TO MEMBERS

POSTAGE PAID

Western Australian No Tillage Farmers Association (Inc) WANTFA

MAY 1996 *"NO TILLAGE—LEARN THIS CONSERVATION CROPPING SYSTEM"* NEWSLETTER VOL 4 NO 2

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Topical Section

NEWSLETTER CHANGES

Ken de Grussa, President

As our former editor Bill Crabtree is now in Canada the committee of WANTFA has decided to enlist the services of David Rees, Farm Consultant, of Albany to edit future issues of the newsletter. In the interim the job of putting this issue together has fallen to me, with the assistance (gratefully accepted) of my wife Audrey and daughter Kathy. My thanks to Bill for the considerable effort and dedication he gave to producing eight issues of the newsletter since September 1993, and thanks also to the many contributors who have made this and other issues of the newsletter possible.

The WANTFA AGM and Conference held at Darkan in February is well covered in this issue, however it is appropriate to give recognition to the people who have devoted so much of their time and effort to make the event such a great success. Thanks are due to David and Ray Harrington, and Greg Ricetti, and no doubt many others whose names I do not know. The organisation, the presentation, and the quality of the speakers have made the 1996 Annual Conference a difficult act to follow. Thank you to everyone who helped make it so.

FOLDERS OF PAST NEWSLETTERS AVAILABLE

Kevin Bligh Secretary Ph 09 3683893 Fax 09 3683355

Folders of the nine issues of the WANTFA Newsletter published since September 193, are now available for $20 or one year's membership AND the folder for $35. Send your cheque indicating which you require, together with your address, phone and fax numbers to WANTFA, c/- the Kondinin Group, PO Box 913, Cloverdale, W.A. 6105.

WANT FA acknowledges CSBP & Farmers Ltd for a $1500 donation and assistance in producing the professional-looking folders. Landcare grants to Ray & David Harrington of Darkan and the Three Springs Land Conservation District, directed to the folders, is also gratefuly acknowledged.

FIRST NATIONAL NO-TILL FARMERS' CONFERENCE AND STUDY TOUR

Kevin Bligh Secretary Ph 09 3683893 Fax 3683355

Enquiries to Bill Crabtree (former Editor) and I during an Agmaster flying trip, attending nine field days and meetings one week in February in NSW, Victoria and SA , suggest considerable interest interstate in no-till developments in WA. At WANTFA's AGM later in February it was decided to convene the first National No-Till Farmers Conference & Field day at Morawa W.A. on Wednesday & Thursday 7 & 8 August 1996. The Koolanooka-Bowgada Landcare Group, chaired by WANTFA Vice President Graeme Malcolm, volunteered to organize it - their third major no-till conference in four years. (Graeme also spoke at several meetings at the invitation of farmers in the Mid-North of South Australia from 2-7 March.) It's hard to go past willing workers!

A No-Till Study Tour, including a series of field days throughout the agricultural areas, has been initiated in liaison with local groups and Agriculture Western Australia from 28 July to 11 August, including the conference, as follows:

		CONTACT	FAX/PHONE
Monday 29 July	Kondinin	Trevor Wilkins	098 891172
Tuesday 30 July	Hyden	Geoff Marshall	098 800018
			Fax 800038
Wednesday 31 July	Esperance	Ken de Grussa	090 782026
			Fax 782007
Thursday 1 August	Wellstead	Jim Baily	098 471036
			Fax 471012
Friday 2 August	Kojonup	Tim Trethowan	098 341056
Monday 5 August	Miling	Darryl Abbott	096 511302
			Fax 511008
Tuesday 6 August	Kalannie	Jeni Dodd	098 751050
Wed-Thurs 7 & 8Aug	Morawa	Graeme Malcolm	099 715002
			Fax 715035
Friday 9 August	Geraldton	Caroline Peek	099 218509
			Fax 218016
Saturday 10 August	Northampton	Caroline Peek	099 218509

Visitors are welcome to attend any or all of the above field days, which are timed to allow driving between meetings. Overnight accommodation is available at, sequentially, Hyden Hotel ph 098 805052, Esperance Bay of Isles Motel (2 nights) ph 090 713999, Albany Dog Rock Motel ph 098 414422, Dalwallinu Motel ph 096 611102, Morawa (billeting) ph 099 715002 (three nights) and Geraldton Wintersun Motel ph 099 231211. Contact local tourist bureaux for more accommodation information.

The Australian Taxation Office advise that the cost of such a Study Tour "....would be an allowable tax deduction if the subject of self education, in this case no-till, is directly relevant to the activities by which assessable income is derived".WANTFA trusts that interstate visitors and local people alike will contribute to the success of the First National No-Till Conference & Study Tour.

NORTH AMERICAN FARMERS VISIT

Kevin Bligh, secretary

Thirteen members of the Manitoba North Dakota Zero Tillage Farmers Association visited Western Australia from 7-14 February 1996.Our weather was kind to them on their arrival, direct from -51^{0}c in one of their coldest winters on record - it rained all the way up to Morawa on their first day!

WANTFA Vice President Graeme Malcolm and wife Diane showed them no-till in their area and the Koolanooka-Bowgada Landcare Group arranged a public meeting.A North Dakota State University Extension Engineer and an Agronomist spoke of their machinery and spray adjuvants in particular, while visiting farmers described their systems. One farm is just a mile south of the Canadian border but is twenty miles from the nearest US town.

Tony White of Miling returned some of the kind of hospitality we received in America in 1994, with a joint lunch with a WAFF Regional Meeting after a visit to his parents' farm. Then the party headed south, where Committee member John Hicks and wife Ann of Pingrup invited local people to share a day with the visitors at their farm.

Wellstead was the next stop where Darryl, Corinne and Garry Hine - no strangers to America - showed the visitors over some farms in the morning, in a heat wave, before wisely taking them to the beach for lunch and the afternoon. The group then visited Albany before heading back to Perth via Pemberton. They then flew to Adelaide, where Allen Postlethwaite - who later attended our Annual Conference - drove them to Melbourne via Horsham and the Wimmera Conservation Farming Association. Four days in Queensland guided by Greg Mills of the Conservation Farmers Inc at Dalby followed, before flying on for a week's holiday in New Zealand, and then home.

Montana wheat-grower Mike Greytak who took part with his wife Sigrid, phoned when he got home to say that he ran out of superlatives to put in his diary. He is looking forward , with some neighbours, to hosting a visit by WANTFA's 1996 North American No-Till Study Tour.About twenty people have expressed interest in participating so far, leaving from and returning to Denver in (privately booked) hire cars or vans, from 1 to (probably) 29 September. Please phone me on 09 368 3893 if you would like to participate in the tour.

GREETINGS FROM CANADA

Bill Crabtree, Canada (Fax 0015 1 204 726 7619)

Howdy fellow citizens! This 12 month exchange is fun! But boy it's cold here and it seems as windy as Esperance. I have already learnt a lot about no-till cropping similarities and differences (note some comments in herbicide story). It just so happens that I am probably in the best office in Canada for learning from good scientists about how to make no-till work even better.

Interestingly, no-till is accepted by almost all scientists over here as the way to farm for environmental, economical and personal reasons. I am sure that will be the case in Australia in the next 2-5 years also. I am located next to Dr Doug Derksen, a weed specialist with no-till, and Cynthia Grant a fertiliser specialist in no-till. Also in the same building is a pathologist and microbiologist also intensely studying no-till. The Research Station has just been made a centre of excellence in soil science, so I have been put in the best place possible.

The farms are much smaller over here, usually 500 ha, the average farmer age is ~ 60 years, I am in ~425 annual rainfall equivalents(~30 is snow), The crops are mostly wheat, barley, canola, lentils and flax, the country is snow white and it blows in the wind twice as readily as our cultivated sands. Retained stubbles catch this snow and increase yields. Yields from no-till are usually better than after cultivation yet surprisingly only 5% of farmers no-till, and adoption is slow! Some recent moist seasons have allowed them the luxury of cultivation, but remem-

ber the dirty 30's, this is dust bowl country and often the soil is only 30cm to yuck soil.

