TO MEMBERS

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Western Australian No Tillage Farmers Association (Inc) WANTFA

SEPTEMBER 1994 "NO TILLAGE—LEARN THIS CONSERVATION CROPPING SYSTEM" NEWSLETTER VOL 2 NO 2

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Topical Section

320 AT KALANNIE—MORE INPUT

Bill Crabtree, Development Officer (Esperance)

In early August over 320 people attended the Kalannie/Goodlands Land Conservation District Seminar and Field Day on No-Till. This turnout shows the huge interest with No-Till cropping techniques and demonstrates farmer desire to understand the techniques better. There is a great hunger for information with this new cropping system and we hope that this Newsletter will help fill that gap. More farmer articles are needed however, and they can be on direct drilling as well as No-Till techniques.

The process of getting a story in the Newsletter is simple. Just write an article by hand or type and fax it to me (090 761227), then I will make editorial changes and fax them back to you. Then if I have got it wrong then just fax it back to me with scribbles over it to make it right. The more stories, the more newsletters.

NEWSLETTER DELAY

Ken de Grussa, President

With the long break between editions of the newsletter this year WANTFA members may understandably be wondering what is happening. The resignation of Andrew Heinrich who was going to edit while Bill Crabtree was on leave delayed the newsletter and since Bill's been back, a drought in Esperance and leave by others, gave Bill a heavy workload. Also a lack of

persistence is required and it has in some cases come at some immediate economic cost. Therefore we moved slowly into less tillage as the opportunities arose. Our farming direction has set out to minimise tillage, return all stubbles and achieve economic success.

We have developed machines that can plant at an accurate depth by using large wheels, articulated framework and good hydraulic control. We have increased our row spacing and frame height to improve straw flow. Super Seeder points have also helped with straw flow, given less soil disturbance and given longer wear and easier penetration of hard soils.

Paddocks have to be prepared ahead of the crops. This is done by manipulating medic and clover pastures, being aware of possible herbicide resistance problems and paddock smoothness. Legume crops also act as preparation for No-Till or direct drilling. With the new chemicals now available we can sometimes direct drill without using post emergent sprays.

Pithara/Dalwallinu Experience

It is not possible on our farm at Pithara (12" rainfall) which consists of three major soil types to assess results with experimental accuracy. The soils are; heavy duplex, light clay over gravel and conglomerate and lakeside sandy loams. Over these soil types we use three main rotations:

1. A conventional cropping following pastures.
2. Multiple cropping, both cereal and cereal legume.
3. Two years medic - one year crop;
   both conventional and No Till.

We have found that No-Till sowing has to be done immediately after the opening rain, otherwise the moisture advantage, both for penetration and germination is lost. Badly degraded soil structure has been treated with gypsum, pasture and less tillage and appears after 9 years, to be recovering slowly. Bad weeds, like doublegee and wild oats, have been controlled. Yields have been pleasantly satisfactory, taking into account seasonal condition and comparisons with other crops and methods in any particular year.

Despite using DAP plus Urea, grain protein has been disappointing on a range of soil types. Normally we would just use superphosphate on this paddock following two years of pasture. I put this low protein down to lack of cultivation to release nitrogen. This is a direct reversal of what has happened to these paddocks for over 70 years, when constant cultivation was used. This gave release of nitrogen and left us with a soil poor in structure and fertility and with a rising water table.

Some of our soils respond to deep ripping and we might have to do this on occassions. Application of sprays, fuel, and wear-and-tear on machinery with all its attendant costs, have been drastically reduced with less tillage and this far outweighs any cost for extra nitrogen that might be needed with less tillage.

Sheep feed is better in pasture years after using less tillage. By reducing crop inputs, we believe returns on these paddocks may well outweigh conventional farming. If the 70 years of conventional farming had continued for the last 10 years, then the paddock would have deteriorated even further. Perhaps we are turning the corner economically and improving fertility, and in due course the grain protein will improve.

