we are conducting two days this September to cover a range of issues associated with retained stubble systems and how to make them work.

Tuesday 22 September Andrew Bruce's property, a couple of km east of Riverton on the Marrabel Road, 9 am till noon (before the Mid North High Rainfall Zone field day)

Wednesday 23 September Minlaton field site, 9 am till noon

Dr Michael Walsh, Australian Herbicide Resistance Initiative (AHRI), University of Western Australia will discuss management of weed seeds at harvest including chaff carts, windrow burning, Harrington seed destructor and any other issues associated with weeds in retained stubbles

Sam Kleeman, Adelaide University, will discuss interactions between stubble, herbicides and seeders

Stefan Schmitt, Ag Consulting Co, will launch the stubble calculator being developed from this project

Mick Faulkner, Jeff Braun, Trent Potter and Bill Long will add comments about trial results from 2014 and any other topical issues with stubble management

Mick Faulkner – intro –

It's all about how we can integrate stubble mgt with all the other things you need to do in your cropping program. Not about providing all the answers but bringing up all your questions for the wisdom of the group.

Trent Potter –

Project going for 18 months. This paddock was canola last year and had some pretty significant problems with Beet Western Yellows virus. There will be some research in the project but one of the outcomes is for us to come up with locally specific guidelines on how to manage your crop stubbles. How you set the stubble up at harvest time, how you manage over summer, what you do at sowing. How do you handle heavy cereal stubbles, how do you manage diseases pests and weed in a stubble system. Also about storing water.

Today we will talk about weed management and also how herbicides work in a stubble system. Project runs for five years and we will be coming up with guidelines all through the five year period.

Everyone has their own system and does different things on their own farm. We see a lot of this project as us getting your information, tailoring it and getting it out to a lot of farmers so they can make up their minds about whether they want to pick on something that you are doing and change their system a bit. They might say that what you are doing is not good in their area so it's a matter of tailoring the information so people can make informed decisions on managing the stubbles in their own system.

We have a steering committee that meets a couple times a year. The program is being done through Yeruga Crop Research along with Mick and Jeff and Ag Consulting Co., Mid North HR Zone and YP Alkaline soils. Another day at Minlaton tomorrow.

We understand that burning may be necessary at times maybe when you have a very high cereal stubble load. It's a matter of understanding what that burn is doing so you can make an informed decision about whether you will do it.

We have a few speakers but we are really keen for you to ask many questions and turn it into a discussion.

Mick:

The other thing we might do because there has been a fair emphasis on weed control, herbicides use with a lot of stubble. In this situation we have a trial here on herbicide use that really isn't a stubble issue. We might talk about late season weed control in crop too. The use of glyphosate pre-harvest in wheat has really taken off. That's all about this integrated approach because we all know that we are on borrowed time with our herbicides. We have lost of our post ems for things like ARG, only two left for most of us – clethodim and butryoxydim. There is a lot of clethodim resistance through this area so Factor is being used more and more. At this point in time it is the last roll of the dice and we have nothing in crop in cereals. How effective we may be with pre-ems and how we use them

best and how we get the best control in-crop late season. It doesn't matter how resistant the ryegrass is if you haven't got any! The same with radish.

Dr Michael Walsh, Australian Herbicide Resistance Initiative (AHRI), University of Western Australia will discuss management of weed seeds at harvest including chaff carts, windrow burning, Harrington seed destructor and any other issues associated with weeds in retained stubbles

My job for the last 16 years has been working on harvest weed seed control. Basically the home of it is in WA and it's probably because we have had some pretty bad herbicide resistance issues there. They it has evolved is that we have had farmers asking what can they do about it...ryegrass in particular. Herbicides are starting to fail so let's do something at the end of year and see if we can target it. They started off with chaff carts and realized that if you attack the chaff which is where all the weed seeds come out of the back of the harvester then you can actually do something about your weed numbers in the following year.

Chaff carts – farmers have had a love-hate relationship with those for nearly 30 years now. Everyone loved the idea of killing those weed seeds but hated the idea of pulling the chaff carts. Then it evolved into a bar direct system, narrow windrow burning, came along and has been hugely successful and it has reinvigorated the interest in harvest weed seed control.

That Harrington Seed Destructor further stimulated interest as well and now we are starting to do some work on tramlining. That's the basic intro but the obvious question is how many are using harvest weed seed control and what are the issues if you are?

Jeff – a lot of this area is hills and valleys and the smoke just descends on the closest town that tends to be on the valley floor. That is when it becomes a big issue. Chaff dumps burn for 48 hours and that is the biggest issue around these areas.

Mike – Burning is a problem everywhere. We are lucky in a way that there are not many people in the wheat belt so a lot fewer to complain but fires still get away, still areas that burn that shouldn't be burned. We started working on narrow windrow burning in 2002 and said well right then this would be a temporary thing which would enable us to show the benefits of harvest weed seed control and then hopefully we will have a seed destructor next. But unfortunately these developments take a lot longer than you'd hope so we have been stuck with burning.

The conveyer belt system on the chaff carts has changed the burning issues for chaff dumps so then that's a big bonus for the chaff carts. I also gather that not many people have the conveyer belt system on chaff carts here, is that the situation?

Instead of a cross auger and a blower pushing the chaff onto a cart, the chaff goes right onto a short conveyer belt that's flat and then a longer one that takes it up into the cart. So what happens is that instead of the chaff being reprocessed through the auger and blower it comes out as it would normally out of the back of the harvester and its got quite a bit of short straw in it that sort of just holds air pockets in the chaff heaps over summer so that when you light them up they actually burn quite quickly.

Farmer – we were emptying the cart in barley once for every two boxfuls of grain and in wheat once for every boxful of grain and that is a huge problem.

It's also a problem burning windrows in three or four tonnes of stubble. You're not just going to burn the windrow. The whole lot will go.

Mike – for a start you always get twice as much chaff out of wheat as you do out of barley, that's the way the heads form in the barley.

Farmer – is there any way we can cut down the amount of chaff you actually have to catch?

Mike – close up the header and get more stuff going out in the straw – laughs!