I am yet to see soil, as the "fields" are as white as an Esperance beach. They sow their crops the same time as we do (in May) and hope to finish before June. Were you able to get on top of those summer weeds? Wasn't it fascinating to see, at Esperance and Darkan Allen Postlethwaite's slides of his 28" wheat rows that yielded 5.0 t/ha, similar to his narow 14" rows. Research over here and farmer experience shows the same trend most are finding 10-15" rows are the way to go with wheat and canola (within rotations).

It is pleasing to see Ron Jarvis and Gordon MacNish showing the good results on rhizoctonia reduction from the wavy disc in this issue. This is a trend we have seen over the 3 years of testing in the Esperance area. In one of these 1995 trial sites at Esperance Downs Research Station it was very dry at sowing and the disc treatments gave much better vigour and establishment than the cultivated treatments, which tended to dry the soil.

It is also good to see that Martin Carter of Canada has confirmed David Roget's work in SA where retaining cereal stubble suppressed rhizoctonia. Both studies have now been published. This gives some hope for natural biological control in no-till stubble-retention systems.

I hope 1996 is a good season in WA. Until the next issue Cheers! And look after Bob Bradley!.

GENERAL MEETING MORAWA 7 AUGUST 1996

Kevin Bligh, Secretary

The Seventh General Meeting of WANTFA will be held at Morawa Town Hall at 6.00p.m. on Wednesday 7 August 1996. The Agenda will be to consider the following proposed amendments to the Constitution, shown underlined below, and to discuss any other business placed on the Agenda before the beginning of the Meeting:-

"9 Terms of Office

A. The terms of office of Committee Members advisers and Officers shall be no more than four years <u>except that those appointed at the 1996 Annual General Meeting may hold office for no more than six years.</u> If the President is elected to the Presidency in his/<u>her</u> fourth or <u>sixth</u> year as a Committee member, the following year he/<u>she</u> will serve as Past President, with full voting rights on the Committee".

Explanatory Note: The immediate Past President, President and Secretary were first elected on 4 August 1992. Their terms of office would therefore end in 1996 unless the Constitution is changed in this regard. It is suggested that the rapid development of no-till sowing systems in Western Australia would be furthered if current Committee members and officers (listed at the bottom of the front page) all of whom are in their last two-year term of office, were to be made eligible to serve another term. The opportunity is also taken to consider eliminating restricting, gender-specific language from the Constitution.

Alternatively, section 9A (above) may be deleted, along with 9B "Committee members must retire for at least one year before becoming eligible for re-election".

REPORT ON ANNUAL CONFERENCE AND AGM

Kevin Bligh, Secretary

WANTFA's Annual Conference at Darkan on 28 February 1996 was enriched by guest speakers Dr Dwayne Beck from South Dakota State University speaking on no-till crop rotations and Allen Postlethwaite from St Arnaud, Victoria on a farmer's perspective. WANTFA is particularly grateful to the Hon. Minister for Primary Industry Monty House for a $2,500 grant towards Dwayne's visit. Allen's out of pocket costs were covered by the hundred-strong attendance.

Allen described his family's no-till operations. Wife Yvonne does the accountancy, agricultural scientist son Neil applies the science. Mechanic son Trevor keeps the wheels turnable, while Allen "...looks after our attitude to Russia and China!" They started using 400mm wide sweeps 15 years ago and came down steadily to 18mm knife points. Having heard Dwayne Beck at the Manitoba-North Dakota Zero Tillage Farmers Association Annual Conference last year, they now have a nice crop of sorghum growing, though the corn they sowed isn't looking so well.

Agriculture Western Australia research officer Mark Sweetingham spoke on minimising lupin disease and Stephen Loss, also from Agriculture W.A., spoke on pulse crops. Concurrent sessions for no-till beginners and the more experienced and a plenary session including six farmer speakers made it a most rewarding day.

Existing Committee members and Officers were re-elected at the WANTFA AGM. Decisions were taken to set up a fund-raising committee, request a meeting with Monty House to discuss areas of concern, and to convene the First National No-Till Farmers Conference and Study Tour (see above) in August 1996.

President Ken de Grussa of Esperance reported on a successful year for WANTFA, and was warmly thanked for his efforts on behalf of WANTFA members. Bill Crabtree (Newsletter Editor) spoke of his appreciation of WANTFA as he was about to leave for his year's exchange in Canada. (see his article in this issue). Bob Bradley, his exchangee, arrived in mid-March to take up his duties based at Esperance. The meeting expressed appreciation to Agriculture Western Australia for making the exchange possible.

HOLISTIC RESOURCE MANAGEMENT

at Permaculture Conference

Perth, 27 September - 1 October

Allan Savory, the originator of Holistic Resource Management in Africa and America, will be a Keynote Speaker on Sunday 29 September at the Permaculture Conference at Swanleigh (near Perth Airport). Holistic Management starts with the quality of life you want and the environment you want to leave behind, as well as the income from production required (See January 1996 and October 1995 Newsletters). For further information contact the Sixth International Permaculture Conference, PO Box 568 Kalamunda 6076. Ph 09 291 9306. Fax 09 291 9978.

DEFINITIONS REVISITED

Ken de Grussa Ph 090 782026 Fax 090 782007

WANTFA has tried to encourage some uniformity in terminology, and to that end we have attempted to define the terms used. These definitions are listed here once more. There has been some media publicity about No-Till (the term) recently by people who have something to sell, and that is fair enough. However, considering that the term "No-Till" has been in use since long before WANTFA was conceived, and is recognised in most of the English speaking world of agriculture it is hardly "new" and need not be confusing!

- Multiple tillage; Conventional, involving a number of passes.
- Reduced tillage; Something less than the usual number of passes.
- Direct drill; A single pass involving seeding with a full cut of the topsoil.
- No-Till; Disturbing only the soil in the seed - or fertiliser - rows with discs or narrow points.

A definition of tillage as adopted by WANTFA is " Complete rearrangement of the entire topsoil structure", but to use the term "No-Till" when describing the use of points 70 to 100 mm wide is stretching the imagination somewhat!

Science Section

TACKLE HERBICIDE RESISTANCE WITH NO-TILL

Bill Crabtree, Canada (Fax 0015 1 204 726 7619)

I am frustrated with herbicide resistance gurus who talk doom and gloom. I believe that with inspiration and determination we can solve this problem, but sadly you rarely hear of exciting developments in herbicide resistance. Lack of lateral thinking has forced some croppers to revert to otherwise redundant practices, including; burning, tickling, harrowing, growing pastures (for some) and delayed sowing - options that keep being talked about - but they are not sustainable!

Fresh thinking is needed. Also farmers that are already using some new tools should be encouraged and their techniques publicised. I have learnt that if you "give away what you learn, you learn more". Interestingly, innovative farmers, whether in W.A., over East or in Canada/U.S. are almost always ahead of researchers.

Some long term no-tillers are finding they now rely less on in-crop grass herbicides. By not mixing the topsoil, weed seeds stay on, or near, the surface. Weeds that were placed or mixed deeper with previous cultivations mostly germinate within 2-3 years of being put into the soil. With no-till systems, seeds at depth become depleted or exhausted. Since all new weed seeds remain on the surface they germinate quickly or remain ungerminated that year.

Therefore these weeds can generally be more efficiently controlled with knockdown herbicides before sowing. These surface weeds then have to contend with a knockdown 7-10 days after the break, being shallow sown, survive in rotting weeds and retained stubble possibly with allelopathic effects, less mineralised nutrients, more firm soil, more insects and possibly in-crop SpraySeed 4-8 days after sowing. This no-till environment is very different from cultivated soil.

Clayton's Incorporation of Trifluralin

Work by Steve Curtin (see January 1996 edition) and others has shown how effective trifluralin can be with no-till knife point sowing. Many farmers say trifluralin has gone from being a 70% herbicide to a 95% plus one. This is because weeds and trifluralin are put together in a thin 5-10 mm band of soil. The knife throws enough soil over the inter-row to bind the trifluralin - "Clayton's Incorporation". This is an exciting technique for herbicide resistance, but is probably limited to parts of the rotation where stubble cover is low.

