Precision Agriculture Project

Aim: To fine-tune the fertiliser requirement of yielding zones in different paddocks.

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Company: CSIRO

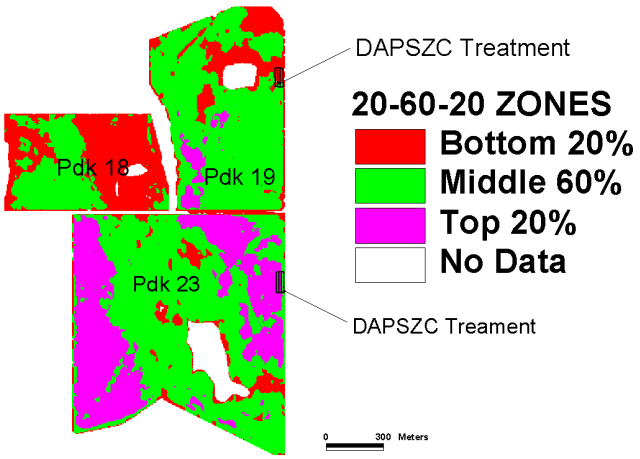
Farmer: Rod Birch
Location: Teasdale Road**,** Buntine

Background: Analysis of yield maps for the period since 1998 on Rod Birch's paddock 19 and 23 showed consistent patterns of grain yield. The question asked was "do the high and low yielding zones require the same amount of fertiliser?" Two on-farm experiments we set up by Rod Birch on these paddocks in 2003 to compare grain yield responses to three rates of DAPSZC-™ (17.3% N, 18.6% P, 8.5% S, 0.15% Zn, 0.05% Cu, 0.02% Mn and 8 mg / kg Mo).

Trial Details:

Plot size and replication	13.5m x 100m. No replications but duplicate yield measurements were made in each plot.
Soil type	Low yielding areas in paddock 19 and high yielding areas in paddock 23
Sowing date	May 2003
Conditions at sowing	Normal
Machinery	Flexicoil Bar
Seeding rate	Calingiri wheat at 80 kg/ha
Fertiliser DAPSZC-™	0, 60 and 120 kg/ha. Farm practice is 60 kg/ha
Herbicides and Insecticides	Normal practice
Paddock 23 History Paddock 19 History	2002 = Lupin, 2001 = Wheat, 2000 = Lupin 2002 = Wheat, 2001 = Lupin, 2000 = Wheat

Results: The yielding zones for paddock 19 and 23 based on the top 20 %, middle 60 % and bottom 20 % yield for five years since 1998 are shown below. Different zoning criteria also possible based on the preference of the growers and the impact that these zones have on farm management and profits.



The maximum crop yield on both paddocks was achieved with 60 kg /ha of DAPSZC-™, additional amounts of this fertiliser did not increase yield further. The biggest response was achieved in the lowest yielding zone in paddock 19 when yield increased by 11%. This yield increase was worth $56 / ha (grain price assumed to be $ 200 / t) and the price of 60 kg of fertiliser was $ 33. Yield response was very small in the highest yielding zone in paddock 23. The investment of $ 33 / ha in fertiliser for maximum grain yield was not matched by revenue from increased grain yield. A soil test would be worthwhile in the high yielding zone to determine if fertiliser P can be withheld for the next few years to increase farm profits without compromising the sustainability of the farming system. The details of the results are shown below.

	DAPSZC rate (kg/ha)	Grain yield (t/ha)
Paddock 19 Low yielding	0	2.46
	60	2.74
	120	2.73

Paddock 23 High yielding	0	3.21
	60	3.28
	120	3.28

The commonly held assumption that higher yielding zones should be given more fertilisers was not borne out by the findings of this on-farm experiment. In this case, it was the lower areas that needed more fertilisers than the higher areas to bring production up. Similar findings that low areas sometimes require more fertilisers were also made elsewhere in WA.

Summary:

- The higher yielding zone of the paddock did not require more DAPSZC than the lower yielding zone. Such on-farm experiments have a great potential to inform and improve paddock management for increased profits and environmental outcomes by using inputs more precisely. It's DAPSZC requirement in fact appeared to be nil for a crop yield of 3.21 t/ha.

Technically reviewed by: Rod Birch