Farmer – we have minimal chaff coming through when we run the stripper front. We were talking about stripper fronts and the seed destructor and I think it would be useless when you were running a stripper. You might collect a bit of the ryegrass but I think the stripper actually leaves a lot of the ryegrass and brome behind anyway, doesn't strip it off the stalk.

Mike – I don't know but I'd think there would be some weed seeds that would go in. Are there any in the grain sample?

Farmer – clean.....but then we don't look!

Mike – you can cut down on the short straw going in and some of the lighter stuff goes over the top. The baffles, if not right, you lose too much and potentially weed seeds. There are modifications you can do to cut down on it but you don't want to compromise the whole reason you are doing what you are doing which is to kill the weed seeds.

Jeff – given the massive interest in chaff carts at the moment (negligible here!) what is your experience with the Emar Chaff Deck (?) I've been talking to people about getting hold of them but I cant find anyone in SA who has one and yet they are so cheap and I believe they will work very well, particularly in the wetter environments. Can you tell us a bit about that?

Mike – So the chaff deck system, where you put the chaff on the tramlines? The idea there is that you are trying to set up a chaff matt to surround your weed seeds and prevent them from germinating and emerging. There's a lot of interest in the Esperance area in WA to try to get away from the burning issues. Its just

the chaff, you are splitting it out of the chaff stream onto the wheel tracks. Essentially it is a hostile environment so it is compacted soil. You travel over those wheel tracks frequently during the growing season. You have that chaff mulched system there so it can be a non-wetting environment there. The weed seeds do struggle to come through. The chaff itself can have an allelopathic effect on the weed seeds. The chemicals that leach out of the chaff can kill the weed seeds or at least prevent them from establishing.

Farmer – that would only work in a controlled traffic system?

Mike- there is a guy in Esperance who is doing what we call chaff lining and he has a windrow chute but is just collecting the chaff. So it is a narrow chaff line. He's on a disc system and he has 7" row spacing and his aim is to get that chaff in between a row. So cut it down to less than 7". The idea is that when you set up these systems you want that chaff packed in around the weed seed, a nice contained mulch as much as possible because that is when you get the effect on the weed seeds. If it spreads out that is where you get the seedlings coming through. Packed as tight as possible. He is getting the system to work reasonably well because he is able to contain that chaff stream into a nice tight windrow.

You can do all sorts of variation around whatever suits your system but the principle is contain that chaff, get it into a mulch and you'll prevent seedlings coming through. The unfortunate thing is that there are always edges and you will get emergence coming up around those edges. The systems that we have are not perfect whether it is windrow burning or chaff lines.

Farmer – what about keeping stock off the rows?

Mike – absolutely essential. As soon as stock walk through them or disturb them it opens them up and lets the seedlings come through.

Farmer – with a disc system, chaff is your enemy. So getting establishment either side of that narrow chaff row would be a bit difficult which would in turn let those weeds germinate and grow?

Mike – yes if you look at his crop you can see a little dip where the chaff lines are. They will be shorter wheat so his establishment is a little bit compromised and some weeds come through. But his argument is well at least I have taken them from out across the width of the comb into that area there. 80-90% effect in controlling weeds seeds and have contained them to some extent without actually having to burn. Drops them in the same place, same row next year. In this environment you would get quite a lot of breakdown because you have quite a lot of rainfall and good soil types so you get worms and things coming up through. You do need rainfall to get that breakdown otherwise you build up the chaff in drier environments. Chaff line on top of chaff line and it gets messy and you have to do something about it.

Trent – what about putting the right amounts of NPS onto the strip with the chaff. Will that help to break it down?

Mike – yes it probably would.

Trent – Clive Kirkby – doing it and we tried to get him here to talk about it. Done a lot of work. CSIRO has had a couple of long-term stubble intervention trials and they have been driving soil carbon down the whole time retaining stubble. Clive has come in and worked out how much NPS is actually in the bugs in the soil that break down the stubble and has been applying that at the equivalent rate depending on how much wheat stubble is there. If you are only trying to break down what is in that little narrow band you could get away with small amounts of nutrients to help break down that chaff.

Mike – it is a little non wetting so you would need moisture to get it to happen. Getting back to your chaff deck system, I've seen systems made up out of PVC tubing, tin so you can have a crack yourself. You don't need to buy a \$15k unit.

Farmer – I heard they would not sell one into SA until they get them right in WA

Mike – I think Primary Sales are selling them in WA. There were 100 made for sale this year. A lot of guys have to spray their chaff lines. There are systems where they are looking at burners mounted on 3pl on tractors. There are concerns about the gaps where weeds seedling get through. Not a perfect system.

Jeff – harvest timing?? Two weeks past optimal harvest timing we only got 15% of the ryegrass. Massive difference. Just lodged. We were cutting at 10cm and most were below that.

Mike – normally what we find with ryegrass is if it is a crop like this it will stand up and stay upright through harvest but where you have open spaces the plants just naturally start to lodge and then grow along the ground. All grass weeds do that. One of the good things about the brassicas is that they tend to stand up no matter what.

Farmer – tell us where the Harrington SD is at?

Mike – There is supposed to be an announcement this week about the commercialization of the HSD. So GRDC will make an announcement about who the commercial partner is going to be and then I guess we will learn after that about what the plans for the production and sale of those units are. But I think at this stage it looks like it will be a local manufacturer and they will produce systems that will retro fit onto your harvester. All the testing both engineering wise and biological wise has pretty much all been done now. It's good, really effective on ryegrass, WO, W Radish, bromegrass. They know how much power it will take out of the harvester. Depending on the speed you want to run it out it will take 70-100hp. The recommendation is that if you run it at 2500 rpm then you should be looking at 70-80hp. I'm saying you'd be getting 90-95% kill at that speed maybe go a little faster to get it up to 98 or 99%. That would be up to the operator to decide. Exciting times that could change everything. Ray Harrington thinks it will be same price as a chaff cart but ultimately it's up to the commercial

company to decide. Chaff carts are about \$80k in WA which is insane for what they are – big box with a conveyer box. Couple hundred sold in last 3 years.

Farmer – with HSD what are you finding cropwise?