Add trifluralin use to the idea that weed seeds are left on the surface in a hostile zone with little nitrogen and you can see why it works well. There is potential for other herbicides to also work with this system. Some farmers have been using 500-800 mL/ha of Simazine in cereals (beware with high pH), 200-500 mL/ha of diuron and label rates of Avadex. These herbicides along with Metribuzin, Bladex and ALS inhibitors, need testing in the context of no-till with different furrow shapes, row spacings, surface cover, soil organic carbon levels, soil biology and residual activity. Fame is waiting for the person willing to explore many herbicides with knife point sowing!

Can we make trifluralin work with disc no-tilling, with no soil throw, or in eastern Australia where barley is sown into wheat stubble for disease reasons? Harm van Rees' work with granular trifluralin in Victoria and some recent work here in Canada immediately before sowing, showed that granules may work in our farming systems. Harm's work showed that granular trifluralin, incorporated with full-cut direct drilling, sometimes gave equal control to liquid trifluralin.

In Canada, granules have previously only been used in the fall (October), 7 months before sowing in May. However. the up-front cost and the hassle of applying it after harvest and before the snow falls, has encouraged some farmers (including Stan Rampton, current President of the Manitoba-North Dakota Zero Tillage Association) to apply it 10 days before sowing. The farmers apply it at 22kg/ha, or 1.1 kg/ha of active ingredient. These granules are not volatile like the liquid but do need rain to dissolve them and allow them to spread over the surface before covering with soil.

What might happen in Australian conditions? Perhaps apply it just before a moderate front and hope to get more than just a dew within a week, and that your soil temperature is not too hot (>20^{0}C). If granular trifluralin does work well in stubbles, it would reduce our herbicide-stubble tie-up dillemmas. The granules give less tie-up with the stubbles, as they find their way through the stubble to the soil surface. This is more likely if the stubble is left standing, tall and ungrazed.

Interestingly, liquid trifluralin can be incorporated by rain alone. Applying it in or just before a rain allows it to move through the soil. Trifluralin will not move once it dries. This should encourage those with disc seeders to try trifluralin liquid in the rain or granules before a rain, even into moderate stubble levels. Be sure to leave some miss (test) strips.

Stubble Factors

A build up of organic material through stubble retention increases biological activity, which may increase the rate of herbicide decay in soils. This could benefit next years crop that may be herbicide sensitive. With no-till there is limited mineralisation early and more later, which is likely to have effects on the rate of herbicide decay, with perhaps slow initial breakdown in the thin weed and organic matter layer under a 5-10mm soil cover.

Weed suppression due to cereal stubbles is dramatic in many instances. Pastures after a 4 t/ha wheat crop are always slow to get started and give poor early production, especially without grazing or slashing. It is no different with weed seeds in the crop inter-row, while crop seeds germinate freely in the created furrows (depending on the level of hair-pinning and seeding rate).

Sadly, stubble burning is promoted for reducing herbicide resistance. Ironically the benefits of keeping stubble are enormous with slow nutrient release, disease suppression, reduced evaporation, structural improvements, as a wind and water erosion deterrent and for improved weed control. Interestingly, many farmers and agronomists have observed more weeds in parts of paddocks after accidental or deliberate stubble burning. I am puzzled why trial results only show how good stubble burning is for reducing in-crop weeds. We need to be aware that with stubble retention other problems may emerge like hair-pinning, emergence difficulties in wet soils, increased insect activity and some chemical tie-up. However, these problems can be managed by rotation of crops and herbicide groups.

Strategic SpraySeed

Most no-till machines give precision seed placement, with disc machines usually more precise. Since weed-seeds are left near the surface with no-till, and crop emergence is uniform or on the same day, the target window for using gramoxone or SpraySeed (at ~ 500mL/ha) is now 2-4 days wide. These knockdowns can also be used during a light rain. The weeds can usually be killed with only a little green showing, while wheat and barley are safe at the half leaf stage due to bigger seed reserves. Better activity on weeds, *and unfortunately crop,* will occur on overcast days or late in the afternoons, when these desiccants can translocate 10 mm below the surface.

Knife Tickle

Some farmers use a knife tickle during a summer rain for stimulating pre-season weed germinations. This can also reduce water evaporation and run-off in poorly structured heavy soils. Such a tickle does minor harm to soil structure - especially

at wider row spacings. However, this alone will not kill weeds and some farmers put trifluralin or other soil active brews on before the tickle (SU's, Diuron, Atrazine, Metrabuzin). This technique should be followed up with a knockdown to stop escape weeds from setting seed for resistance reasons. Such a knockdown is often difficult due to dust rising from disturbed soil.

Catch, Crush, Cast, Cart or Cremate

All these activities on ryegrass and other weed seeds are practical tools that do require effort and management and they may slow harvest. Several farmers are doing one or more of these with good results. Caught seeds and husks can be dumped in one part of the paddock and can tolerate high winds. An electric fence can be run around these dumps and contents fed to stock with other supplements if needed.

A grinder or hammer-mill fitted below the harvester which is fed weed seeds would destroy seed viability. Spreading this with a small fan would evenly spread this organic food back on the paddock. Alternatively, just evenly spreading viable seeds back over the swath can improve herbicide effectivness. The seeds could also be carted off the paddock and fed to stock or a furnace - desirable for problem weeds.

Other ways

Obviously hay growing is an option for those who are near a market or can value- add. Crop topping, although not broadly registered, is effective. Another radical approach which is used by some farmers is to grow pastures and not graze them , but spray them twice with different herbicide groups- the second spray being a knockdown to ensure resistance is not compounded. With sub-clovers both sprays can be knockdowns. Since chick peas are bitter to sheep they can be lightly grazed in September, especially if wider rows are used. Popular in Canada is changing the seeding time of a paddock through the years in a rotation, allowing later germinating weeds to be exposed to a knockdown herbicide.

(This is one of the arguments for including warm season crops in the rotation, see the article "Longer No-Till Crop Rotations" in this issue. - Ed)

Biotechnology enabled Basta^{R} (a knockdown herbicide) resistance in Merrit lupins and this should be available to farmers in 3 years. In Canada farmers already have access to Roundup^{R}, Basta^{R} and Pursuit^{R} with different canola varieties.

Conclusions

There are a thousand ways to beat herbicide resistance. The doom and gloom and negative reflections on herbicide resistance by some experts, particularly related to no-till cropping, has been too negative and too narrow. Alan Mayfield (from SA) said in 1994, "there are 3D's to solving herbicide resistance, they are determination, determination and determination". The specific keys to avoiding resistance are low weed numbers to start with, new no-till or other techniques, mix herbicide groups and take control by being determined and enthusiastic.

There are safe herbicide resistance techniques that can be adopted immediately with no-till. Specifically, trifluralin (and other herbicides) with knife points or in the rain, timely in-crop use of SpraySeed, retain stubble for biological weed control, rotating the time of sowing of paddocks, physically handle weed seeds, and talk to others about their ideas. Try some granular trifluralin in thick stubbles. Be sure not to believe all the doom you hear and read, and be positive.

RHIZOCTONIA BARE PATCH TILLAGE EXPERIMENTS 1995

Ron Jarvis, Gordon MacNish and Leigh Smith

Last year we had 5 field experiments sown with Onslow barley at Esperance Downs (2), MtRidley (1), and Wellstead (2).

Discs, coulters, narrow points, point sizes digging deep, speed of seeding and a fungicide treatment were compared for their effect on rhizoctonia bare patch disease, and yield, at some or all of the five sites. Measurements were taken during the year and at harvest.

The treatments can result in differences in:

1. Patch area
2. Crop vigour within the patches
3. Crop vigour in the non-disease affected area

Patch incidence (as measured by the percentage area affected) and severity % (a measure of light, moderate or severely affected growth within the patches) were measured during the season, and header yields plus some sample yields from patches were measured at maturity.

