

# Inter row sowing and no-till – a good marriage

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## Take Home Message

Inter row sowing in no-till systems works well and can increase crop profits for wheat, lentils and canola.

## Background of experiments

The importance of stubble to retain soil moisture and increase yields is evident in seasons like 2006. However, successful establishment of crops in paddocks with high cereal stubble loads continues to be an issue for stubble retention, especially in no-till systems where offset discs and prickle chains are not used. Efficacy of soil applied herbicides (Dual, Diuron, Treflan, Avadex etc) is also a big problem when large amounts of stubble are retained, particularly given the heavy reliance of these herbicides in no-till. The advent of 2 cm autosteer systems can help solve this issue by leaving most of the stubble standing and sowing between the rows in the following year. In addition, wider row spacings (9” to 12”) and knife points in no-till concentrate soil-borne pathogens in these stubble rows. Autosteer creates an opportunity to sow next years crop away from last years stubble row to minimise the impact of disease. Experiments at sites in SA and NSW in 2004 and 2005 have demonstrated that on average a 6% yield increase for wheat on wheat (range of 0 to 9%) could be achieved by sowing inter row. In 2006 a number of experiments were established throughout SA,

1. Herbicide efficacy trial. Twelve treatments; three stubble treatments (standing, slashed, burnt) by four IBS (incorporated by sowing) chemical treatments (none, Treflan 480 @ 1.5 L/ha, Dual Gold @ 750 ml/ha, Avadex @ 1.6 L/ha). Stubble loads were 6 t/ha. In the standing treatment 3 t/ha was standing and 3 t/ha was lying on the surface, and in the slashed treatment 6 t/ha was lying on the surface.
2. Inter row sowing lentils into wheat stubble (3 t/ha). Three treatments; inter row with standing stubble, stubble slashed and stubble burnt.
3. Inter row sowing canola into wheat stubble (3 t/ha). Three treatments; inter row with standing stubble, stubble slashed and stubble burnt at Sandilands (Yorke Peninsula). Two treatments; on row and inter row with standing stubble at Karkoo (Lower Eyre Peninsula).
4. Wheat on wheat experiments in medium to low rainfall regions (Mid North, Upper Eyre Peninsula, SA Mallee).

## Efficacy of herbicides in heavy stubble (6 t/ha)

Ryegrass control in standing stubble was significantly better than slashed stubble with all three products used (Table 1). In 2005 the same trial was established on a site with only 2 t/ha of stubble, and no difference in herbicide products was observed. Therefore, with stubble loads above 2-3 t/ha we expect better herbicide efficacy when stubble is left standing.

**Table 1:** Ryegrass control at Sandilands, 2006

Stubble treatment	% ryegrass control		
	Treflan	Dual	Avadex
Burnt	89.3	66.7	38.3
Slashed	29.3	37.3	16.3
Standing	84.3	78.3	51.7
l.s.d	17.3	35.3	20.2

### Increased harvestability of lentils with inter row sowing

As in 2005, there was no yield advantage in sowing lentils inter row, however there was a significant potential advantage in the harvestability of inter row lentils at Sandilands (Table 2). Lentils plants sown into standing stubble (15 cm high) were taller by 6-8 cm and the height of the first pods was also greater by 4-5 cm compared to burnt and slashed stubble.

**Table 2:** Lentils at Sandilands 2006

Stubble treatment	Plant ht. cm	Ht. to 1st pod cm	Yield t/ha
Burnt	23.8	14.6	0.58
Slashed	25.7	16.1	0.65
Standing	31.4	20.2	0.58
l.s.d	3.3	1.1	n.s.

What is the advantage of inter row lentils with stubble? Increasing the height to where the first pods develop and by the lentils using the stubble to “lean on” at harvest time will reduce the number of lentils lying over onto the ground. This in turn can result in greater harvest speeds and result in more total lentils being harvested per hectare.

### Canola establishment in wheat stubble

At Sandilands, although not significant, visually the standing and burnt stubble treatments had more even and higher establishment than the slashed treatments. Yields of canola in standing stubble were significantly higher than slashed stubble (Table 3). At Karoo inter row canola into standing stubble had both higher establishment and yield than the on row treatment (Table 4).

**Table 3:** Canola at Sandilands 2006

Stubble treatment	Plant # per m <sup>2</sup>	Yield t/ha
Burnt	47	0.45
Slashed	68	0.32
Standing	70	0.59
l.s.d	n.s.	0.22

**Table 4:** Canola at Karkoo 2006

Stubble treatment	Plant # per m <sup>2</sup>	Yield t/ha
On row	36	0.27
Inter row	47	0.35
l.s.d	10	0.06

### Yield increases in wheat on wheat

Even under very low yielding conditions, there were significant yield advantages for inter row wheat on wheat in the Mallee (Waikerie) and Upper Eyre Peninsula (Kimba). At Kimba inter row wheat had increased plant establishment and had higher yields than on row wheat (Table 5). At Waikerie the highest yielding treatment was inter row wheat with high nutrition (Table 6). At this site continuous cropping (mainly cereals) with higher inputs is proving successful. This trial indicates that inter row sowing may further improve their system.

**Table 5:** Wheat at Kimba 2006

Stubble treatment	Plant # per m <sup>2</sup>	Yield t/ha
On row	130	0.17
Inter row	141	0.25
l.s.d	10	0.06

**Table 6:** Wheat at Waikerie 2006

Stubble treatment	Input level*	Yield t/ha
On row	High	0.70
Inter row	High	0.83
On row	Low	0.66
Inter row	Low	0.70
l.s.d		0.15
*high = 80kg DAPZn + 20 kg urea		
*low = 40kg DAPZn		

## What GPS accuracy do you need?

If you are serious about inter row sowing, a  $\pm 2$  cm RTK system with your own base station is the way to go. This is because repeatable accuracy enables your sowing rig to come within  $\pm 2$  cm of your sowing rows from the previous year and be able to hold a straight line down the length of the field. Sub-metre autosteer ( $\pm 10$ -20 cm) does not have this level of repeatable accuracy. You can re-set your A:B line by eye and attempt to inter row sow the following year, however, this will not be as successful as a  $\pm 2$  cm system. Also, owners with sub-metre systems will allow for some overlap to compensate for the lower level of accuracy in the system. This results in an uneven row configuration across the field. From farmer experience, an estimated success rate for inter row sowing with various systems is as follows,

- Up to 90% for  $\pm 2$  cm RTK system with your own base station
- Up to 70% for sub-metre autosteer ( $\pm 10$ -20 cm)
- Up to 50% by eye using permanent wheel tracks

## Some rules to follow for inter row sowing

- The base station **must** remain at the same location for a particular paddock year-in year-out.
- Your auto-steer **must** have the ability to store and recall an A:B line for a particular paddock.
- Your auto-steer **must** have a 'nudge' feature in order to move the required distance to go inter row e.g. nudge over 5" in year 2 if you are on 10" spacings
- You **must** keep the same row spacing year-in year-out
- It is preferable to sow in the same direction each year for each run because sowing rigs will crab, but hopefully crab in the same pattern as the previous year.

## Acknowledgements

YP Alkaline Soils Group

Bill Long, Danny LeFeuvre, Nathan Rennie, Ag. Consulting Co.

Peter Treloar, PIRSA

Michael Bennett, SANTFA

Peter Hooper, Hart Field Site Group

Steven Simpfendorfer and Andrew Verrell, NSW Department of Primary Industries

Jack Desbiolles, UniSA

Funding by: South Australian Grains Industry Trust Fund (SAGIT), National Landcare Innovation Grant, SANTFA, and gps-Ag.