Mike – Its working well on all chaffed crops. We are finding some subtle differences between the chaff materials. What happens is when you put weed seeds in the chaff material and its going through a mill, the chaff actually has a cushioning effect on those weed seeds. So the different chaff properties sort of relate to the different cushioning effect. We are finding that barley chaff has a bit more of a cushioning effect at an equivalent amount of chaff material being fed in. Canola has a less of an effect so it is more able to target the weed seeds in canola. Wheat is intermediate between canola and barley and lupins is about the same as wheat. The difference is maybe 7-8% so not huge but it is there. The positive thing about barley chaff is that you are getting half as much through per tonne of grain so you probably wont see any difference between barley and wheat.

We haven't looked at lentils, just the chaff we had available in WA and not too many lentil crops.

It will be a factor that if you have something spinning at high speeds and you have powdery chaff material it's unavoidable that something will happen – fire – somewhere along the line.

When they will be available is in the hands of commercial providers but I'd be surprised if they weren't available next year. Even for this harvest they might want to rush out a few models to build up some info on operation of the systems in the field. So they might want to get another four or five systems going. It will take a few years to learn the ups and downs of the whole system.

At the moment it is a hydraulic system and potentially you can change the speed of the mill, turn it on and off and bypass the mill at the back with the chaff. In the standard system you would want to have it going because there is some value in processing the small grain that comes out in the chaff. That does become a weed problem down the track. You are probably better off to keep it running once you have it fitted.

You can also shift it from harvester to harvester. The frame it sits on attaches to the tow hitch so you could potentially put forks in there, drop it out, disconnect the hydraulics and move it out of the road if you wanted to. Good if you wanted to switch to new harvester. There will be some learning getting if fitted to other harvesters. One of the issues is just finding a drive system for the different machines. They have worked it out for the Case so they know where the shaft is that they can drive it off and where to mount the hydraulic pumps etc. Those drive systems and their availability are incredibly variable between the various brands of harvesters. At this stage only done on the case.

Farmer – how does it work?

Mike – its basically metal spinning at very high speeds. The original towed system has a mill with counter rotating mills of just round bars. This is a single sided mill which has a fixed top row of bars and a spinning rotor. Six rows in total. The idea is that the material feeds into the center and airflow and centrifugal force sends it out through the sides and as it goes out it just gets whacked backwards and forwards against the bars. It's all just about impact. If the weed seeds get a big enough whack against the bar they will split break cut whatever and become nonviable. The issue is that you have to treat that whole chaff sample to get the weed seeds which are probably 1% of the mass of the chaff material but you have to treat it all to get down to the weed seeds.

It does create dust but the bulk is just a finer chaff material. You can still see that it is chaff.

Farmer – have they considered having it under its own power?

Mike – yes that was considered for the old harvester but most of the new ones coming in are bigger machines with more access power so we will go for them as the potential market first.

Sam Kleeman – the more that goes in the front of the machine the more effective it is so is anyone using crop lifters to draw more material into the machine?

Mike – there is an issue of not getting all the weed seeds in the front. Still at stage of trying to make sure we are targeting the weed seeds we do have in the chaff. People still have trouble getting the weed seeds out of the straw stream onto the sieves but as far as getting more into the front the only messages we have at the moment are cutting as low as you can, timing at harvest – weedy areas first if you can. Swapping – windrowing is an option in some areas. We have done a little bit of work on growth regulators to make the weeds stand up more in the crop. Crop competition has a big effect on that. Crop lifters I'm not sure they are all that useful. Growers tell me they struggle to lift up the crop so they are not going to do that good a job on the weeds. Hopefully we can get some engineers to develop better crop lifters, which would really help. In a good crop like this you shouldn't have any problems getting all the weed seeds in the front.

Canola is an issue because in big canola crops you can't cut low enough to even get it in the front anyway.

The stripper front may have a role in collecting tillers on the ground. There is quite a vacuum from those fronts so maybe they are better than people think.

Trial Plots – Mick Faulkner

What we have done here, if you remember last year this was canola and it has really ended up being about the Beet Western Yellows virus as much as anything else. The aim was to retain all the stubble from the previous year which was two

years ago, which was a wheat crop that went about 5t/ha. But when we measured the stubble here there was about 12t/ha of stubble including chaff. So that's an awful lot of stubble and so we are talking about what are the impacts of that in terms of herbicide use and in terms of weeds and just comparing a tyned seeder with a disc to get some basic data. Thanks to Andrew Bruce to start with. We have to wait until these guys have finished their seeding program and Sam Pryzibilla runs his machine up from Riverton. They have done a great job. There are two of these sites, one here and one over on Greg Callery's on bean stubble. The reason for that is that we were establishing pulses and canola into stubbles. If you remember last year at the bottom end there was a bit of ryegrass down there so the previous year that wheat was cut for hay and then we had a burned plot of stubble, a slashed plot and then this was full standing stubble. But in saying that, the stubble was grazed over the summer.

Last year after the canola, the windrowers went through the plot and the windrows were burnt as most people have done for over 30 years in this region – narrow windrows. It worked a treat down the bottom, it was nice and confined and did a good job. But as we came this way we had more and more stubble and we lost the fire. In this area where it was full standing stubble the whole plot was burnt, it just got out of those windrows. So there was the equivalent initially of 12t of straw and chaff there, even a year later that is going to go. There was a minor difference between the plots that were sown with the tyne and the disc. Where it was sown with the disc was a complete burn last year with the canola. But where the tyne was used there was some canola straw and wheat straw from the previous year that wasn't burnt. That is simply because the other tyne was throwing a bit of soil over some of the straw. Will hand over to Geoff to go through the treatments. They are in big blocks – plot length is 12m but there are 10m inside each one of those that is actually sprayed so there is a little strip of 2m between each plot.

Jeff Braun

As Mick explained, we have a 12m spray boom and we just blanked off two nozzles on either end of the boom and ran it through. What we have done is just put out a commercial 1x rate and a 2x rate next to each other. We started off with Avadex at 1.5L in the first 10m and then a gap and then 3L. Then we went to Boxer Gold at 2.5L and 5L. Then Sakura at 120g and 240g and a final treatment of trifluralin at 1.5L and 3L. Running perpendicular across these plots was a tyned machine and alternating tyne/disc/tyne/disc. There's supposed to be retained stubble but as Mick said it all got burned.