Table 1. Deep coulters or points (5 trials)
Rhizoctonia Bare Patch

Treatment	Incidence (%area)	Severity %	Barley yield t/ha
No-till double disc	44	34	2.77
Double disc + wavy coulter	32	24	2.97
Level combine 50mm points	40	27	2.83
Modified combine 50mm points	26	18	3.11

The wavy coulter and the points on the modified combine worked 10 cm deep (6 cm below the seed) and reduced patch and increased yield. Yield differences were not great overall despite being statistically different in four of the five trials. Esperance was very wet in the early part of the season and this tends to negate any tillage effects on the disease by reducing early onset of the disease. Very good October rains at Wellstead appear to have allowed patch areas to yield much more than the potential we assessed earlier in the season.

Table 2. Point sizes working 10 cm deep on a modified combine (3 trials)
Rhizoctonia Bare Patch

Treatment	Incidence (%area)	Severity %	Barley yield t/ha
Narrow knife (5mm)	29	26	3.01
50mm	20	16	3
Superseeder	20	18	3.02
125-180mm	19	16	2.97
Level combine with 50mm points for comparison	31	29	2.8

50 mm points working deep were wide enough to give the equal best disease control. However in previous research wider points have been better. All point sizes (when digging deep) gave equal yields last year.

Speed of seeding

Two speeds (6 km/h and 12 km/h) were compared in a Wellstead and an Esperance trial. Two machines were tested: (1) Great Plains double disc with 20 mm wavy coulter; (2) Modified combine with 50 mm points.

Table 3. The effect of seeding speed
Rhizoctonia Bare Patch

Speed	Incidence (%area)	Severity %	Barley yield t/ha
6km/h	31	19	3.11
12km/h	30	20	3.18

There was no effect of speed on rhizoctonia patch incidence nor severity for either machine, and no effect on yield.

Fungicides

At Wellstead, flutriafol at 400g a.i./ha was applied on the fertiliser. Seeding was with a Great Plains double disc seeder with 130 kg/ha of Agras No. 1.

(Continued page 5)

Table 4. The effect of fungicide Rhizoctonia Bare Patch

Fertiliser treatment	Incidence (%area)	Severity %	Barley yield t/ha
No fungicide	51	44	3.28
Fungicide	49	39	4.16

The fungicide cost $108/ha and had no effect on rhizoctonia. It did reduce scald and powdery mildew and consequently gave a very good yield response. The modified combine with 50 mm points reduced rhizoctonia (to 36% incidence, 27% severity) and increased yield by a half tonne per ha in this trial.

Biofumigation

There has been much discussion about a possible effect of canola on rhizoctonia bare patch in the following year. Dr John Kirkegaard published results from laboratory work, but currently believes the effect may only last during the canola growing period and may not continue suppression of the disease into the following season. Gordon MacNish and Brad Peter's results from Esperance showed no residual effect from canola, mustard and lupins sown in 1994, on the area of patch in the 1995 barley crop. Barley after lupins yielded 250 kg/ha more than following the other two crops.

A new trial was sown with canola, mustard and barley in 1995 at Wellstead and Rhizoctonia will be assessed in lupins (and yellow lupins) in 1996. However, we are not very hopeful about biofumigation effects because there were many rhizoctonia patches within both the canola and mustard last year, and these patches yielded 35% less than unaffected areas. For comparison, in a nearby trial in 1994, lupins yields were reduced by 64% in patches.

Overall, canola yielded. 2.46 t/ha, mustard 2.64 t/ha and barley 3.62 t/ha on the site which will have no-till lupins in 1996.

NO-TILL TRIAL RESULTS FROM THE MID-WEST

Paul Blackwell, Dave Nicholson and Mike Jones (Geraldton Office)

Many of you will have seen the trials at Morawa last year at the August field day run by the Koolanooka-Bowgada Landcare Group. Those trials, combined with others at Mullewa, Pintharuka (Nth of Morawa) and Eneabba are funded by the GRDC and have provided the following messages.

- Long term no-till comparisons in continuous cereals with narrow rows gave some encouragement for no-till practices

The long term trial at Mullewa sowed Wilgoyne on 12th June with 148kg/ha of Agras. There was 207 mm of rain from May-October, at Mullewa Research Station.

Scarify-sow (ScDD) was compared to direct drill (DD) and no-till with superseeder points (NP) for the fourth consecutive season.

Treatment	ScDD	DD	NP	lsd
Yield, t/ha (10%mc)	1.32	1.37	1.36	0.05
Diff. from DD, kg/ha	-52	0	-10	
Protein, % (11%mc)	12.1	12.4	12.5	
Hect. wt, kg/hl	79	78	78	

At this 7" row spacing there have been no significant differences between narrow points(superseeders) and wide points in 3 of 4 years in a long term trial at Mullewa and about 10% less yield in 1 year.

There have been some corresponding improvements in soil conditions over the same period. This gives some encouragement for non -till methods in the midwest in continuous wheat and narrow row spacings to help overcome limitations from hardsetting behaviour (this hardsetting soil does not respond to gypsum)

- At wider row spacings (10-12") in the first year of no-till in continuous cereals the results were less encouraging.

At Koolanoooka Wilgoyne was sown on the 22nd of May with 100kg/ha of Agras after an oat crop the previous season. 173 mm of rain fell in the growing season on this trial on Barry York's property.

Deep Keech points (DSP) were compared to deep blades (DB) and K-Hart discs (ZT).

(10" row spacing, DSP at 12" row spacing) There was no evidence of root disease at this site.

Treatment	ScDD	DD	DSP	DB	ZT	lsd
Yield, t/ha (10)	1.82	1.99	1.87	1.79	1.31	0.07
Diff from DD, kg/ha	-173	0	-120	-200	-683	68
Protein, %(11)	9	9	9	9.5	9.5	
Hect wt, kg/ha	81	81	81	81	81	

This is the trial viewed at the field day

Direct drilling with wide points (1994 kg/ha) outyielded the best no-till (deep Keech points and half banded fertiliser) by 129kg/ha or 6%, deep blades with all fertiliser banded was 200kg/ha less(10%) and heavy duty discs and presswheels almost 700kg/ha less (34%) and very poor early vigour, as well as the weediest crop.

This emphasises that deep narrow points can be safer than discs without cultivation below the seed, as well as a safer option to place some of the fertiliser with the seed.

Protein levels were not improved (9%) for the better yielding no-till method, compared to direct drilling.

- In a medic pasture /wheat rotation without complications from root disease we got the best result for no-till.

Wilgoyne was sown again with 100kg of agras /urea on the 31st May. There was 197mm of rain from May to October.

DD, DB and ZT were compared (DB was mainly deep placed fertiliser) following Scarification, direct drill(dd) or no-till, narrow points (nt) history. This was on Garry North's property at Pintharuka.

Sc=scarified 1993 and 1995, dd=direct drilled in 1993, nt= no-tilled with narrow points in 1993. (10" row spacing in 1995) G= good crop, P= crop affected by root disease.

Treat.	ScZT	ScDB	ScDD	ddZT	ddBD	ddDD	ntZT	ntDB	ntDD	lsd
Yield (G)	2.07	2.16	1.92	2.24	2.28	2.11	2.14	2.17	2.14	0.17
diff. from ddDD	(-35)	(+51)	-183	(+128)	176	0	(+33)	(+60)	(+28)	170
protein	11.7*	12.5	12.3	12	12.5	12.4	12.3	12.2	11.8	0.55
hect.wt	81	81	81	81	81	81	82	82	82	
yield (P)	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	
%poor	33	9	2	44	44	16	48	48	18	
all yield	1.91	2.1	1.92	1.92	1.97	2.02	1.87	1.89	2.04	170
diff.from ddDD	(-110)	(+81)	(-108)	(-72)	(-49)	0	(-150)	(-134)	(+13)	

- differences in brackets are not statistically significant.
* significantly less than ddDD protein.

Direct drilling with wide points (2107) was improved by 176kg/ha by deep blades. This treatment had a direct drilling history for the one previous crop.

Protein levels were not improved (12.5%).

This emphasises the benefits of a good legume history

to provide yield benefits from no-till methods with soil disturbance beneath the seed.

There is an obvious warning that root disease can be worst when the least soil disturbance is used. This negated any advantages to no-till as can be seen from the values for 'all yield' in the table. But, remember that the other sites on the same soil showed no effects of root diseases.

