

# TWINN CROP TRIAL



Potato Trial: Herefordshire, England 2007 & 2008

## KEY RESULT

A single application of TwinN in combination with organic fertiliser application resulted in **15 and 20% yield increases** over organic fertiliser application without TwinN, in a 2007 independent replicated trial using two cultivars. In the same trial, **yield increases of 28 and 29%** were measured for the same two cultivars when treated with two applications of TwinN. A repeat independent trial in 2008 resulted in **yield increases of 29 and 43%** in one cultivar, **and 12 and 26%** in a second cultivar. A significant shift in tuber size distribution towards larger tubers was observed in all TwinN plots in both trials.

## TRIAL RESULTS

Table 1: Total Yields of 2 CVs of Potato in 2007 & 2008

2007 RESULTS	Milva		Valor	
	Tonnes/ha	% of control	Tonnes/ha	% of control
Untreated control	14.5 a	100 a	18.6 a	100 a
Single TwinN at planting	17.5 b	120 b	21.4 b	115 b
TwinN twice soil and foliar	18.6 c	128 c	23.9 c	129 c
LSD (p<0.05)	0.84 t/ha	6%	0.63 t/ha	3%

Data values that share adjacent lower case letters a, b, or c are not significantly different (p<0.05).

2008 RESULTS	Amarosa		Valor	
	Tonnes/ha	% of control	Tonnes/ha	% of control
Untreated control	10.9 a	100 a	29.3 a	100 a
TwinN at planting, emergence	12.2 ab	112 ab	37.9 b	129 b
...at planting, emergence, tuber	13.7 bc	126 bc	41.7 bc	143 bc
LSD (p<0.05)	2.46 t/ha	23%	6.53 t/ha	22%

Data values that share adjacent lower case letters a, b, or c are not significantly different (p<0.05).

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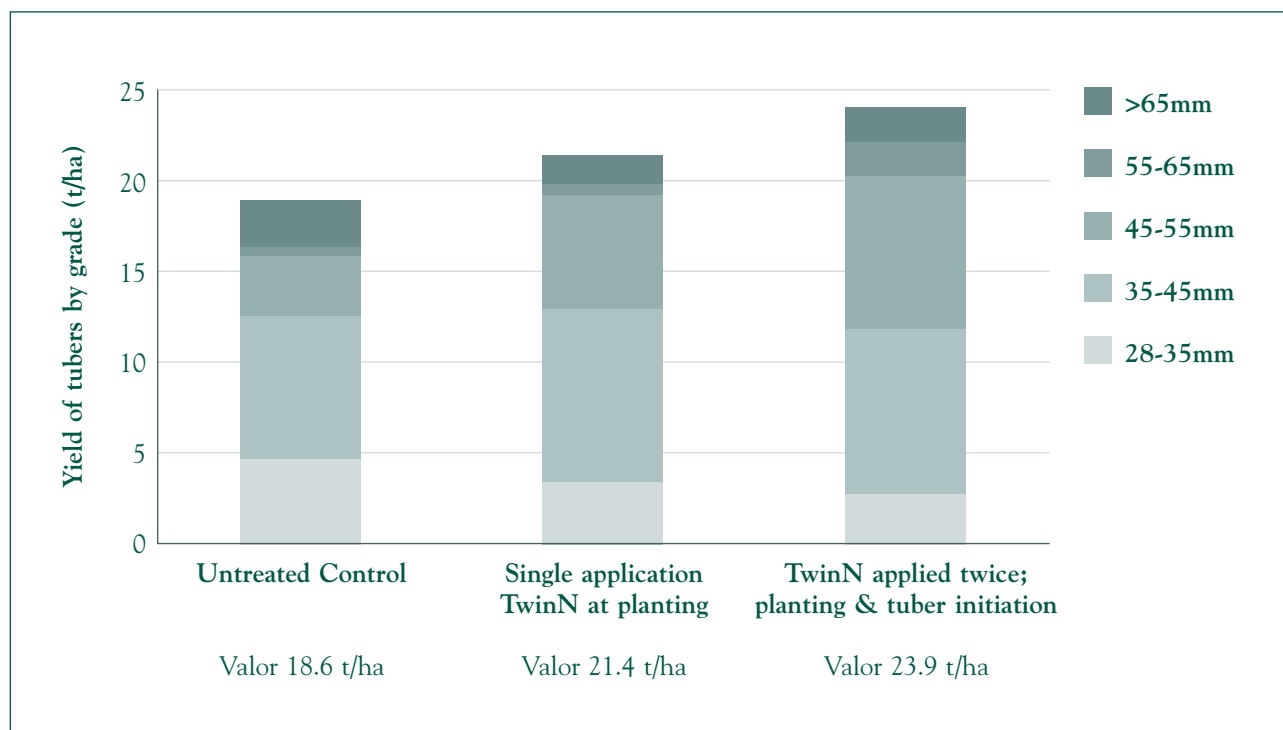
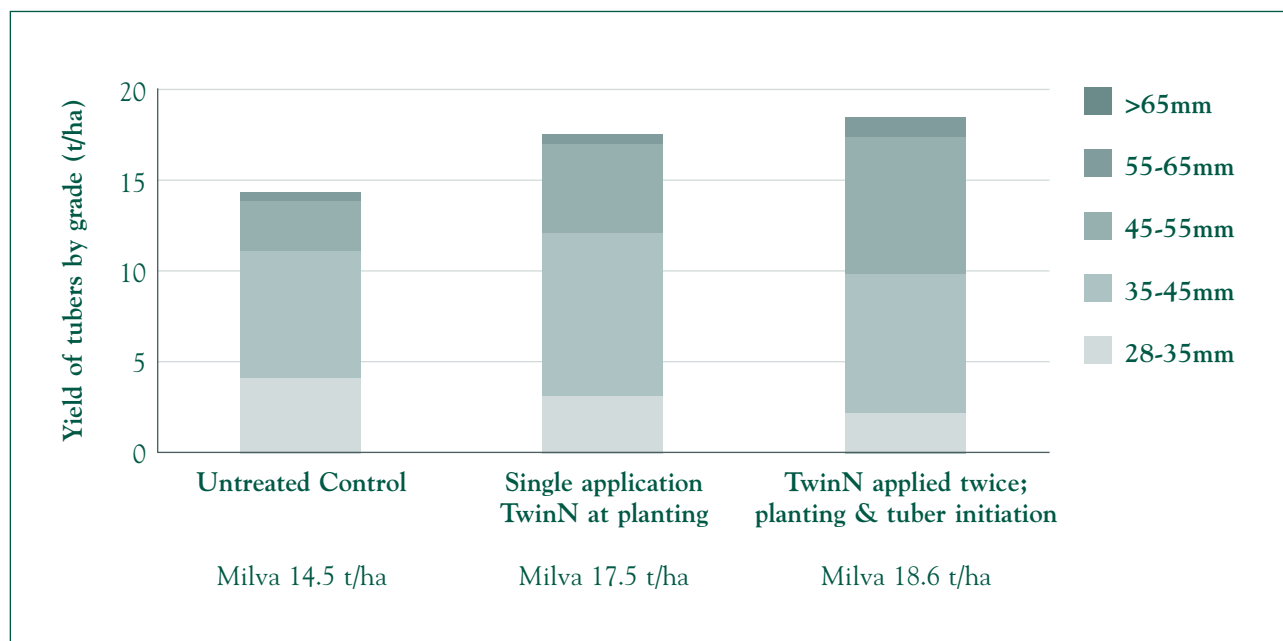
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**Table 2: Effect of TwinN on Tuber Size in CVs Milva & Valor in 2007**