The first treatment Avadex Extra at single rate we had 77plants/m² on the disc and 82 on the tyne. Not much difference. At the 2x rate there was 82 on the disc and 92 on the tyne. Not significant.

Sam Kleeman – I'd definitely be very wary of high rates of triallate over there with low disturbance discs we have definitely seen a touch up. The standard 1.5L seems reasonably safe but as you go up toward the 3L mark I'd be very concerned about damage. The damage will be similar to trifluralin. You get that

club shaped so I'm quite interested that you got that amount of throw with the tyne.

Jeff – there was a reasonable amount of throw wasn't there Andrew?

Andrew – yes

Mick – we have a video of it. There was dust coming off. It's a vertisol and two days without rain and it's dry on the top anyway.

Sam Kleeman – you probably would have had enough throw to promote safety but I definitely – if you are a single disc user, I'd be wary of high rates of Avadex on these sorts of soils.

Mick – we did NDVI on these too to see if there was something going on with emergence and really the only thing it showed us consistently was that trifluralin did have an effect. That's a plant numbers thing. But consistently the disc is higher than the tyne. You can notice that the rows are closer – 7.5" rows compared to 10" so not really a factor of the seeding system but a factor of the row space.

Jeff – the conditions were a factor too. We really didn't have much rain. It was sown towards the end of May and everyone remembers we didn't have any rain in June so it really favoured things like Boxer Gold in this particular trial over what we would normally expect in the paddock situation.

Mick – If you look down the other end of these plots you do see wild oats and it has been the typical problem that Avadex is not good enough in these soil types on wild oats. It gets 80% and that's about it and with a lot of fop resistant WO in the area now you are starting to add a fair bit of money to the whole exercise when you are starting to use high rates of Avadex and then have to go back and use something like Atlantis. We don't have group B resistance here yet.

This is also one of the soil types and one of the environments that false wire worms love irrespective of the rotation. We always thought that false wireworms were a symptom of an old pasture rotation but they are here all the time and there were significant losses in some areas to false wireworms. It is another situation we have to think about and we will talk about controlling some of the insect pests we have.

Jeff – white pegs for the middle of each treatment. So here's 3L of Avadex which was surprisingly safe and surprisingly ineffective on the WO. This one is Boxer Gold here at 2.5L. When you compare the emergence here we have 88 with the disc and 92 with the tyne which in a commercial situation you might expect 60% emergence? Normally you'd expect a 1/3 reduction.

Sam Kleeman – With Boxer Gold as you're aware it does depend entirely on the rainfall preceding the application. It's a high-risk entity this year because you are just not getting that lateral or positional selectivity. If you get a significant

rainfall event within a week to two weeks we are talking anywhere from 10 - 25mm, and soil type dependent as well, you can expect it to wash back in much more readily in the disc. I gather rainfallwise, it is a bit of a heavier soil

Mick – Maybe we can use this to advantage if there's no rainfall in the 7 day outlook. The emergence dates are here from the MNHRZ sites and we have five sowing times down there. First was the 28 Mar and took 5 days for the crop to emerge. So if we do get that opportunity, the seven day forecast is really useful for early sowing. We can say, hang on, we have got no chance of rain but we have enough moisture to get the crop up and we can go with Boxer Gold.

On the 10th of April it was 8 days to emergence. It's probably still in that area that we can use pretty well. On 24 April 10 days. By the time you get to the 8 May you are talking 12 days from sowing to emergence and you are starting to get beyond the realms of possibility with the forecast I think. Certainly by the 22 May it was 13 days and we cut out our early June sowing because no one does it anymore but I suspect it would be well over two weeks. So we can use sowing date to help in terms of the choice of what herbicides we use. The earlier we go the more likely we are to get away safely on a heavy soil with Boxer Gold.

Sam Kleeman – I believe a lot of the damage occurs from the S-Metalochlor, that's the most mobile one and that's through coleoptile uptake and then you get a sealing effect. So if you do have delay in emergence where the crop can be a bit more advanced before you do get mitigation back you are going to overcome some of these crop safety issues. Timing of the rainfall event will be quite important. For you guys and this is off label so be careful, some guys have been quite happy this year with a very early post application. Even if you do get some mitigation back in the wheat should be advanced enough by that stage that while it might hold it up a little bit it will cope with it to be able to detoxify to some degree and move on. Most of the damage you see is the S-Metalochlor. You won't actually see it unless you look really hard and you'll find sealed coleoptiles. You might have a row where there isn't anything there and it's basically where the S-Metalochlor has sealed the coleoptile and it won't come up.

If you know you have a bit of a dry window with the forecast and the crop can get up and out of the ground and then you do happen to get a sizable rainfall event then you have more margin for error. With the rates you are using you are still going to get pretty good weed control. Predominantly it is root driven and should get good uptake and control but from a crop safety point of view it is certainly a useful approach.

You want to promote crop safety but then you don't want to lose efficacy and you want to be hitting ryegrass.....generally you do get some ryegrass that has emerged and you don't want that later ryegrass to be anything more than 2 leaf. Once it gets beyond two leaf you are still heavily reliant on root uptake and it can move on. If you knew you were going to get a 5-10mm rainfall event within a week or so of putting out that post application then that's as ideal as you are going to get.

Mike - This could change selection pressure on the ryegrass. The weeds would be exposed to lower rates and you would be letting more through. It's an issue right across the board with soil applied herbicides anyway, the potential for reduced selection pressure based on rainfall and exposure to the herbicide, timing of emergence. Fortunately there are no big robust resistance mechanisms to our pre-em herbicides that we have found, at this stage anyway.

Agro (?) Every crop – every year – post em approach is what the guys are doing.

Sam – I'd be concerned. Prosulfacarb is one of the key actives in Boxer and that is coming off patent soon and the generics will have a hold of that and I'd be quite fearful cause I can tell you that with the prolonged use of triallate in our system.....triallate and prosulfacarb have the same mode of action – carbamates. I'd be quite concerned with a year on year approach with prosulfacarb and historically a long use of triallate I'm concerned we will get cross resistance and prosulfacarb will be on the way out. I'd be rotating or breaking it up a bit or it will lead to the loss of Boxer Gold and prosulfacarb.