Legumes were found more sensitive than wheat to the no-till method on these heavy, hardsetting soils. A presswheel from the DBS unit in wet conditions led to about 650kg/ha loss from a yield of 1700 kg/ha for Albus lupins.

The benefits of no-till furrow sowing on a deep water repellent sand at Eneabba were a contrast to the results for the heavier textured soil at Morawa.

The soil is 2-3m of very repellent pale sand over gravel or clay in the poor sandplain between Eneabba and Three Springs (Mike Cripp's property).

The results were as follows.

No-till was done with a disc or blade with or without working below the seed(w), with a furrow (f) and with a presswheel (p).

	Wheat		Lupins	
Treatment	yield, kg/ha	diff from DD, kg/ha	yield, kg/ha	diff from DD, kg/ha
Deep non-wetting sand, crop after blue lupin pasture, Eneabba, May- October rainfall = 518 mm, well distributed				
Blade, sown 25th May			Gungurru, sown 17th May	
DD	**1336**		**677**	
NT(disc)-w+f+p	1465	129	807	130
NT(blade)+w+f+p	1535	199	943	266
LSD		110		125

The trial showed what other results on the non-wetting sands in the West Midlands have also shown; that yields are generally increased with a furrow and working under the seed to reduce compaction and root disease problems, as well as providing the opportunity to deep place fertiliser for lupins.

It was important to manipulate the blue lupin pasture in the previous year, using grass selectives to remove grasses and knockdown to kill the lupins when they flowered and had converted a large amount of nitrogen from the atmosphere. The knockdown allowed a more pliable stubble at seeding.

We hope these results help Mid West farmers make better choices of no-till methods.

The choices would then allow a maximum of wind and water erosion control, while minimising loss of income from crop yield or quality. With best early vigour and final yield will also come the best crop water use and a minimum increase to any groundwater accessions.

This season we will look more closely at alternative legumes and the root disease story at Pintharuka. If any of you want further details of the results, please feel free to contact us.

METRIBUZIN/BRODAL REPLACES SIMAZINE/BRODAL FOR FURROW SOWN LUPINS

Paul Blackwell and Grant Morrow, Geraldton Office

No-till furrow sowers on the non-wetting sands in WA have sometimes had bad experiences with post emergence simazine top-ups which are washed into the furrows and can overdose the crop.

Spraying with high cover levels and onto wet surfaces has helped to minimise the problem, but six trials over two years in the Northern Region and extensive farmer, agribusiness and contractor experience this last season has found that metribuzin-brodal mixtures are safer. They are able to be applied late (about 8-12 leaves) and can help to control grasses as well as the troublesome broadleaves such as radish and doublegee. The reason for increased safety comes from more leaf than root uptake by the crop than simazine, as long as the mixture is sprayed onto wet plants. The trials also showed that increasing the rate of pre-seeding simazine, to try and keep up the simazine 'budget' may not be a wise practise.

For more details we suggest you phone Ralph Papalia at Elders Geraldton (099 211 666).

'NO-TILL SHORT FALLOW' AND 'NO-TILL TICKLING'

Paul Blackwell

These ideas come from conversations with no-till farmers using blade points and concerned about water entry into pastures compacted by sheep, and the risks of second knock-down herbicides.

'No-Till short fallow' uses a narrow point to open the well compacted pasture on the first rains, especially working on the contour. This should allow better water entry by the following rains without as much soil disturbance and structural damage.

'No-till tickling' will stimulate weed emergence for the main knock-down dose and should minimise the need for a second knock down.

You will already have figured out that 'No-till tickling or fallow' is really the same operation and is done with the bar alone, no seed or fertiliser! Happy tickling!

BANDING OF UREA FOR WATERLOGGING SOILS

Mark Seymour, Agriculture WA, Esperance
Ph 090 761333

On soils with a shallow subsoil in the Esperance region waterlogging is a problem in most years. In the waterlogged soils nitrogen can be lost to plants via leaching and denitrification. Work elsewhere in Australia with both wheat and rice have found banding nitrogen below the seed to be of benefit in waterlogged conditions. This is thought to be due to a number of reasons:

1. The nitrogen is placed further away from the surface in a lower oxygen environment. Therefore the oxygen loving bugs that nitrify nitrogen into nitrate are less abundant. This results in a slower rate of nitrification.

2. If this is so then less nitrogen should be leached as there is less nitrate-nitrogen present in the soil. The nitrate form of nitrogen is much more mobile than the other forms. This may be important in waterlogged soils where water moves through the soil taking nitrate with it.

3. If the soil continues to be waterlogged and the oxygen levels drop, denification occurs as bugs that thrive in low oxygen soils dominate the nitrogen cycle. But if there is less nitrogen in the nitrate form , less total nitrogen can be denitrified. Therefore less nitrogen is lost in the form of gases.

4. The other reason may be similar to deep banding of manganese in lupins. You are placing a nutrient down into soils that will remain moist for longer, and so increase the availability of the nutrient for longer.

Anyway that's the hypothesis. Does it work in Western Australia? Is it better than other methods of applying nitrogen? We tested the role of deep banding for the first time in 1995 at one of my waterlogging sites at Dalyup, Esperance.

(Continued page 8)

The treatments were:

3 depth of placement x 4 rates of N + 3 extra treatments

Depth of placement
1. Topdressed
2. Drilled with seed
3. Deep banded (5-7cm below seed)

Rates of N
1. 0 kgN/ha
2. 25 kgN/ha
3. 50 kgN/ha
4. 100 kgN/ha
urea used as nitrogen source.

Extra treatments
Shallow cultivation and zero N
25 N DWS + 25 N topdressed 6 weeks after sowing
25 N banded + 25 N topdressed 6 weeks after sowing

Results and Comments

The perched watertable was measured in slotted 40mm pvc pipe, in the nil plots. The site was waterlogged from 18th July to the 6th of August, with an SEW30 of 237 cm. days. This is not all that high an intensity or duration of waterlogging, due to the lower than average rainfall in August and September. The plants were at late tillering to early stem elongation during these 19 days of waterlogging.

The site was following a canola crop and so was responsive to nitrogen application, up to 100 kg N/ha when topdressed or deep banded (Figure 1). All nitrogen application treatments except for 100N drilled with seed were significantly higher yielding than zero application. Max yield and gross net profit was achieved at 100 N either topdressed or banded.

There was a significant difference between methods of application due to fertiliser toxicity when nitrogen was drilled with seed. At lower rates of nitrogen (25 and 50 kgN/ha) whether the nitrogen was topdressed, drilled with seed or banded had no significant effect on grain yield.

Side applications of nitrogen 6 weeks after sowing were beneficial if the original nitrogen application was drilled with the seed. But deep banding 50 kgN/ha was just as good as deep banding 25 kgN/ha at sowing and then side dressing 25 kgN/ha 6 weeks later.

In general we could not support our hypothesis that deep banding nitrogen would be the most effective method of applying nitrogen in waterlogged conditions as the topdressed treatments were equally as good as the deep banding treatments. This may be due to the lower than expected intensity and duration of waterlogging in which case this work needs to be tested further.