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**Table 3: Tuber Size Distribution in 2007 Expressed as Percentages**

	2007	Yield as % of the untreated control		
Treatment	TwinN spray treatments	>45mm	28-45mm	Total
Milva 0	Untreated control	100% a	100% b	100% a
Milva 1	TwinN once at planting	176% b	105% b	120% b
Milva 2	... twice: planting, tuber initiation	281% c	86% a	128% c
	<i>LSD (p&lt;0.05)</i>	59%	12%	6%
Valor 0	Untreated control	100% a	100% a	100% a
Valor 1	TwinN once at planting	139% b	104% a	115% b
Valor 2	TwinN twice: soil & foliar	204% c	93% a	129% c
	<i>LSD (p&lt;0.05)</i>	14%	12%	3%



Photograph taken 26 July 2007 showing untreated control on left of centre, and TwinN applied twice on right of centre. Although it appeared in the field that the untreated plots were slightly paler in colour, analysis was not employed to confirm this.

**Table 4: Yield of Potatoes by Grade (t/ha) in CVs Valor & Amarosa, 2008**

VALOR	<25mm	25-35	35-45	45-55	55-65	65-75	>75mm	Total
Untreated control	0.09 a	0.40 a	2.4 a	8.8 a	13.5 a	4.2 a	0.0 a	29.3 a
TwinN at planting, emergence	0.05 a	0.36 a	1.7 a	8.7 a	17.0 abc	9.3 bcd	0.7 a	37.9 b
... as above + at tuber initiation	0.03 a	0.35 a	2.4 a	11.2 a	19.0 bc	8.3 bc	0.5 a	41.7 bc
LSD ( $p<0.05$ )	0.086	0.446	2.13	4.36	4.01	3.43	3.03	6.53
AMAROSA	<25mm	25-35	35-45	45-55	55-65	65-75	>75mm	Total
Untreated control	0.03 a	1.5 a	4.7 ab	3.4 a	1.1 a	0.0 a	0.0 a	10.9 a
TwinN at planting, emergence	0.02 a	0.9 a	3.2 a	5.1 abc	2.0 a	0.8 a	0.0 a	12.2 ab
... as above + at tuber initiation	0.03 a	1.6 a	5.8 b	4.4 ab	1.2 a	0.3 a	0.0 a	13.7 bc
LSD ( $p<0.05$ )	0.24	0.92	1.95	1.91	1.88	1.99	0.0	2.46

## TRIAL SUMMARY

**Trial Performed & Analysed By:** Peter Glendinning, Independent UK Agronomist in 2007 and Peter Glendinning and Agrimarc Ltd in 2008.