Mick – I guess this will come up in the diseases part of it but I don't know how many of you have seen Septoria. I'm older than many of you but I do remember the major disease areas in the high rainfall areas of the mid north with Septoria. Then stripe rust came along in the early 80s just to add a new one. This is the worst Septoria I've seen since then. The interesting thing is that it is on Mace which is not as susceptible as some of the other varieties. The biggest thing is that it changes the way we have got to look at next year because the inoculum will be on the stubble next year. It's right though the mid north. There's hardly a paddock without Septoria. The inoculum is there and we like to sow earlier each year. You want to give Septoria the best conditions in the world – you have a lot of inoculum so you put wheat on wheat and you sow early. So we need to rethink. We don't know if we have any resistance as is rumoured in the SE and Western Vic but if that is the case and we start getting back into Septoria being a major problem – we have to rethink our strategies, not just in terms of fungicide use but rotations. I presume this would have had a flutriafol or triad on the fertiliser – yes- so we can see that those fungicides are not good enough. Probably had an eyespot spray as well? It is doing something and I wouldn't like to see this without the eyespot spray. Propiconazole is probably not the best fungicide for Septoria whereas for eyespot in this area it is still working a treat. Tebuconazole is a brilliant fungicide on stripe rust but not right up there in terms of Septoria. The other thing is if you are struggling to identify it, because it does have a long latent period from when you start to see blotches before you start to see the picnidia – the little black dots – a bit like ascochyta. 1:06:35 It has a very long time before that happens. One of the giveaways is that lucerne flea find it extremely attractive. So you can go out and see that the lucerne flea has selectively grazed the Septoria areas. They will go to those areas on the leaf and graze them and because they like it, the lucerne flea number can build up quite quickly.

The eyespot trial we have down on Tony Clark's with SARDI – we have an untreated buffer and that is absolutely flogged with Septoria. It's Mace.

We can expect that next year the inoculum levels will be extremely high. If we are having an early break and a good year then we are going to have a problem. There are strategies, of course, but it may be that a different look at fungicides might be needed and maybe not having quite so much exposure just to one variety might be called for. It's pretty hard not to just look at Mace because it's the best variety we've got.

Trent – there will be a lot of info from western Vic but they are not growing Mace. A lot of their varieties are longer season ones.

Mick – about six weeks ago the GRDC were having Septoria workshops (in Vic?) and we said don't worry about having one in the mid North (SA) because we haven't seen it for a while! That wasn't real smart because within a week we started seeing it.

Trent – a lot of Septoria operates pretty similar to Blackleg. I'm not even certain how effective burning will be.

Mick – it is a long distance disease and you are going to be surrounded. It's not like Yellow Leaf Spot which is a very short distance disease – sub metre. Septoria is metres, hundreds of metres and kilometres.

Trent – there's supposed to be a 500m isolation distance for blackleg but for Septoria it's kilometres. That's the big difference between the two diseases. For blackleg 500m is pretty good, Septoria 500m is a total waste of time and if it's in a district then it's going to be everywhere.

Mick – and when you are looking at varietal tolerance it is Septoria tritici NOT nodorum. Make sure you are looking at the right disease. We've had nodorum once in 20 years, not too much of an issue for us and it's a late season disease. This is the mid season one. Epoxoconazole and thioconazole (?) are both very good. Opus or Prosaro.

Jeff – this plot is Boxer Gold at %L/ha. It would have been a different story with a bit more rain, I think. This is Sakura at 120g. With the disc vs the tyne you got 79 and 90 on the tyne and it's probably not really significant. However when we go to double rate of Sakura there is a bit of a difference. The disc was 79 and the tyne was 94, so a bit more.

Sam Kleeman – My experience with Sakura is that it is the safest option for wheat. There does seem to be a little bit of selectivity. On these heavy soils it has been the safest option for single disc users. There wouldn't be too many putting out 240g but even where I've tested it at high rates I haven't had seen too much of an issue. But that's not to say there won't be some problems with a lot of free lime and like where you start to knock the crop around so be wary of that.

Mick – and in low organic matter, acidic soils as well.

Sam – I don't think the Bayer guys have been able to pinpoint if it's the free lime, pH or an interaction. Might be root pruning exacerbating a nutrient deficiency or something else. Disc and knifepoint problem.

Jeff - It's soils that don't have a lot of clay in them. Might be a lot of silt and you just don't have any binding sites for the chemical.

Sam – that's one of the properties of peroxydisulphate is that does show low levels of binding so it is freely available. In the west on the sand for example it shows too much mobility at times and tends to move down so you show less binding and it's more readily available so more capacity for damage.

Mick – the crop does generally recover.

Jeff – looks like Logran or Glean damage

Mick – I know the wild oat population is scattered through here, as it always is, but you can actually see that the control of WO with Sakura is actually better than with Avadex. I know a lot of people have planned to use Sakura for ARG and then planned to come back with Atlantis for the WO and then made a decision that they didn't have to do it. So Sakura has been pretty reasonable.

Sam Kleeman – we've seen about the same activity from Sakura on Brome as well.

Jeff – we have a litre of trifluralin here followed by 3L up the other side there. This is where the emergence starts to become very significant. At 1.5L you ended up with 65 plants/m² disc vs 83p/m² on the tyne. Then when we run to 3L you have a 50% reduction in emergence. You have 42 plants and 88 under the tyne.

Sam – this is something I see in all the tillage work. Trifluralin has no fit with the single disc seeder principally from its properties and crop damage will always get you. IF you can't get separation between the seed and herbicide you can expect this damage.

Jeff – why is that?