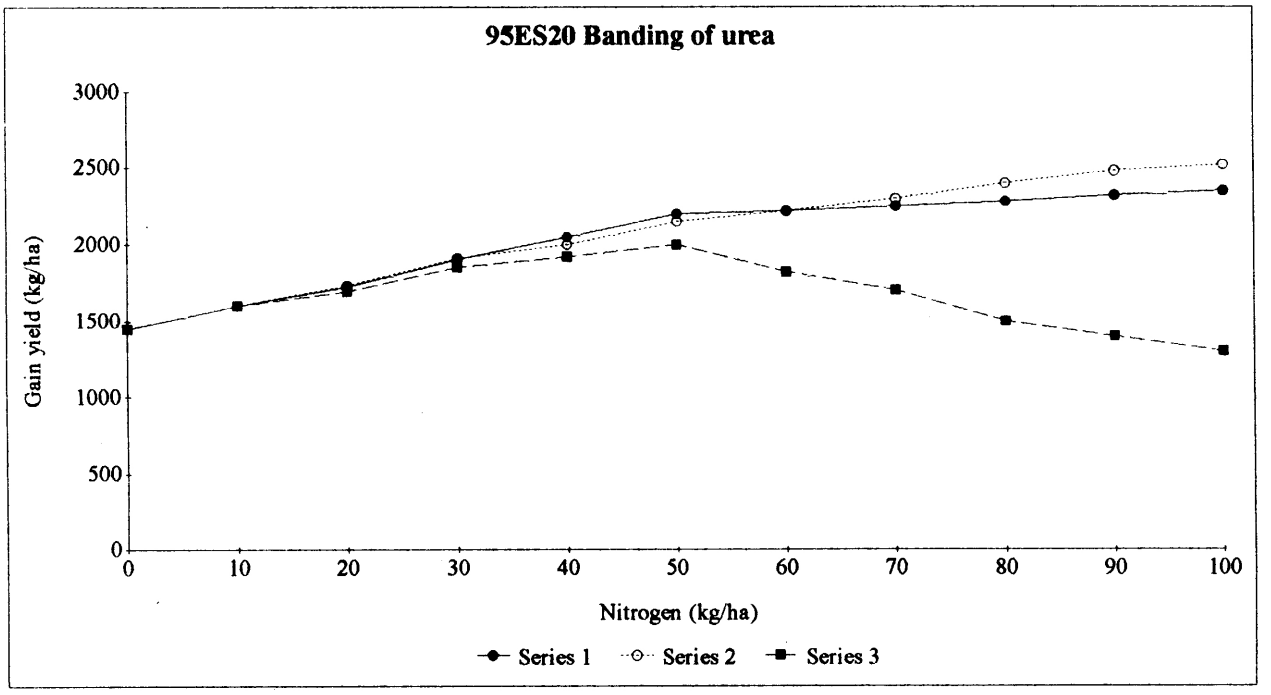

Figure 1: Grain yield (kg/ha) of Machete wheat in response to nitrogen applied either topdressed (dotted line, open circles), drilled with the seed (dark dashed line), banded 5 cm below the seed (solid black line), 95ES20.

LONGER NO-TILL CROP ROTATIONS

Kevin Bligh 09 368 3893

A dynamo in the form of Dr Dwayne Beck spoke at ten regional meetings in February-March on no-till crop rotations. A hands-on Farmer on the Dakota Lakes Research Farm at Pierre, Dwayne is also a Professor at South Dakota State University. The 700 people who heard him in Western Australia will attest that he can get his ideas across, too!

South Dakota gets both our climate, and its mirror image below freezing. Temperatures can reach 40^{0}c in summer and go down to -40^{0}c in winter! One difference is that their rain continues into the equivalent of our December. Dwayne's results include up to 1.0 t/ha increased wheat yield in a four year no-till rotation provided four different crop types were used. Wheat, barley and oats are one crop type (cool season grasses.) Cool season broad-leaved crops include lupins, chickpeas, field peas, faba beans and canola. Warm-season grasses including sorghum, millet etc. are all native to the Southern Hemisphere, except corn. Warm-season broad-leaved crops include safflower - which is grown extensively in Victoria - sunflowers and soybeans.

Three year no-till rotations have given 0.3 t/ha higher wheat yield in a low-disease year in South Dakota and 0.7 t/ha in a high-disease year. For wheat disease reasons, their three-year rotation must go sorghum or corn - lupin or chickpea, etc - wheat. Dwayne reckons they could have told you in any coffee shop in Pierre five years ago that you couldn't grow corn there! He is now growing 8t/ha crops on low-value land, far more profitably than in the Corn Belt 300km east.

Four hundred copies of Dwayne's paper were circulated at the meetings or mailed out afterwards. If you would like a copy please fax me on 09 3683355, giving your name and address.

While he was here, Dwayne saw Alan Faulkner's crop of September-sown sudax north of Ongerup - and a crop of millet he said he would be proud of.

To check out optimum sowing dates, varieties and crops at home, Dwayne made cardboard divisions in a seeder box and put a different seed in each division. Every week he sowed a drill run. He notes that warm-season grasses provide a good break for diseases etc and that most are small-seeded. Therefore accurate seed depth control is desirable - particularly achievable using no-till seeders.

Jesse Skoss (Agricultural Consultant) at Manjimup, formerly of Esperance, suggests sowing sorghum no later than early September . Wider row spacings are also recommended, - 18" plus - and be sure zinc is not lacking. Seed companies who can advise on germination temperatures and seed availability of warm-season grass crops include:- Pacific Seeds Pty Ltd (Andy Thomas) P.O. Box 371 Midland WA 6936-PH 09 2501558 Mobile 015 991028 Fax 09 2501514.

Wrightson Seeds Pty Ltd 22B Reginald Street Rocklea Queensland 4106 -PH 07 3274 3477

Heritage Seeds Pty Ltd 74 Chale Street Yeerongpilly Queensland 4105 PH 07 3848 7277 fax 07 3892 3990 Southedge Seeds Pty Ltd Rains Road Mount Abbott Mareeba Queensland 4880 PH 070 932208.

Dwayne suggests that it will be 1998 at the earliest before we can check out effects of warm season grasses in the rotation on wheat yield. Therefore it would be useful to grow some areas of warm season grasses in 1996 and a cool (or warm) -season broad-leaved crop in 1997.

Committee member Jim Baily of Wellstead observes that he inadvertently got into a warm-season grass rotation when he sowed sudax into pasture in 1987 and got 2t/ha of lupins in 1988 and 4t/ha of wheat in 1989, despite a severe aphid infestation. Then after lupins in 1990, wheat in 1991 went 5t/ha - supporting evidence for the potential of warm-season grasses in Western Australian rotations.

Dwayne points out that all they had to do in South Dakota was save soil moisture with no-till and use seed and fertiliser rates already recommended a mere 300km east of Pierre. We are 15,000km away, in the Southern Hemisphere! Our rain usually cuts out in September in the Northern agricultural areas and, frequently, October in the Southern compared with the equivalent of December in South Dakota. So let's not underestimate the magnitude of the task!

Spin-offs may be valuable if warm-season grasses can be successfully grown.Deeper-rooting species may use moisture at a greater depth , potentially reducing recharge to salt watertables. Stubbles of warm-season grasses generally take longer to break down than wheat, possibly remaining to provide additional ground cover to reduce wind erosion after a lupin crop, for example. I believe the prospects are interesting!

Lest anyone think that Dwayne has a vested interest, I might add that the Board representing the 300 odd farmers who own the Research Farm - run by the University - were loth to let him come to Australia. Since we are closer to their millet market in Asia, can you blame them? But Dwayne was able to convince them that he would learn more from us about grazing -which they want to include in their farming systems - than we would learn from him. I hope he can convince them again in a couple of years time!

Farmer's Section

NO-TILL AND CROP ROTATIONS

Tim Trethowan, Kojonup Ph/Fax 098 341056

We all know the benefits of crop rotations, the use of break crops to reduce root disease, and perhaps some nitrogen input with legumes. The other main advantage of rotations is to be able to control different weeds in different stages of the rotation.

Weed control is one of the main drawbacks to the successful use of No-Till, preparation needs to start at least the year before,and preferably two years before the rotation starts.

My rotation is canola-wheat-lupins-oats. In the better soil types this rotation can be repeated at least twice, poorer soil types will usually sustain one rotation.

All grasses should be taken out in the canola stage, setting up the wheat stage. All broad leaf weeds should be taken out in the wheat stage setting up the lupin stage. All grasses should be taken out in the lupin stage setting up the oats stage and so on.

If all weeds are taken out in the first rotation, a lot less chemical needs to be used in the second rotation. But each stage needs to be carefully done to achieve any advantages, that is,less chemical useage.

I rely strongly on knockdowns, glyphosate and Spray Seed for my initial kill, following up with diuron or simazine. None of these chemicals seem to have resistance problems. Hopefully other chemicals for grass control,(Targa, Sertin etc.) need only be used once in any rotation. The same goes for Glean.

With the introduction of new triazine- resistant canola varieties, only knockdowns and atrazine and /or simazine need to be used on canola, and knockdowns and diuron on wheat and oats, with knockdowns and simazine used on lupins.

