

## Weethalle tillage demonstration

Bob Thompson, NSW Agriculture, West Wyalong.

Stephen Rutledge, "Nyntie" Kikoira.

**Background:** There is a trend in the district to reduce the number of cultivation's prior to sowing. Tillage operations are costly if you factor in not only the variable costs but depreciation on the tractor and implements. Reduced tillage operations are gaining in popularity and spray fallowing is now widely used to commence a long fallow. Farmers differ in their opinion on when to commence tillage, if at all. Zero tillage has been widely promoted as a sustainable farming system but has yet to gain wide acceptance in the district. To evaluate the impact of tillage treatments on wheat yield a number of farmer demonstrations have been conducted over the last 4 years with initial funding from the Kondinin group.

**Methods:** Cunningham wheat was sown on 29 May at 50 kg/ha with 80 kg/ha MAP using 23 cm row spacing. Large (22m by 100m) demonstration plots of 4 treatments and two replicates were laid out on a red clay soil on "Nyntie" at Kikoira. The paddock had a history of unimproved pasture, which was chemically fallowed in July 1998. The traditional tillage system was where up to 5 tillage operations were performed for weed control and to develop a seed bed prior to planting. In the reduced tillage system herbicides were used for weed control eliminating the need for secondary tillage. The reduced tillage treatment was either cultivated in August or February depending on the treatment with the Trangie "one pass" tillage implement. In the direct drilled treatment the seed was directly sown into an unprepared seed bed. Herbicides are the main form of weed control, however, plant material can be removed by grazing or burning prior to sowing. All treatments were sown with a Flexicoil air seeder with 9" sweeps. There would have been more soil disturbance than would normally be desired in a zero tilled system.

**Table 1.** Raw/all (mm) received at "Nyntie" in 1998 and 1999.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	68	0	0	36	14	68	68	85	106	42	43	0
1999	35	8	76	18	25	57	17	56	48	102	26	77

**Results and Discussion:** Rainfall in September was only 48 mm, and substantially less than evaporation, consequently the crop suffered drought stress like other parts of the central west (Table 1). Good falls of rain in October allowed the crop to fill what grains had been produced. The traditional tillage system produced the highest grain yields (3.6 t/ha) whereas the direct drilled treatment produced the least (3.0 t/ha, Table 2). The calculated water use efficiencies ranged from 9.1 kg/ha/mm in the traditional tillage system to 7.6 kg/ha/mm in the direct drilled treatment. There was little effect of the treatment on grain quality as measured by grain protein and screenings. There was evidence that the potential of the reduced tillage treatment was not realised as screenings were elevated and test weight was depressed. The traditional tillage plot had a gross margin of \$62/ha greater than the reduced tillage plots and \$93 /ha than the direct drilled plot. This difference in profit may have been reduced if the full overhead and machinery costs were taken into account. The direct drilled crops had only 22% of the biomass of the conventionally cultivated crop at flowering. The delayed flowering and maturity may cause a yield penalty when October rains fail. 1999 was a wetter than normal

spring and the direct drilled crop was able to catch up, finishing only 20% lower yielding than the conventional crop.

**Table 2.** Performance of a wheat crop with contrasting tillage treatments.

Tillage Treatment	Yield (t/ha)	Plants per m <sup>2</sup>	Dry Matter (t/ha) *	Protein (%)	Screenings (%)	Test Weight (kg/hi)
Traditional	3.60	110	11.05	13.9	1.2	80.5
Zero till	2.98	91	4.65	13.6	0.8	80.8
Reduced July 98	3.30	106	7.25	13.7	4.0 1.3	65.5!
Reduced Feb 99	3.30	124	7.10	13.7		80.0

Dry matter cut taken 10th September, crop harvested on 2 nd Dec.

**Conclusions:** Growing wheat in an area with a growing season of 140-175 days and only 220 mm of incrop rainfall, benefits from at least one deep cultivation (15-20cm) prior to sowing. The timing of cultivation of a chemically fallowed pasture is probably unimportant. If a erosion risk is present then cultivation should be delayed as late as practical. Reduced tillage systems are becoming more widely adopted by central western wheat farmers. It is suggested that most farmers could increase their average yield by 10% if they modify their chisel plough to a one pass plough. For design modification contact Alan Palmer at Trangie Agricultural Research Centre.

**Acknowledgments:** Barry Minogue and Delwyn Wright

**Table 2.** *Effect of herbicides on lucerne stand density at Weethalle*

Fallow Treatment	Cost/Ha	Lucerne Plants Per Plot (30m <sup>2</sup> )
Nil	-	188
600 ml/ha Lontrel	\$33.00	0.3
1.5 L/ha Roundup 450 + 500 ml/ha Lontrel	\$39.50	0.7
1.5 L/ha Roundup 450 + 400 ml/ha Dicamba	\$18.00	60.0
1.5 L/ha Roundup 450 + 7 g/ha ally	\$16.90	39.3
1.5 L/ha Roundup 450+150 ml/ha Garlon 600	\$21.75	24.0
3.0 L/ha MCPA amine	\$15.00	7.3
1.5 L/ha MCPA amine + 500 ml/ha Lontrel	\$35.00	0
1.5 L/ha MCPA amine + 400 ml/ha Dicamba	\$13.50	6.0
2.0 L/ha Tordon 242	\$30.00	0

Future plans: This is the first trial in a series (possibly three more), before application is made to the National Registration Authority. Future trials will concentrate on MCPA, Lontrel® and Tordon 242®, evaluating rates and mixtures. The focus for herbicide removal is autumn. It's well recognised that autumn is a crucial time for carbohydrate accretion for lucerne to sustain its persistence. The lucerne is grazed down to 50mm tall over a 7 day period in May. The stock are then removed to allow lucerne regrowth for 16 to 21 days, after which it is sprayed. Regrowth by the lucerne plant for the first 21 days, is largely fuelled by carbohydrate reserves in the crown and tap root, from day 28 (about) the lucerne plant can have completely replenished the carbohydrate reserve. This year the autumn spray date was the 9 July, due to the seasonal rain and mild conditions, normally spraying should occur in late May early June. To date this has been the first successful trial to identify some herbicide options with which to fallow establish lucerne. All other trials conducted by CSER.O, Weeds CRC unit at Tamworth and Wagga have had a spring focus and failed to achieve a minimum of 95% kill level.