Sam – from our work, a lot of the issue is just through entrainment. The disc forces herbicide down into the slot. More so than a covering device. The only way we could mitigate that was simply by trying to move the herbicide in advance of the disc so you didn't have that interaction. We did that with residue managers but they don't have a fit for everyone, same as disc openers. It's an inherent property that you draw the herbicide down into the row where it's quite toxic and you end up with damage. The properties of trifluralin are a bad fit for a single disc anyway. It is highly volatile so if you don't get a little bit of soil over it we have shown that you do lose it fairly rapidly. Not overly stable and does photodecompose as well. Single disc trifluralin is no go. High stubble loads as well, it binds tightly to stubbles. Not a herbicide for those systems except of course for canola and pulses.

One of the worst things you can do if you do get treflan damage in this environment where you've all got trifluralin resistance is that ARG loves the absence of competition so if you set the crop back by 50% you can guarantee the ARG in there will absolutely thrive and you'll have a mess for the following year.

Jeff – let's see what 3L does. It's actually recovered quite well compared to what it looked like. The disc was 42/ tyne 88. 50% reduction in emergence.

Sam – quite likely it will make up for it in ear density

Jeff – we know from our canopy mgt stuff that 40p/m² is still enough to produce a decent yield. This was sown at the end of May though so it may not have the time to tiller out properly.

Mick – if you are going to muck around with trifluralin it's for your early sowings not your later sowings. You are really playing with fire on later sowings but you might take a punt on a paddock or two with early sowing as long as the weed burden isn't too high.

Sam – Peter Boutsalis did an experiment to show that treflan works well in a dry sowing situation if you get the herbicide near the ryegrass prior to germination its quite effective. But once that ryegrass starts to germinate the level of activity with trifluralin diminishes rapidly.

Mick – you can see here just how devastating slaters are in this area. We weren't even aware of slaters, earwigs and millepedes ten years ago. For every slater you see there are probably 25-30 you don't see. Slater damage looks like snail damage.

Trent – we had this problem down the SE where when you lifted up a piece of limestone there was a whole family of earwigs underneath. It's not just where you have a paddock of stubble because the SE paddocks are pretty well burned. They still had damage because there were rocks they were hiding under and coming out at night and feeding on canola. There's a couple of fact sheets from GRDC, one on earwigs and one on slaters. Nothing registered for control and they suggest getting rid of your stubble for any of them. With millepedes, when we first started seeing damage the SARDI entomologist was saying that they didn't eat green material. I set up a trial in a glasshouse in Struan with 100 canola seedlings and a dozen millepedes or none and the canola was coming up pretty quick and there was significant damage in trays with millepedes.

Jeff – army worms too. The female moth prefers to lay eggs into stubble. Tend not to get them too much after break crops, mainly cereal on cereal.

Farmer – guess we have to burn everything! (laughter)

Mick – you can see the age of that ryegrass (very big) and it obviously was up before the herbicide was applied. Some farmers will say they haven't got ryegrass in the paddock and therefore won't use a knockdown and every time we see that it has been a mistake. Think about the seeding potential of missing one ryegrass with a knockdown prior to seeding.

Sam – Missing one that early can result in thousands of seeds. Each tiller will get a spike with upwards of a hundred plus seeds, so a couple of thousand. You only need a few plants per m² and you have reasonable seed set there. Foot on the throat. Those plants are unacceptable.

Mick – the chemicals here have worked except for stuff that was already up. This little section here is where our trial was and we couldn't get a pre-seeding glypho on whereas the rest of the paddock where Andrew sowed did. If they ryegrass is more advanced than the wheat you know it's been there longer.

Farmer – when you sowed this paddock that ryegrass might have been one leaf and everything was hot and dusty. What is the likelihood of getting a kill anyway? Is it better to leave out glypho and come back after sowing with paraquat?

Mick – The earlier you go with your seeding the more on the ball you need to be to get it done.

Jeff – it's always dusty then. You're better to go with robust rates of glypho. At the start of the year we did a pre-em herb efficacy into stubble trial. Different nozzles, droplet sizes, nozzle spacing and spraying into different stubbles. We had a stripper stubble say 700mm high, a normally reapt stubble at 200-300mm high and essentially a bare area.

We put water sensitive paper out and we also used fluorescent dye. Stefan used his UV light to show up the fluorescent dye and it was really interesting. Even into those big stripper stubbles where we set the boom up to be applying above the stubble and we were getting significant deposition right down to the base of the ground. Significant enough to hit a single leaf ryegrass I think.

Just anecdotally one of the best treatments was 25cm spacing with a coarse droplet and high water rate. That was about as good as we could do in terms of penetrating stubble. 100L/ha was our base rate.

Katherine Borger in the West showed exactly that. Maintain your water rates and you get better deposition and she suggested that it was an improvement by upwards of 35% more product on the ground and equivalent improvement in ryegrass control. Water rates are key.

Mick – work done by Phil Gordon at Hart on summer weed control – Delta T is not a real problem. There has been this stuff promoted about not spraying in high Delta T. High Delta T is only a problem if you droplets are too small and

then they will evaporate between the boom and the ground. But if your droplets are big enough they WONT evaporate. We had Delta Ts of 14 and were getting 100% control. Don't be afraid of Delta T but DON'T use a flat fan nozzle 02 because it just wont work. You need big droplets and don't be afraid of going during the day.

Jeff – the other thing with that fluorescent dye in the stripper stubble the droplets actually created quite a long streak on the straw instead of being deposited as a droplet. It actually bounced off the straw by using quite large droplets. Maintain those coarse droplets and good coverage with 25cm nozzle spacing seemed to be ideal along with a fairly robust herbicide rate. We used 015-04 nozzles.

Mick – most of our treatments were applied at around 12-14k/hr and it didn't really matter which nozzle or droplet size you used, there was no deposition on the back side of the leaf. If you have a ryegrass that's vertical and you hear all this stuff about twin nozzles or setting them one way or another, we actually couldn't get it to work!

Trent – we had water sensitive paper back to back and every second one had nothing on it.

Mick – they are only going to work to get deposition on the back side, I think, is to be below 12k/hr.

Jeff – or fog it out and drive backwards!

Mick – as you go faster, the droplet traverses a greater distance so it's not 50cm above the target anymore so there is greater chance of evaporation and you could easily lose 30-40% of those droplet. They are only meant to go 50cm and they could end up going 2m. If you are going 28km/hr the boom is also rocking up and down. If you have really good stability and you can keep it at 50cm above your target, maybe. Someone with 25cm spacing can go faster in worse conditions than someone on 50cm spacing. At 50cm spacing with a 120ft boom you only need a little bit of wobble and suddenly the end of the boom is up over a metre and sometimes up to 2 metres. If you do that with small droplets then not many of them are getting down to the target.

