

TWINN CROP TRIAL



Dryland Maize, South Africa, Oct 2008 - May 2009

KEY RESULTS

An independent replicated trial in maize showed that use of 2 applications of TwinN combined with 50% chemical N fertiliser gave an 8% increase in yield and a 29% increase in profitability compared to the conventional 100% N fertiliser program.

All four TwinN treatments tested increased profitability per ha compared to the conventional 100% N fertiliser program.

TREATMENTS

Treatment	Preplant DAP (kg/ha)	Topdress 1	Topdress 2	Chemical N/ha
1. Full chemical fertiliser program	167	160 kg/ha LAN	160 kg/ha LAN	120 kg
2. 25% chemical N	167	0	0	30 kg
3. 50% chemical N	167	107 kg/ha LAN	0	60 kg
4. 25% chemical N + 2 TwinN (1 soil, 1 foliar)	167	TwinN soil drench	TwinN Foliar	30 kg
5. 50% chemical N + 2 TwinN (1 soil, 1 foliar)	167	107 kg/ha LAN + TwinN soil drench	TwinN Foliar	60 kg
6. 25% chemical N + 2 TwinN (both foliar)	167	TwinN Foliar	TwinN Foliar	30 kg
7. 50% chemical N + 2 TwinN (both foliar)	167	107 kg/ha LAN + TwinN foliar	TwinN Foliar	60 kg
8. As per Treatment 7 + organic N ^a	167 + organic N	107 kg/ha LAN + TwinN foliar	TwinN Foliar	60 kg
9. Zero fertiliser, Zero TwinN	0	0	0	0 kg

a: 50 kg/plot of Gromor compost.

TRIAL SUMMARY

Trial Performed & Analysed By: Neu-agri Consulting, Republic of South Africa, as an independent trial

Trial Design: Randomised block design with nine treatments and four replicates of each treatment.

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TRIAL RESULTS: Yield and Profit Increase Comparisons

Treatment	Yield (kg/ha)	Increase in Yield ^y (%)	Cost per ha of Fertiliser (\$AU)	Profit ^p \$AU/ha	Increase in Profit ⁱ (%)
1. Full chemical fertiliser program	6997.2 ^{bc}	17	807	816	0
2. 25% chemical N	6066.2 ^a	2	411	996	22
3. 50% chemical N	6458.2 ^a	8	543	955	17
4. 25% chemical N + 2 TwinN (1 soil, 1 foliar)	6742.4 ^b	13	550	1014	24
5. 50% chemical N + 2 TwinN (1 soil, 1 foliar)	7085.4 ^{bc}	19	683	961	18
6. 25% chemical N + 2 TwinN (both foliar)	6860 ^{bc}	15	550	1041	28
7. 50% chemical N + 2 TwinN (both foliar)	7467.6 ^c	25	683	1050	29
8. As per Treatment 7 + organic N ^a	6771.8 ^{bc}	14	837	734	-10
9. Zero fertiliser, Zero TwinN	5958.4 ^a	0	0	1382	69

LSD (P= 0.05%) for yield = 613.2 kg/ha and yields with the same letter (a, b, c) beneath them are not statistically different. For example, T9 is different from T1 because they don't share an a, b, or c.

y: % increase in yield is compared to T9 (zero control).

p: Profit per ha is calculated by multiplication of the yield by the corn price and subtraction of all fertiliser and TwinN prices that were current in RSA at the time of the trial. Currency conversions are 1AU\$ = R6.5, US\$0.77, EUR 0.56.

i: Increase in profit is compared to 100% chemical fertiliser treatment

SUMMARY OF RESULTS

- ◆ Two TwinN applications plus 50% chemical N fertiliser gave the highest yield in the trial with a 25% yield increase over the zero N/ zero TwinN control and an 8% increase over the 100% N treatment.
- ◆ The 25% N plus 2 TwinN application treatments and the 50% N plus 2 TwinN treatments were all statistically equal with the 100% chemical N treatment.
- ◆ The substitution of the first foliar application of TwinN with a soil drench application in combination with 25 or 50% N did not statistically alter yields, although the yields were consistently slightly lower than those from two foliar applications.
- ◆ Addition of organic fertiliser reduced yields and profitability. This is thought to be due to use of non-composted organic material and is strongly anomalous with all other trials of TwinN with organic fertilisers.
- ◆ Reducing N fertiliser application to 50, 25 or 0% increased profit compared to 100% N, although yields were statistically lower. However this is not likely to be sustainable over time and resulted in significantly lower yields than T1 and T4-T8.
- ◆ All TwinN treatments increased profit per ha significantly compared to the 100% fertiliser treatment, with 50% N plus 2 TwinN giving a 29% increase in profit.

Pre-plant fertiliser application consisted of 160 kg P₂O₅, 50 kg K₂O and 2 kg boron per ha.

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TRIAL DETAILS

Crop Data

Crop: Maize Row width: 90cm
Plot size: 5 rows by 7m, middle 3 harvested.
Sowing date: 24/10/2008
TwinN application dates: 24/11/2008, 27/12/2008
Harvest date: 20/2/09

Soil Data

Soils were red in colour with approximately 50% clay and 3.5% organic carbon content. Soils were free draining with very little moisture retention in the top 50mm.

TwinN Applications

The first application was at 6am at 31 days post-planting. Weather conditions were 14°C, misty with light rain and wet foliage for 5 hours. The second application was made at early flowering under similar conditions and followed by 85mm rain overnight. Foliar applications were made using a backpack at 400L/ha using a coarse nozzle setting and banding over the top of the crop. Soil applications were made at a rate of 1000L/ha onto moist soil and banded onto the base of plants.

Crop Protection Treatments

Karate (Cyhalothrin) applied at planting for cutworm and 4/12/2008 for stem borer. Greencure (natural pyrethrum) at 22/12/08 for stem borer.

CONCLUSIONS

- ♦ Use of 2 TwinN applications combined with 50% chemical N gave the highest yields in the trial and the highest profitability (increase of 29%) compared to the standard 100% N treatment. This is the recommended program for most producers as it maximises both profit and yield per unit of land, while improving environmental outcomes by reducing use of nitrogen fertilisers.
- ♦ Use of 2 applications of TwinN combined with 25% chemical N gave similar yield to 100% chemical N (15% versus 17% increase over zero control treatment). This program may be suitable for producers who need to farm with lower fertiliser inputs.



Maize growth with 25% fertilizer plus 2 TwinN applications (left) compared with plants without any added fertilizer (right).