Watheroo Experience

Our Watheroo farm consists of sand over gravel and deeper sands in a 16" rainfall and is ideally suited to a lupin:cereal rotation. For 10 years a major part of the crops have been in this rotation. At no time has any straw been burnt and crops of lupins and wheat are well above district average. All these crops are seeded with a Shearer Cultitrash on a bar that gives articulation and reasonable depth control with following flexicoil packers.

One could expect a duo-culture in such close rotation is bound to give problems. When we started, we expected the rotation to be limited for various reasons, but some of the problems that have arisen were not anticipated. No ploughing has been used rather we have used Sprayseed and direct drilling with post-emergent herbicides as necessary.

This is not cheap farming, as direct fertiliser inputs, particularly N are higher to replace the crops that are exported from the farm. Fuel and wear and tear are low cost under this system, but to replace cultivation requires high usage of herbicides.

Non-wetting sands seem to be exacerbated by trash retention. Consequently, weed germination is unreliable and prolonged. This perhaps increases herbicide resistance. Delayed germination of plants makes weed control difficult.

Direct drilling gives greater control of wind erosion. Better management of stubbles with more machinery of high capital cost would reduce wind erosion even further. Unfortunately we have not been able to control dust losses, particularly in the lupin rotation. The economic pressures to have sheep grazing to the maximum, does little to help minimise losses of fertility in dust. It seems the only chance to stop dust losses is to remove the sheep and/or go into alley farming.

Summary

We see no alternative to total stubble retention, and have been able to use No-Till and direct drilling to great advantage with the fall back position of minimum tillage.

In our experience, there appears to be some losses of yield with No-Till, but in the long-term, where No-Till can be used, we expect the gains to override the losses. Cropping with total stubble retention is entirely compatible with good agronomic practice, but there is the possibility that soil compaction will still have to be combated with deep ripping periodically on some soil types.

In 1993 we used No-Till on 1106 ha, direct drilled on 1174 ha, and conventional methods on 659 ha. In 1994 we used No-Till on 966 ha, direct drilled on 763 ha, and conventional methods on 150 ha. We are very satisfied with the No-Till results and see no reason to stop us persisting if circumstances are right.

In 1995 we will be governed as always, by the weather and paddock preparation, but our intentions are to continue with total stubble retention with as little tillage as possible.

GREAT PLAINS FOR CORRECT SEEDING DEPTH

Stuart McAlpine (Buntine 096 642082 or fax 68)

Our No-Till began in 1989. We have always suffered from wind erosion at least once a year, either just before or just after seeding. In 1989 we ploughed two paddocks while wet, and seeded them with just a puff of dust - ideal conditions, and yet they blew terribly. It was then that my father Ian and I decided that changes had to be made to our management practices.

We had just purchased a Shearer Flexmodule Seeder and with some modifications we set the machines up for direct drilling into lupin stubbles. My trials the year before on our light land showed that our soils respond to a cultivation. Hence we put large points on the first three rows and put 5 cm blocks on them which cut out the need for one working which reduced wind erosion. The trash clearance was pretty good though we still had to burn the header rows on the thicker crops to get through.

Our main problems were still in the planting of the lupins. My light soil would set down hard over the summer, especially when we had summer rains and sheep traffic. Dry seeding with the cultitrash was not possible, it just wouldn't penetrate, so we had to skim plough first and then seed. The crops were great but the soil damage was not acceptable.

The hunt began for a machine that could handle thick stubbles, give good penetration, provide an accurate seeding depth and rate, and something that you could put someone on knowing that as long as they drove straight and were not out of seed they were doing a good job - not much to ask for!

Dabbling with No-Till

In 1992 I trailed a Great Plains double disk open seeder. We had a lot of summer rain that year and it just would not penetrate. It was then that Tom Atterby of Great Plains informed me of their No-Till drill. While travelling overseas, at Tom's suggestion, we visited the factory and saw the Great Plains No-Till drill in Salina, Kansas.