Jeff – I saw a situation in lentils yesterday where it was through a gully and the boom height was quite high and the lentils are dead from botrytis because the fungicide just never got down into the canopy.

Trent – We are trying to get Bill Gordon to come across and set up a demo day with some different spray rigs and water sensitive paper for early March next year.

Mick – a good role for a drone is to get up above your paddocks and pinpoint those areas where the crop may be thinner and less competitive towards weeds where weeds will grow vigorously and set more seed. Even with headlands, not

everyone is getting it right turning the machine on and off. We should be going back and doing something with those areas that just don't have the competition to keep the weeds down. That's just a weed burden that we cannot accept next year.

It's a good thing to investigate so we can have some targeted weed control rather than spending a lot of money on parts of the paddock that don't even have any ryegrass.

We don't get much ryegrass with our really early sowing. We certainly get a lot with the late time of sowing. If you sow late the wheat is delayed in emergence, but not only that, the length and width of the first two leaves – they are shorter and narrower. It's usually wet and cold in those environments and ryegrass just loves it! Delaying seeding to get ryegrass controls doesn't always work.

Sam – my belief is that you get most of the ryegrass created by the disturbance of the sowing pass. So you can have that mindset of delaying to get a better knockdown but it doesn't mean that a lot of the ryegrass will. A lot of the ryegrass will come as soon as you stick the drill in the ground. It just loves cold, wet conditions and it will thrive in absence of competition. A good pre-em with good early sowing and good competition is as good as anything.

Farmer – how much herbicide is getting tied up in really heavy stubble loads?

Sam – as soon as you are getting more than 50% ground cover you are starting to impair your pre-em's but it does depend on the properties of the pm. Trifluralin as I said shows very low solubility and binds tightly so any trifluralin or dye that you see is not going to wash off and move. Sakura on the other hand shows some solubility and very low binding and there's potential with rainfall that it will wash off. If you have a really thick heavy stubble and you can't see a lot of ground it's not going to matter what pre-em you are going to impair the activity. Stubbles aren't conducive to good pre-em activity unfortunately. We just have to work within the constraints we have got to make them do the best that they can.

The objective is to get as much as possible on the bare ground. Any that is on the stubble to a great extent will become inactive. And due to the inherent patchy nature of stubble you are not going to get a homogenous band of herbicide down there. So you can expect where you have heavy overlaying patches that weed control is going to be quite poor. Carrier volumes are vitally important – 100-150L/ha was the effective range that Katherine Borger found.

Jeff – show of hands of who has crop topped some cereals in the last few years? Happy with the results? I'm very happy with the results when we do it but I think it's always better to go slightly earlier and accept some yield loss. That's why ryegrass maps are so crucial. I think a season like we have this year where we had some decent early rains and got ryegrass germinations within bean stubbles and canola stubbles probably presents an opportunity to get some of this high resolution satellite imagery now. Commercially it's down to 5m pixel size or

smaller. The value is that you can create ryegrass maps and then at this end of the season you can actually go back and top those areas. That way we can go in 7-10 days early, know that we are going to get 100% control and accept the 10% yield loss on those patches. Otherwise it's just touch and go, particularly with a variety like Mace, to get the timing right. It's maturity is that similar to ryegrass I feel that it's getting closer all the time. Essential to get some ryegrass maps.

Hit up your machinery dealers on exactly how to make coverage maps from the gps.

Rates of glyphosate – 2-2.5L/ha That's also effective on some of the broadleaves.

Jeff – If you have a rough finish going into terminal head moisture stress then 55% moisture is about right. If you have a soft finish, canopy is still green, taking a long time to go off then 45-50% is more around the mark for a glypho timing.

Mick- its daunting because it's a pretty green crop that you are going to spray and it's easy to say 'Im going to wait'. The only way to get confidence is to do those head moistures. Its not hard to go and cut 30 heads off, weigh them straight away – don't leave them in the ute for 2 hrs before you get home because they will already have started to lose moisture. So, weighed straight away, put them in the microwave and keep on turning them until you see them dried out and you can start to break them with your fingers. When they are at that stage they are still not dry. You cannot dry stuff in a microwave. The last ten % of the water you have to get out in an over. Put them in an over for around an hour at 70-80 degrees and you'll get that last big of moisture out. You'll get your eye in after a while to know what you are looking for – that 50-55% moisture.

With barley it's not yet legal to spray glypho on barley but if you are supplying a domestic market and your are outside of Viterra, Grain Corp, etc then it is between you and the buyer. It's just the storage system that doesn't allow it. We know it is not a registered use, hopefully it will be. Even in feed barley that will be enough because it is easier to get the timing right. It matures so much earlier than ryegrass.

Jeff - I think as soon as you get to the watery stage that is the last chance you have got with ryegrass. Anything after that you might as well forget it, just lose control of it.

Mick – the combination of crop topping and some sort of seed destruction is probably the ideal. We don't have much glypho resistance in the middle of the paddock, it's edges or voids in the paddock. It just needs to become more and more standard practice as we get more and more confident to do it.

Farmer – how early can you go on beans with glypho?

Jeff – I think ten days earlier than paraquat.

Mick – but just remember you have later order pods on beans and you can get glypho into those beans and the following year you will have % of those beans that will come up and look like you put Lontrel on them if you sow them.

Jeff – I should mention the canola side of things with glypho too, that's been a massive development. That window of 7-10 days is valuable, a lot of the ryegrass was just flowering then. Use high rates if you need to, up to 4.1L/ha. High water rates.

Farmer – we keep talking about using glypho everywhere. Is that sustainable?

NO!