Attention to detail is essential. Spraying with the right chemical at the right time is the only way to keep the rotation alive. However there is a conflict. We try to get our crops in early to achieve high yields. This usually means the weeds haven't germinated so can't be killed.

In the first stage of the rotation, that is canola, this problem can be solved with the new triazine resistant canola. A completely clean canola crop will reduce the weed burden for the rest of the rotation. The canola can be sown and weeds controlled later. This allows more crops to be sown at the right time.

In the past by the time I reached the lupin stage of the rotation sometimes it wasn't even necessary to use a knockdown.

My No-Till machine is an air assisted combine using Harrington points , Ryan tynes and ten inch row spacing. Finger harrows are used on pasture or after a burn and a chain is dragged when sowing into stubble.

EYRE PENINSULA EXPERIENCE

Malcolm Gardner, Eyre Peninsula, South Australia

We farm on Eyre Peninsula, South Australia, in the Karkoo district, on a typical sized property for that area of 650 ha.

Our first experience with reduced tillage was in 1967, when a chemical salesman turned up, promoting this sensational idea of killing off the weeds by spraying them, instead of by cultivation, then simply planting the crop with the combine - in one pass.

Very intriguing, I thought, and worth trying on a small scale. This was before Spray-seed as such was formulated - we were given a recipe of Gramoxone, Reglone, and wetter. In this instance timing was rather too late in the season, conditions were very wet, on low fertility white sand. Results of a comparison between this new "Direct Seeding" process, and conventional multiple cultivation (side by side) were very poor (both measured only in bushels) but the new process was approximately 50% better, which encouraged us to persevere in this radical departure from the established way.

(Continued page 10)

We used this technique for varying proportions of our cropping programme over the next ten years. Spray-seed came onto the market, and with help and advice from ICI , variations in the routine were made. We had some excellent results, and many failures - mainly through poor "in-crop" weed control - but in looking back, we know we had embarked upon a giant learning curve, which even now has hardly more than begun.

Results in 1978 convinced us that crops can be successfully established without much tillage, when we direct drilled all the crop (one pass), with almost the best yields ever.

We settled into a routine of mainly one pass with full cut, before sowing - with full cut, having previously sprayed with either Spray-seed or Roundup.

The machine used over the last fourteen years is a Horwood Bagshaw 32 row, six - rank trash combine. Standard points achieving a full cut have mostly been used, but in recent years there have been variations in makes and types of points.

In 1992 we fitted ten deeper narrow points at one end of the combine, also with deep banding equipment on that section, and sowed all of the crop in that way. Trailing harrows were used for the full width.

Because of the extra depth of the narrow points - for control of Rhizoctonia (a problem very prevalent on Lower Eyre Peninsula, and one which CSIRO and Department of Agriculture trials have proven can be alleviated by deeper soil disturbance), and also the fact that the deeper, and in our case, longer narrow points had their tips more forward than the tyne pivot pin, we ran into a tyne breakout problem. In the heavier soils spring tension was barely sufficient, and after release, return to the rest position was difficult.

However, despite the fact that there were gaps here and there along these rows in some soils, most of the way the crop from the narrow points was indistinguishable from that from the remainder of the combine. Once again it was demonstrated that a normal crop could be produced without even complete cultivation.

One disturbing realisation is that despite a very big reduction in tillage over more than 20 years, to predominantly one- pass, full- cut seeding, wind erosion after sowing on the non-wetting white sands is still an ever present risk.

I see the removal of all standing cover, and the burial of much of the existing cover, by the full cut operation, as the factors I would like to eliminate.

After reading and listening to various publicity pertaining to Zero Tillage, including a "narrow-point" conference in Adelaide in 1994 which included very encouraging contributions from WANTFA representatives, I decided to follow this progression.

So to make a more serious comparison in 1995, I set up three different crop establishment systems under the 32 row combine.

1 At the right hand side, five Triple Disc units - having an independently sprung wavy coulter in front - set to penetrate 50mm below depth of seed placement - also set at a slight angle to leave a narrow slot for deep banding fertiliser. These units were followed by press wheels which carried the rear of the unit. A hand screw adjustment accurately controlled seeding depth. One row was blocked off to accommodate the extra width of these units which were spaced at 8.5" = 21.6cm.

2 Next were ten rows - normal combine spacing, entirely conventional. All tynes in place, standard points, all seed and fertiliser down the normal tubes. Trailing harrows behind this section only.

3 At the left hand side, remaining 16 rows - normal combine spacing. All cultivating tynes removed. All sowing tynes retained, fitted with "Superseeder" tungsten faced points, set to penetrate 50mm deeper than seed placement. Fertiliser was deep banded behind these points. Seed was sown through separate tubes attached to light swinging tynes in line with the main tyne. They acted as a closer behind the narrow point and made a shallow furrow for the seed. (Similar sowing tynes were shown to me in August 1994 at Agriculture Western Australia, Geraldton . Each of these rows was followed by an independent press wheel.

At harvest time I was afforded hundreds of chances to assess these treatments visually, because the wider spacing and concise rows of the triple disc seeder units stood out clearly, allowing me to gauge the position of each treatment. Except for a situation involving 150ha which I will describe separately, there did not appear any difference in head size or overall crop density. I felt that all treatments should yield about the same.

While the fertiliser company fieldmen were at our property harvesting some other trials of their own, they readily agreed to reap three replicates of each of the three seeding treatments which I had pegged out. In the paddock of Dagger wheat which yielded 2.1 tonnes/ha, their official finding was that there was no significant difference between the treatments.

That crop was sown in mid June by one pass after weed growth had been removed using Roundup at 1 litre and Goal at 100mls. Marshmallow had been thicker and more widespread than ever before.

In the exceptional situation I referred to earlier, the 150ha was extremely rough and ridged caused by wind erosion due to some other abnormal factors. Knowing that I was intending to adopt no-till as a cropping routine, and this would not level out these ridges, I elected to cultivate this area conventionally four times, then incorporate Trifluralin with harrows. The levelling was achieved fairly well, but of course the tilth became dangerously fine as predicted.

During the actual sowing period we had continual showery weather. Not a lot of rain fell in total, but the conventionally prepared area remained rather too wet although not actually boggy.

The interesting observation was that in many areas, round after round, that section of the combine - having all tynes, standard share trailing harrows and shallow sown - germinated badly, and in fact there were many short strips which didn't come up at all, while alongside, the zero-till sections - either by triple disc or narrow point (both with press wheels) - gave an excellent germination all the way. The damage from the multiple pass tillage was so severe that if it had all been seeded with the "full cut with harrows" method, then total resowing may have been required!

After many years of practising reduced tillage and direct drilling by full cut, and my recent experiences of trialling "No Tillage" seeding, I feel confident in embarking upon "No Till" full scale, and I would like to thank the committee and all the various contributors to WANTFA for all the information and encouragement they have provided.

NOTILL'S TOP 10 LIST

Bryan Jorgenson, Ideal, South Dakota.

1. **Develop a long term rotation plan for at least the next three years.**
2. **Test soils for fertility, soil P.H. and organic matter.**
3. **Keep accurate records to analyse productivity and avoid costly mistakes.**
4. **Spread straw and chaff evenly and keep weeds from going to seed.**
5. **Establish a good crop rotation plan to avoid crop**

diseases. Determine best seeding rates to optimise production and weed control.

6. **Make sure your seeders, drills and sprayers are in good condition. Keep openers sharp and spray tips new.**

7. **Avoid excess traffic on your fields, such as with trucks and large grain carts.**

8. **Read and understand chemical labels to avoid causing crop damage and rotational conflicts.**

9. **Keep your neighbours on their toes wondering what you are doing.**

10. **Keep the faith and avoid the "tilling temptation".**

ADDRESS TO THE JERRAMUNGUP SEPTEMBER 1995 CROP ESTABLISHMENT SYSTEMS WORKSHOP

Rick Swarbrick:(Gairdner) Ph 098 361038

I have been asked to give a local farmer's perspective on crop establishment.