There were several features about the Great Plains No-Till drill that I really liked. The coulter was capable of up to 540 lbw spring tension enabling lupins to be sown into hard dry soil. The wavy coulter was either æ or 1" wave, I believed this would help give some protection against Rhizoctonia. The coulter enables cultivation to 10 cm depth and gives some shattering between the rows. The coulter would also do all the hard work

Science Section

CROPPING REDUCES PASTURES

Jeremy Lemon, Development Officer (Esperance)

The effect of cropping on pasture production is complex. A complete cultivation, with cropping, usually decreases both the density and early feed production of a pasture following a crop. However, cropping generally improves the legume component.

In annual pastures the initial amount of green feed available is directly related to the size of the germinating seed pool. With large seed pools and dense establishment, maximum growth rates are achieved more quickly than with less dense pastures. Maximum growth rates are achieved with 1.2-1.5 t dry matter/ha.

Cropping reduces and often prevents weeds producing seeds. The only seed available for pasture after a crop is seed which survives by dormancy, hard seededness or as a weed. Pasture establishment on the Esperance sandplain (by Harry Fels) and other sites shows the negative impact of conventional cropping on pasture density, growth and recovery.

Measurement	Years since crop		
	1	2	3
Pasture legume density, plants/dm2	7	13	16
All species density, plants/dm2	24	43	124
Potential initial green biomass, kg/ha	61	124	169
Days taken for pasture to reach initial green biomass of older pastures	17	5	-

By deferring grazing at the break, sparse pastures can accumulate biomass and reach the growth rates achieved by denser pastures but there is always a delay at a critical time of the year. In seasons with an early break pasture growth rates in stubbles are not such a problem. Here farmers hold stock on older pastures before cropping them. Allowing pasture in the stubble paddocks to grow.

Another way to reduce the effect of cropping on pasture density is to ensure a good legume seed set the year before cropping. Controlling insects and competing weeds will help boost seed levels which can then survive the cropping phase better. Choosing more hardseeded pasture legumes will also help with regeneration.

Medics and subclover have been selected for their hard seeds; small seeded volunteer legumes and serradella also have hard seeds. This enables a seed pool to survive without additions to it in a crop year. This is different from most other pasture species like the annual grasses which need to set seed annually to maintain a high population. Capeweed and geranium have some level of dormancy or hardseededness which enables them to survive a crop year.

Legume regeneration after cropping is comparatively better than with other weed species (below table). In the first year after crop the legumes comprised 29% (7/24) of the pasture species, whereas in the third year the legumes were reduced to 13% (16/124) of the pasture population.

Cereal crops deplete soil nitrogen and so create an environment in which legumes have a competitive advantage over non-legumes. This allows the legumes to grow fast and dominate the pasture because nitrogen is limiting the growth of other species.

Tillage associated with conventional cropping incorporates pasture seeds into the soil. Deep, vigorous cultivation like scarifying and ploughing buries some seed so deep that emergence is unlikely. Shallow, direct drilling and No-Till leaves the seed close to the surface where temperature fluctuations can soften the hard seeds and depth is unlikely to reduce emergence. Below is 1985's pasture regeneration data, from a long-term trial at Esperance Downs Research Station where a 1:1 crop:pasture rotation was in progress.

Pasture measure	Pasture Species	Sowing treatment: No-Till Early	No-Till Late	Direct Drill Early	Direct Drill Late	Work Twice then sow Early	Work Twice then sow Late
Density/m2 21/6/85	Clover	318	139	56	53	29	31
	Grass	11	8	37	21	33	16
Composition (%) at 26/9/85	Clover	90	83	46	55	30	36
	Capeweed	2	7	10	12	25	25
	Grass	8	8	37	27	33	25
	Bare	0	2	7	7	12	13

Delayed sowing in the crop year generally decreases the pasture densities the following year and usually decreases the percentage of grass in the stand. Earlier sowing means grasses in the crop are controlled less effectively hence more grasses grow in subsequent pastures. The No-Till treatment gave much 'better' pasture composition the following year, with few grasses and 90% clover.

In medic pastures, shallow cultivation buries burrs. This means that seedlings survive better because the emerging root is in the soil, rather than exposed to desiccation on the surface. No-till practices where no soil is sprayed over the soil surface may decrease medic establishment in the following years.