Mick – well, it is sustainable if you don't have any weeds. We just have too much tolerance of weeds. We don't have to have weeds. We accept too many. We used to have a model that said if you had less than a certain threshold you weren't going to get crop losses and therefore don't spend the money on control. If we accept one ryegrass in our paddock we are going to always have ryegrass. We have to have NO ryegrass and NO wild oats and have to think of all the possible things we can do to stop it. What Mark Sandow is doing is terrific because he's got it down to doing a lot of things on a small area because he's mapped it. If Mark spends \$200/ha on ryegrass control on .5% of the paddock, who cares?! You need to have the attitude that you won't let ryegrass set seed even if you have to hire people to grub it out with a hoe.

Sam – resistance is based around numbers. The higher the numbers the greater the probability that there's a mutation that will confer resistance.

Mick – we can't afford to lose glypho.

Jeff – probably emphasizes the point of having that second mode of control too like some harvest seed set capture in conjunction with crop topping with glypho. You can't afford to lose a chemical that is worth \$4/L.

Mick – the carcinogenic thing about glypho. It has gone from no risk whatsoever to – “it could possibly” which is the same as caffeine and salt. So if you ate your body weight in glypho you are probably going to die. From a practical point of view we need to get the facts so that not just ourselves but other people in the community understand the real risks. We tolerate these media beat ups rather than saying what is the real message here, what is the science.

Farmer – what about crop topping oats in front of cutting?

Mick – working extremely well. It is a legal use now, on the label. Some exporters are not that keen so you need to discuss it with them. But that's an emotive thing especially into Japan. The industry needs to be able to say to them that this is legal, the work has been done we have MRLs. The weed control benefits are really good because you can actually start picking up a little bit of brome and WO as well as ryegrass. From a hay point of view there are some risks. If you

spraytop and you get 10 days worth of rain you are going to have some pretty shit hay even before you cut it. It will start to degrade. You only need 24hrs but I'd suggest 48hrs as a minimum before cutting to make sure you get full translocation through all the weeds and the crop. Then from that point on you will actually start to get desiccation, curing, dehydration of the plant while it is still standing as compared to in a windrow. The heat and the wind will have a bigger effect than in a great big windrow. So it works extremely well. If you say you are going to be somewhere between a day and a half and five days, maybe seven, between application and cutting. You will have three days or so of curing while standing.

The key to figure out how good the penetration is how much summer weeds you get. We have had wonderful control of fleabane with that late season glypho application. It's a small plant and very susceptible to glypho and it's tiny down in there in the canopy. The control has been fantastic so we are getting glypho right down to the base of the plant even in a pretty big oat crop.

Jeff – the other thing about the glypho is that it gives you the opportunity to put a bipyridal herbicide out too. It's so hard to get the double knock right when you are flat out seeding whereas if you get the glypho on ahead of the oats, just go follow it up with some gramoxone, perfect time to put a double knock on it and reduce that chance of glypho resistance. Wack it on heavy.

Mick – no good cutting hay and having the ryegrass in the paddock set seed.

Jeff – you can't use it in every crop but putting a little bit of amitrole in with the paraquat has completely changed how effective paraquat is, particularly on ryegrass. That little addition of amitrole makes it better translocated and more robust on those bigger plants. Doesn't cost much but you can't do it on top of pulse crops but after cutting hay it's perfect. 50-60mLs of amitrole in 1.5L of paraquat. Don't use over the top of anything to be sold as grain.

Trent – let's come back to the insect pest. Talking to Greg Baker from SARDI – Which pests are the biggest issues for you. I guess we have slaters, millepedes and European earwigs to start witharmyworms.

Jeff – anyone with black soils will have slater issues.

Trent – millipedes? (yes) earwigs? (yes) armyworm? (yes)

Mick – we tend to just whack on some chlorpyrifos and it's probably controlling near everything that's out there but we don't know which one was actually doing the damage.

The earlier we sow the more barley yellow dwarf virus we see so we have to do something about the transmission vectors early in the season. Maybe imadocloprid in cereals. You can easily lose 30% of yield with BYDV

Trent – we had a straight-line relationship between the amount of rain from Dec through till May and how much BYDV yield loss we get. The more rain, the more aphids are surviving. In the SE we have perennial grass pastures so there's a reservoir of the disease there all through the summer so the earlier you so, the aphids pick up the disease from those grasses and transmits the disease. It's the early infection that causes the most significant yield loss. The biggest we measured was 40% in one year. The wetter the summer and autumn in the SE the more likely we are to have significant yield losses. With a dry summer and autumn then not as much risk.

Mick – we see it more on the valley floors where the perennial grasses are growing compared to up the slopes. Those on creek lines or rivers more at risk.

Trent – same at BWYV – if the aphids pick it up, everytime it feeds it is transmitting the virus to another plant. If the aphids come early, fair bit of summer rain then a big issue. We treat with a seed dressing to start with to get 6 weeks protection and then we come back with another insecticide. Does a good job. Increasing the sowing rate to get a thicker canopy works too as the aphids don't tend to penetrate as well as they do on the edges or in thinner areas of the crop.

Once you find aphids, it's too late because they are already infecting the crop.

Stefan – we put some really high insecticide rates down the furrow through liquid tubes and also Impact for blackleg control and it's done a pretty good job. It was canola on canola and the flutriafol did a pretty good job.

Trent – You can't put it on as a seed dressing because it is phytotoxic so it's always put on the fertiliser. So putting it on as a liquid under the seeding row might be a useful way to get the uptake from it and get it working.

Mick – if you are using fungicides in liquid injection, don't use anything but Triad or flutriafol at this stage because all the others have some sort of impact on the crop and it's mainly negative. Teb, propaconazole, amistar extra all caused problems in our trials.

Stefan – we have produced a stubble calculator, a decision support tool that tells you if you cut at this height and this speed what your cost of harvest will be and then also you can calculate what you are doing post harvest with stubble management. The idea from Mick Faulkner and Bill Long was that people might go out with stripper fronts and wizz across the crop and then intend to come back with their harvester later and cut it low, how do you sum up where you are with header hours and costs over the whole program. Then it got extended into what other people do with burning, narrow windrow burning, slashing, baling and the associated nutrient loss. It will allow you to calculate if you burn a paddock, you can put in your burn % and look at what nutrients \$\$ are going up in the sky. It will be distributed through the HRZ newsletter and the Alkaline Soils group.