However to do this I have to look at my objective which is a 4t/ha crop and between establishment and objective there are a number of factors critical to my farming practise.

The list goes something like this:

Maximum trash retention - have already grown good lupin or cereal previously.

Good seeding depth control and seed to soil contact done with minimal, if not nil, soil disturbance.

The crop must have early vigour possibly cope with an extended dry period up to a month such as August 1995, and must finish well without necessarily getting a good finishing rain. Finally, this crop must produce a sample that satisfies the most demanding buyer.

Impossible, you might say, but I'm confident by the end of today's program we will have gone a long way to addressing these concerns.

Getting back to establishing this 4 tonne crop - what is required. There are machines being used which can sow successfully into heavy trash, doing it with good depth control, good seed to soil contact and achieving this with minimal or nil soil disturbance.

Some crop varieties appear better suited to no-till. I consider canola in this category. A Canadian friend finds his oats very conducive to no-till. Mike Brown has grown oats at Narrogin using no-till for twenty years, with good success.

Coping with extended dry periods - Dave Tennant of Agriculture Western Australia, told us at the Geraldton Stubble Workshop 4 years ago that in some years moisture loss is greater in stubbles when showers are small. It can take most of the small showers just to wet the stubble with very little reaching the soil. We experienced this in 1994. In 1995 our crops had only 8 mls for August and this was spread over 5 not very wet days.

The all important grain sample - in the past one of our problems has been staining, now it doesn't appear such a problem. Talking to the maltsters they requested the Grain Pool forward their various samples of staining and found no problem malting any of them. What they don't like is mixtures of stained and unstained or black tipping, but replace staining with protein and the problem may have shifted.

The stubble - I wish to run 4 sheep to the hectare for 2 months over summer without having the stubble move again. Some varieties seem better in this area than others. Canola has surprised many farmers in the way it has handled summer grazing especially if sown no-till into good trash. Some wheat stubbles are far superior to others in this area.

It appears at times that my perspective of crop establishment raises more concerns but I do not believe we can continue as we have been. Many farmers are questioning our direction, whether it be from soil conservation or sustainability. Maybe some of the problems should be addressed from outside the crop establishment area. Some farmers have opted for no stock. We saw this in Geraldton 4 years ago. It would be interesting to hear from that young fellow who was destocking his farm back then. How has it affected his land? Many of the bad blows in our area can be attributed to stock, but most of us need stock to remain viable. This may best be dealt with be feedlotting, not for fattening but for maintenance.

This workshop is the fourth I have attended. Geraldton 4 years ago should have been the beginning of a very constructive and enjoyable era for all people involved in agriculture. It hasn't lived up to what it promised. This was painfully clear at a smaller gathering with Agriculture Western Australia in 1994 at Jerramungup where almost the same 5 priorities were on the white board at the end of the day. To me this means all of us here today must give some consideration to how our priorities are to be carried to fruition.

Approximately 2 months after the Geraldton Stubble WorkshopStubble Workshop the Jerramungup Extension and research Advisory Committee ran a day where farmers got up and spoke about their systems and why they were doing what they were. It was disappointing to hear farmers stating that they were happy with the way they were sowing into lupin stubbles when on that very day their paddock was blowing. Another farmer was harvesting very low regardless of fuel cost and time loss ,and was happy with this system ,but within 6 weeks had arranged to import a machine just to get through his stubbles. We cannot expect our concerns to be taken seriously if we don't state them honestly.

The importance of all parties understanding and contributing honestly to research through days like today will ensure the research is relevant and ensure the adoption of the findings.

BENEFIT OF PRESS WHEELS IN SOUTH AUSTRALIA

From: Bradley Hicks- Arthurton, Yorke Peninsula, South Australia. Fax no: 08 88 351255

I farm near Arthurton on the Yorke Peninsula, in a Cereal/Pasture (sheep) rotation, with about 260 ha of annual cropping.

Press wheels have the potential to improve emergence and early growth- and so yields- by an average of 13% over a range of soil types! Trials by Rohan Rainbow, Research Agronomist (Clare SA) over 3 seasons have confirmed earlier results from Chris Norris' initial work on the Yorke Peninsula .

My interest in Press wheel was sparked by Chris Norris,then Senior Farm Mechanisation Officer - Dept of Agriculture Kadina SA,at an Agricultural Bureau meeting in late 1985. Prior to this time, I was aware of emergence problems related to difficult soil types. My farm covers nearly 1,700 acres and comprises non - wetting sand ridges, sand over clay, clay-loam, surface sealing clay and crabhole soils. I use a minimum tillage system of workup, spray Trifluralin/harrow, sow.

Chris had been working with press wheels in Queensland prior to his move to South Australia, and his results showed worthwhile yield responses to press wheels. Encouraged by this information, I contemplated modifying my combine.

In early 1987, I purchased secondhand steel press

wheels at a clearing sale and enlisted Chris' help to fit a gang of 4 to the right hand float of my 20 row Horwood Bagshaw Big Clearance combine; the rear cultivating tynes were utilised as mounting points, giving easy pressure adjustment via tyne release springs. Ridge dividers were fitted aligned with front sowing tynes.

Several weeks after sowing, Chris measured emergence numbers and depth of cover. Results showed conclusively the benefits to both emergence and early plant growth of press wheel rows ,compared to drag harrows. Optimum depth of cover proved to be 25 to 40 mm.

Chris returned at harvest to take plant cuts for production and average yield increases due to press wheels, ranging from 7% in Festiguay wheat on clay loam soil to 23% in Schooner barley on sand over clay. Some yield variation was seen between different wheat varieties.

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In 1988 I fitted press wheels to a further 3 floats (12 rows) leaving the centre float with spring tyne harrows, for a direct comparison. Spring tyne harrows were also used as ridge dividers in front of alternate press wheels. 75 mm sowing points were fitted to reduce the possibility of seed bounce.

Spring tyne harrows on the centre float showed problems with uneven depth of cover even in moderate trash levels, and at speeds of about 6 kph. Press wheels, however, give a uniform pattern and more even depth of cover in most trash conditions and up to 9 kph.

Press wheels also showed about 50% improvement in emergence on non wetting sand and surface sealing clay, possibly due to improved seed/soil contact and furrow sowing pattern; head emergence of press wheel rows was about 2 days earlier than harrow rows.

More widespread trials carried out on the Yorke Peninsula in 1988 by Chris Norris showed average yield increases of 17% over spring tyne harrows. Unfortunately Chris returned to Queensland in early 1989, but his early work was taken up in 1990 by Rohan Rainbow. Rohan began trials in 1991, concentrating on emergence and early plant growth. Press wheels gave 7-15% improvement over other covering devices in both emergence and growth in heavy soils. Sandy soils showed no response, probably due to soil slumping into furrows. This could have been improved by wider press wheels in conjunction with shallower sowing.

1992 saw trials expanded to include yield surveys, with press wheels giving an average 4% increase over spring tyne harrows in red-brown earth soils. Sowing conditions were "ideal" (adequate soil moisture) in trial areas, followed by a very wet spring.

More widespread trials in 1993 with a dry sowing period but adequate spring rains , showed 30% average yield increases across all soil types, with a 10-50% increase where surface sealing occurred. Press wheels also reduced mice damage at Wokurna (sand) from 50% with spring tyne harrows to 10%.

Dry sowing conditions again in 1994 saw improved emergence due to press wheels, but a dry spring meant there was no yield benefit over harrows.

Average yield increase due to press wheels in all trials from 1992-94 was 13.7% over a range of soil types. Yield benefits due to press wheels will be greatest in a season with dry sowing conditions, followed by a good spring; they will also be of benefit in difficult sowing conditions eg. minimum till and no till, where seed/soil contact can be improved greatly.

Back to my system; I now only use sowing tynes on my combine, fitted with 50 mm points. This year I will be fitting 35 mm modified points, while for next year I will convert from 2 sowing rows to 3 to increase trash clearance, while retaining 180 mm row spacing. I may also switch to no-till in the future.

In summary, press wheels have been shown to give several agronomic benefits in South Australia over a range of soil types and several seasons. These benefits translate to worthwhile yield increases, and consequently increased profitability.