BURNING RE-QUESTIONED?

Bill Crabtree, Development Officer (Esperance)

Hmm! It happened again! Many got caught in the dilema of too much stubble and therefore had to burn to effect seeding. The burning, as we all know, was followed by strong winds which caused severe Statewide erosion. I have spoken to many farmers who were caught in this trap, including wheatbelt farmers. Someone said "I didn't think we'd forget our 1983 experience, but we did!"

Perhaps the trick is - manage, in any one year, for a decade of seasons. This requires forward planning and flexibility. Making the stubble short and evenly spread is one key (see Linda's story below). Spacing tines out carefully with wider row spacings (10-12 inches) is becoming popular. Putting leading angled discs in front of tines greatly improves stubble flow. Many have tried this trick which was originally tried on 6 row combines by the Marshall and Raszyk brothers. Some others include: David Campbell (Scaddan), Trevor Spencer (Dalyup), Jim Baily (Wellstead), Doc Fetherstonhaugh and Frank Kirchner (Munglinup), Paul Spittle (Condingup) and Chris Henderson (Lake Varley).

The leading angled coulter idea is cheap and simple. I'd strongly recommend that you give one or more of the above farmers a ring. Alternatively, I'll invite them to write their own experiences in the next edition of the Newsletter (before Christmas) with more info. With 1994 being a dry seeding it meant that the stubble was dryer and therefore easier to seed through than normal. However, farmer impressions appear to be that the stubble handling capability was improved by perhaps 20-50% when configurations were set properly.

Continuious croppers often say that it is better to keep the stubble tall and ungrazed. With the disc only machines this lessens this risk of pinning (seed being placed in thick straw in the soil) and nitrogen tie up which is important for a cereal on cereal rotation. Obviously it would be best to avoid this rotation if possible. Other crops that may break this practice include beans, canola, peas, chickpeas, medics (with sheep) lupins and other lupins.

This year has been the toughest cropping year ever for many farmers on the south coast. Yet despite this there are some very good looking crops where thick stubble has been easily sown through. No-Till has excelled in most areas, flat furrow sowing has been very beneficial in this dry season.

HANDLE STUBBLE AT HARVEST

Linda Leonard, Stubble Extension Officer (Merredin)

A stubble handling demonstration at Cunderdin in May was well attended. Farmers saw first hand the value of managing stubble at harvest, especially if they are limited to a tined seeding machine. Both tine and disc machines were organised to do the seeding. Short, yet thick stubble did flow through tined machines.

The trial was set up last harvest with the stubble being cut at either 50 cm (20") or 20 cm (8") height. The harvester used was fitted with a straw chopper and chaff spreader, therefore the straw that lay on the ground was in short lengths and well spread along with the chaff. There was 4 t/ha of stubble across the paddock and it was ungrazed.

For tine machines the stubble, straw and chaff needed to be in short lengths and well spread to minimise problems at seeding. At 6" or 14" row spacings the tine machines were able to seed through the short stubble but blocked very quickly in the long stubble. This emphasised the need for stubble management (short lengths and evenly spread) at harvest when using tined seeding machines.

All the disc machines were able to sow through both long and short stubble without blocking. Machines included: a Forward Engineers No Till air seeder, a Great Plains and an International 511 with a Walker culti-trash float. The culti-trash also had a treatment with Phillips rotary harrows and Blanchard land packers.

The demonstration showed one system of stubble management which enables seeding through high levels of stubble with any seeding equipment. However, sowing through stubble is not the only system objective. Weed control, seed placement, nutrient availability, straw burial and distribution, and disease are all factors that need to be looked at to optimise yield potential. This trial will be repeated next year to look at the residual effects of wheat stubble in the next wheat rotation.

Farmers Section

ANOTHER GOOD YEAR OF NO-TILL

Ray Harrington (Darkan 097 363030 p/f)

The '94 season No-Till crops are up and looking excellent. This year I made some changes from the last 4 years. I sowed 90% of my program on the 'visual' contour and I was very surprised how little time was lost with only a little inconvenience considering that I used an air seeder covering 12 ha/box.

