TWINN CROP TRIAL

Winter Wheat: Suffolk, UK, Oct 2008 - Sept 2009

KEY RESULT

An independent replicated trial in wheat showed:

- A single application of TwinN at later growth stages, in this instance Booting (GS45), delivered considerable yield increases.
- A single application of TwinN, at booting (GS45), provided yield increases even at the higher (250 kgN/ha) rate of synthetic N.

TREATMENTS AND RESULTS

Yields at different nitrogen fertiliser application rates with and without TwinN

	Yield (t/ha)			
Treatment	**100 kgN/ha**	**150 kgN/ha**	**200 kgN/ha**	**250 kgN/ha**
T1: N fertiliser[1], No TwinN	**5.46**	**6.21**	**6.62**	**6.14**
T2: N fertiliser + TwinN	**5.87**	**6.67**	**6.46**	**6.77**
Yield Increase	**7.5%**[2] (410 kg/ha)	**7.4%**[2] (460 kg/ha)	**-2.5%**[2] (-160 kg/ha)	**10.3%** (630 kg/ha)

[1]Nitrogen was applied as prilled ammonium nitrate (34.5% N).
[2]Yield increase calculations relate to the increase in the TwinN plus N fertiliser compared to the N fertiliser alone.

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TRIAL SUMMARY

Trial Performed & Analysed By: Nickerson, UK

Trial Design: Four fertiliser rates in blocks and three replicates of the TwinN and non-TwinN treatments randomised within each.

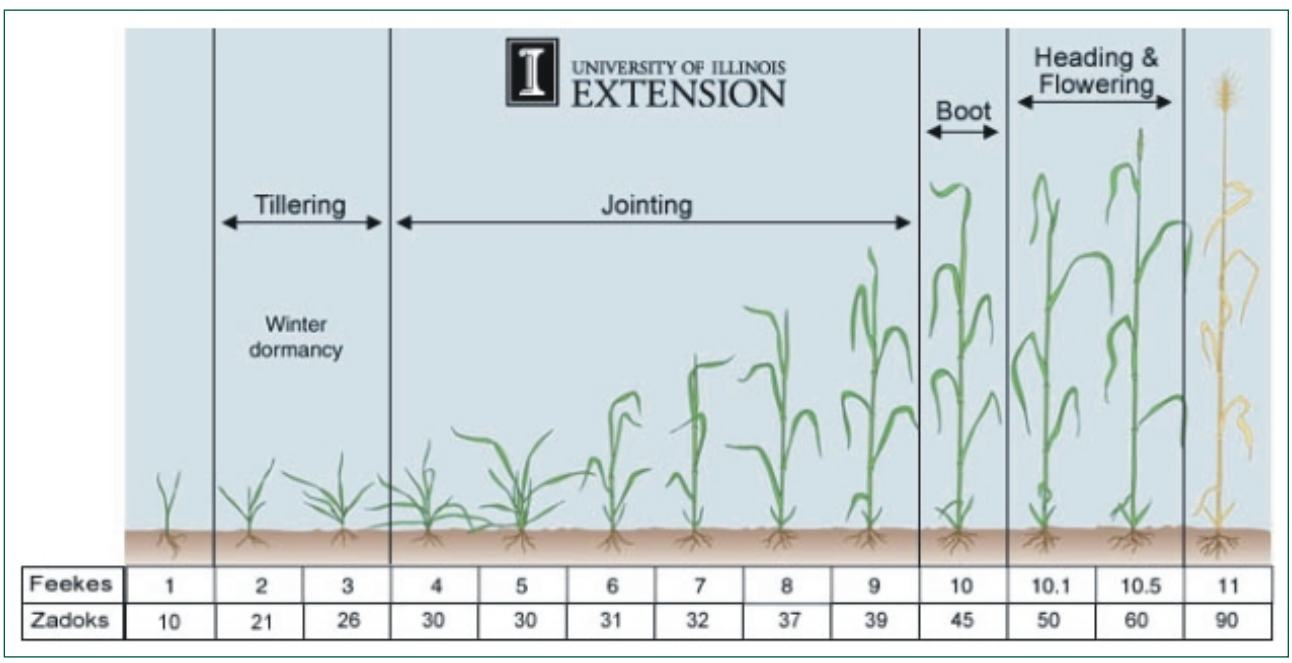
Crop Data

Crop	Winter Wheat
Variety	Solstice
Previous Crop	Sugar Beet
Soil Type	Sandy Clay Loam
Sowing Date	Early November 2008
TwinN Applied	28/5/09 at GS45 (booting)
Harvest Date	19/8/09

Season Conditions Spring and early summer in Suffolk were much dryer than usual, resulting in lower tiller numbers per plant and a much shorter crop, which contributed to the reduced yields. Annual rainfall for 2009 was 527mm compared to the 10 year average of 650mm.

TwinN Application

TwinN was applied using a gas operated spray boom under cool, moist conditions in early evening.



Feekes	1	2	3	4	5	6	7	8	9	10	10.1	10.5	11
Zadoks	10	21	26	30	30	31	32	37	39	45	50	60	90

CARBON FOOTPRINT

TwinN enables high yields with reduced N fertiliser. The calculations for the relative carbon emissions for each treatment have been determined utilising the Renewable Fuels Agency's Carbon Calculator. The measurement is as CO_2 equivalents per tonne of yield. Assumptions are that all urea was applied in one pass, and that TwinN required an additional pass over the field.

The calculation has included TwinN's 1.2 kg CO_2 equivalent/ha as rated by Carbon Associates, Australia.

Assuming the farmer targets a high yield of 6.62 T/ha using 200 kgN/ha, this will produce 35% more CO_2 equivalents than if the farmer had used 150 kgN/ha plus TwinN. The efficiencies are 590 kg CO_2 e/T yield for 150 kgN/ha plus TwinN, versus 794 kg CO_2 e/T yield for 200 kgN/ha.

CONCLUSIONS

- In the treatments without TwinN, the trial demonstrated a direct relationship between yield and synthetic N applications up to 200 kgN/ha. The 250 kgN/ha treatment showed a yield decrease with no explanation for this data point.
- A similar pattern was observed in the N fertiliser plus TwinN treatments (T2) except that at 200 kgN/ha plus TwinN there was lower yield than expected from the general pattern of responses. No explanation was found for this particular data point.
- A single late application of TwinN at booting (GS45) gave a yield increase of between 7.4% and 10.3% at three of four N application rates compared to the treatments that did not receive TwinN.
- TwinN continued to add yield potential (10.3%) to crops with high applications of synthetic nitrogen (250 kgN/ha).
- The late application of TwinN at booting enables increased flexibility and potential for the use of TwinN. Growers can choose to apply TwinN later in the crop cycle when favourable season conditions exist.
- TwinN enables production of high yields with a reduced carbon footprint.