**Trial Design:** 2007: Randomised block design with 2 replicates for each cv.  
2008: Randomised complete block design with 4 replicates.  
Separate site for each cv.

## TRIAL DETAILS: 2007

**Varieties:** Milva, Valor  
**Sowing date:** 24/04/07  
**Harvest date:** 19/09/07  
**Trial layout:** Randomised block design, 2 replicate blocks per treatment in 2 varieties. Block size: 25m x 250m  
**Fertiliser data:** Preplant application of Bioganix at 5 t/ha, equivalent to 80 kgN/ha  
**Soil data:** Reddish fine silty clay loam over shale, with good water retention and moderate permeability.  
**Site history:** Wheat 2006

### TwinN applications:

1. Untreated control.
2. TwinN applied once, to bare soil at planting, 26/4/07 (note that manufacturer's instructions are to apply to emerging plants rather than bare soil). Application onto moist soil.
3. TwinN applied twice, once to bare soil at planting, 26/4/07 and again at tuber initiation, 11/6/07. Application was onto dry foliage on a summer afternoon (not recommended by manufacturer).

Application was by a Berthoud 2000 commercial spray rig at 400l/ha at 45 psi and TwinN was applied at 2X commercial rate.

## TRIAL DETAILS: 2008

<b>Varieties:</b>	Amarosa, Valor
<b>Sowing date:</b>	15/5/08
<b>Harvest date:</b>	12/11/08
<b>Trial layout:</b>	Strip design, 4 replicate blocks per treatment for each variety. Block size 1.9m x30m. Separate sites were used for each variety.
<b>Fertiliser data:</b>	Preplant application of Bioganix at 10t/ha, equivalent to 160 kgN/ha on Valor site and nil fertiliser at Amarosa site.
<b>Soil data:</b>	Reddish fine silty clay loam over shale, with good water retention and moderate permeability.
<b>Site history:</b>	Valor site - clover grass ley; Amarosa site - peas

### TwinN applications:

1. Untreated control.
2. TwinN applied to bare soil at planting, 20/5/08 (note that manufacturer's instructions are to apply to emerging plants rather than bare soil) and to soil and foliage at full emergence, 22/6/08 in light drizzle, late afternoon.
3. TwinN applied to bare soil at planting, 20/5/08, full emergence, 22/6/08 in light drizzle and at tuber initiation, 17/7/08 in light drizzle, late afternoon.

Application was made using a hand operated CP3 knapsack sprayer at 3-bar pressure at 600 l/ha and TwinN was applied at 2x commercial rate.

## CONCLUSIONS: 2007 Trial

1. A single application of TwinN, sprayed onto bare soil at planting, significantly increased the total yield of potatoes harvested in both the varieties tested. A yield increase of about 3 t/ha was measured in both varieties, amounting to 20% for Milva and 15% for Valor. Note that the recommended application for TwinN is at emergence rather onto bare soil.
2. A second application of TwinN, as a foliar spray at tuber initiation increased yields still further. These were an additional 1 t/ha (8%) for Milva, and 2.5 t/ha (14%) for the higher yielding Valor.
3. Two applications of TwinN increased potato yields more significantly over the untreated control, than a single application at planting. Overall yield increases were almost identical in both varieties; 28% for Milva and 29% for Valor.
4. TwinN applied to the soil at planting significantly increased the weights of both 35-45 and 45-55mm grades, by over 20% and nearly 90% respectively. These increases were clearly at the expense of the yields of the smallest tubers, which were reduced by over 25% in both varieties.
5. Two applications of TwinN more than doubled the yield of the larger tubers between 45 and 65mm. Whereas a single application of TwinN increased the yield of tubers larger than 45mm by 2.4 t/ha, a second application gave an additional 60% for Milva at 3.3 t/ha, and 47% more for Valor, at 3.8 t/ha. The smallest tubers, were reduced to about half those of the untreated control.

## CONCLUSIONS: 2008 Trial

1. TwinN applied to the bare soil a few days after planting and repeated at full emergence, gave a significant yield increase of 8 t/ha (29%) for Valor. Although the increase in total yield of 1 t/ha in the low yielding Amarosa was not significant at  $p < 0.05$ , the yield of tubers over 45mm was, with an increase of over 3 t/ha (76%).
2. An additional application of TwinN at tuber initiation increased yields further, but this was not quite significant at  $p < 0.05$ , despite being a 14% increase in both varieties. However, compared to the untreated control, three applications of TwinN gave a significant yield increase of 7 t/ha (43%) for Valor, and over 2 t/ha (26%) of Amarosa.
3. Excepting one anomaly, all the yield increases described above were measured in the larger tubers: between 45 & 65mm for the Amarosa and 55 to 75mm in the Valor. Yield increases in larger tubers were proportionately much larger than the total yield increases.
4. The sprays applied at tuber initiation gave consistent but small yield increases although none of these was statistically significant. The majority of the treatment effects were seen from the earlier application.
5. Despite the varieties yielding very differently, the yield increases from the treatments were proportionally very similar in both varieties.