I changed my row spacing form the 6" to 7" to make the machine easier to pull. However, it didn't seem to make much difference, though to be fair the new Ryan Tines I used had an 85 kg breakout force which probably made the machine harder to pull in the tougher country. My original estimation of 3 engine hp/tine has been adjusted to 3-5 as greater tine breakout has been needed in this dryish '94 season.

After 2 farmer reports of smashing tungsten off points, I decided to increase my tine breakout pressure from 85 to 95 kg for the last 80 ha. Increasing the pressure just this 10 kg increased point loss 13-fold (a point/350 ha versus a point/27 ha). The 85 kg of tine breakout has been adequate for working most soils 7-8 cm deep at up to 10 km/h. However, I have found that the only way to work some tight clays at the correct depth is to slow down to 6 km/h. Sorry about that! So, for me, 85 kg breakout is enough pressure unless it's too dry or I want to go faster.

Point wear has been excellent but different soil types have shown the need to modify the hard facing in some places. Tungsten and WNIR are both still proving to be excellent value.

Perhaps the greatest challenge in my program is to find a more suitable seed covering system. The options seem to be prickle harrows or covering chains of some description. This year I welded a piece of 40 mm flat bar against the direction of travel, which greatly improved the 3 row finger harrows but it is still not good enough in wet sand or soil that's a little cloddy.

My weed control techniques have been very successful. I combine a high stocking rate at times to complement my herbicide uses. Spraytopping has once again shown that it is "mandatory" and No-Tillers shouldn't even contemplate the system without it. Manipulation appears to be the next step if you are going into a Rotation. In my system, Spraytopping alone gives good enough weed control for the crop and allows enough carryover seed, with the odd in-crop weed, for good pasture regeneration. Clover is still our biggest "weed" in our No-Till system. Even with 3 g/ha of Glean some clover has survived on the sandier soil.

Last year my brother David did his weed control in one paddock too well and his intended pasture paddock for 1994 was sown to canola instead. David's regime was: spraytop, tickle, knockdown, sow, Paraquat after seeding and Diuron Pre-emergent. I guess that looks like a good system to start a cereal:legume rotation.

Geranium has been almost completely blown away. I have a small geranium patch where 4 g/ha of Glean has been used, a neighbour tried 6 g/ha of Glean with the knockdown. Glean appears to be doing the job better than all the other herbicide additives like Goal, 2,4-D and Dicamba at this stage. I am also experimenting with Ally at 3 g/ha on a small patch of Stirling barely.

In closing I am very pleased to be in a No-Till cropping system. It was a late start to the season - and yes, I did refrain from starting immediately after the rain as I waited for the 'church bells to ring at least twice' (an old English saying) to make sure I had good weed germination before applying the knockdown.

PERSISTING WITH LESS TILLAGE

Elton Butcher (Pithara 096 621027 or fax 25)

'Direct drilling' is not new to our farming operation. I first practised direct drilling of oats into wheat stubble during the early 1950's. It produced good crops under the circumstances, but we had no means of controlling weeds or applying N and this stopped us direct drilling.

New land farmers have always practiced direct drilling or min-till, but as weeds take over and compaction sets in, all this changes and they revert to conventional means. Weeds and compaction and convention - we were slow to learn!

Today, we have recognised what compaction is, and what loss of soil structure means, instead of saving moisture, cultivation can actually lose moisture! Instead of requiring shorter season and less productive cereals, we realise that we can plant longer season cereals and take advantage of earlier seasons and convert more moisture to production provided we use approriate agronomic techniques. This also reduces the amount of water entering the underground water table. There are many advantages of No-Till sowing but there are also disadvantages. We have to make the most of the advantages while finding ways of reversing the disadvantages.

Our experience of less tillage over the last 10 years has enabled us to recognise the role that these practices have in our farming system. To use a new system requires long term planning with different: machinery, plant varieties and agronomy. An opportunity use of the system can be great; but in the long term, the changes have to be planned and organised into a whole systems approach.

Keys To Making Less Tillage Work:

1. Careful paddock selection

It may be heavy and hard and lacking structure. It might be sandy and of low fertility. No-Till does not perform miracles. We still have to put the seed in the correct place at the correct time, control weeds and disease and have the correct conditions for success. Poor soil structure and fertility are not ameliorated easily or quickly.

2. Flexibility

We only attempt what we can handle with machinery and the available rainfall. But we plan to be ready for the rain so that we can take advantage of any opportunity to use No-Till.

3. Beware of less mineralisation

With No-Till there is less mineralisation of N and P. This leads to less early plant uptake and extra nitrogen and phosphate may have to be applied at seeding. With No-Till we have to handle more trash which will tie up available Nitrogen and can decrease herbicide activity.

Persisting with the system, in the longer term, has enabled us to overcome some of the difficult problems. Time and

persistence is required and it has in some cases come at some immediate economic cost. Therefore we moved slowly into less tillage as the opportunities arose. Our farming direction has set out to minimise tillage, return all stubbles and achieve economic success.

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I had been having some hydraulic problems with my 63 row so I decided to make some depth stops. When it rained I decided that the stops I had made up after about 4 laps and lots of scratching about were seeding 1/4" too deep. So I made some new stops raising my seeding depth by 1/4" to about 1/2" . I could see the difference at harvest and anything visual I am told is at least 10-15% yield difference. I still believe farmers are not placing enough emphasis on seed placement.

The machine was also capable of sowing very small seeds like canola and clover with accuracy. The machine only has a seed box but this did not concern me as we have not put any fertiliser through our machines for 12 years now and everything is top dressed. After some trial work last year with a 7 foot drill with some encouraging results I decided to purchase a Great Plains 30 foot No-Till drill.

How the machine performed?

We have now sown 3,250 ha with the machine and we are very pleased with our investment. We have sown 1,090 ha of lupins, 490 ha of clover, 100 ha of wheat, 10 ha of oats and 10 ha of lucerne.

Lupins—the stubble handling of the machine was excellent. I had five blocks over 1,100 ha. Most of these were on the headland where the soil was loose. Although I did have a bad hour after the coulters sunk in a soft patch. I aimed for 50 mm seed placement while seeding dry. Now I feel this was too deep as some of the seeds struggled at that depth and the furrow and some of these walls collapsed with rain. This increased the sowing depth and I will take this into consideration next year.

Apart from the wheel marks from the headers and tractors, all the stubble is left standing providing a great sheltered environment. The lupins in these sheltered areas are twice the size and look a lot stronger. I applied 1.5 L/ha of Simazine and 1.2 L/ha of Atrazine pre-seeding. After the first rains and before the lupins emerged I came back with 1.0 L/ha of Simazine. I used some Brodal at 75 ml/ha on the bad radish paddock which was reasonably successful. On one paddock I used 750 ml/ha of Diuron which has given a good result. The last 50 ha I did went dry onto a piece that was in pasture for 2 years and was extremely hard, with some York Gum in one section, with good results.

Clover—The clover stand achieved with 6-8 kg/ha of seed has been excellent. With protein importance in wheat ever increasing, the ability of this machine to plant small seeds accurately will enable me to plant medic, serradella and the likes extremely accurately.

Wheat—The establishment of wheat from the drill has also been excellent. It looks a little deceiving as you sow into the furrows created by the press wheels and have to look down the rows for a little while. I think that if it was extremely wet there could be a problem with clay sticking to the disc, although there are scrapers available. I tried some with a Glean/Logran mix but we did not have any follow up rains for a couple of weeks after planting for incorporation. A light harrowing may have helped. This might also be an advantage if conditions were a little wet and the press wheel was likely to cause crusting, leaving some loose soil over the furrows.

Conclusion:

With this technique you rely on knock downs totally. As I learnt with the trial machine last year, you must have killed weeds right up to sowing. I had some problems with weeds coming through just after seeding compared to the conventional machine which killed these weeds in the dry conditions that were about to emerge. The more weeds that you can get to germinate before your knockdown obviously the cheaper your crop will be. I try to promote the grasses by using phoenix harrows to tickle the ground. I used 400-700 ml/ha of Touchdown as a knockdown with it working well.

We were achieving 10-13 ha/hour with the machine over all the stubbles so although 30 feet seems small you do have a longer seeding window. I believe that in the future I could use this machine to plant my whole 4,500 ha program by working around the clock. This would save maintenance on many machines. Although this machine is not perfect, in my mind, it's getting pretty close.

GREAT PLAINS AND NO EROSION

Bruce Hyde (Dalwallinu 096 641048 or fax 611188)

I wanted a machine that could seed at an accurate depth while not causing a new germination of weed seeds, especially rye and barley grass. In recent seasons we have sown early with some variable results but I was still not happy. I also wanted to sow lupins into heavy wheat stubble without blockages.

Last year Stuart McAlpine's trial (discussed above) showed the excellent establishment achieved with the Great Plains as opposed to a patchy emergence with tines. So we bought a 40 foot Great Plains parallelogram disc openers and heavy duty coulters which we mounted under a Walkers (Merredin) tool bar.

We sowed our lupins 5 cm deep and had the wavy coulters set to disturb below the seed, but with any seeding this is difficult to achieve. We measured the depth of sowing from the bottom of the trench to seed. However, sand washed into the trench, increasing the depth to ~7 cm which adversely affected the germination, delaying emergence by perhaps a week. Plant density was around 32/m2 instead of 45 with a sowing rate of 90 kg/ha. We split the seed and fertiliser on the Fusion airseeder as the openers had provision to place seed away from the fertiliser and stop toxicity.

The use of phoenix harrows at sowing improved the effectiveness of Simazine at controlling weeds. Next year we plan to sow <1" deep from the bottom of the trench then spray 2 L/ha of Simazine pre sowing and use up to 1 L/ha of Simazine with 80 ml/ha of Brodal PSPEm after a rain.

Traditionally we cultivate wheat paddocks to achieve good plant vigour which can be stunted with No-Till sowing. This year we tried half of an 80 ha paddock with No-Till on a lupin stubble and despite the two strong wind events it was the only piece of land not to erode. The soil is yellow sandplain which usually responds to deep ripping though it was ripped in 1992 so would still be benefiting from that rip. We sprayed 2 weeks after the opening rain and sowed, we had a complete germination of grass and a good kill. The No-Till germinated well and showed no loss of vigour and looks comparable to the pre worked soil. Based on this experience we might sow all our wheat after lupins next season with No-Till.

We sprayed part of our program pre sowing with glyphosate and the rest pre emergent with either 400 ml/ha glyphosate or 1 L/ha Sprayseed. The latter worked best and made the emerging crop weed free, this might be a good way to go and if any weeds recover then the crop is more mature than the weeds which could then be sprayed in crop.

We noticed a lot of RLEM and lucerne flea in crops sown with the Great Plains and possibly a bare earth treatment may be warranted with the knockdown.

We found that sowing peas into stubble with No-Till worked superbly. We have always burnt stubble and direct drilled peas using a scarifier as seeding through unburnt stubble with tines leaves a seedbed too lumpy for harvesting. The peas look good, they are more erect with less disease, perhaps due to better air movement around the plants. The most desirable spin off will be the elimination of wind erosion on the pea stubbles. This season we had terrifible erosion on burnt paddocks, into which we have sown peas and expect more erosion after harvest.

When building your own machine from parts there are often more problems than you first think. We put a Great Plains undercarriage on a bar and found unexpected problems. We had to adjust the lift on the bar for transport clearance as the parallelogram openers hang up to 6" lower than the working position. We also recieved a different model opener to the one we had as a template to fit under the bar, albeit the latest model. This is little consolation when the new opener had no tolerance for the bar frame work being positioned on the same plane as the tool bar running back to the rear of the bar. We also found we needed an extra 600 kg on each wing above the coulters to drive the machine into the ground.

Perhaps WANTFA could operate as a broking house for ideas with a directory of peoples names and machines to help resolve these type of recurring problems.