

# MGA/Wessex Water - South West Trial Site, Pilton, Shepton Mallett, Somerset 2020

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**Site**–Mixed species cover crop established September 2019 following winter cereal crop. The soil was defined, through texture assessment, as a medium loam.

A Nutrient Management Plan for the field was prepared based on the soil analysis for pH, Phosphate and Potash. No additional P & K were applied to the trial site and no organic manure was applied. The phosphate status for the field was high (>index 3), as such no additional inorganic or organic phosphate fertiliser is recommended either via the MGA or the fertiliser manual RB209.



Nitrogen recommendations for the site were calculated using the MGA Nitrogen predictor. The N predictor calculated a requirement for 135 kg N per ha.

**Drilling (Early)** – The majority of the site was drilled using the farms Vaderstad Tempo drill on 20/4/20 with drilling date being focused around soil temperature (collected by an infield sensor)

**Pre emergence trial treatments** – Pre-emergence treatments consisting of sprayed Boost / Rise P plus early nitrogen was applied on 23/4/20.

**Drilling (Late)** – The second (late) drilling of maize, at two depths, took place on 21/5/2020.

**Undersowing** – the maize was undersown, using a Weaving Drill, with two different Italian Rye Grass varieties at two different seed rates on 4/6/20. The maize was at the 4-6 leaf stage.

**Site assessment Visit** – A full trial assessment was undertaken on 27/6/20. Crop establishment was good across all treatments and significant visual differences were observed between drilling depth and drilling date trials.

**Plant DM assessment** – Oven DM testing of random sample plants was undertaken on the 14/8/20 where DM% was shown to be 26% and on 9/9/20 where whole plant DM% was calculated to be 34%

**Harvest** – Full trial harvest was undertaken using the NIAB small single row harvester on 17/9/20

## Treatments

Five trials were established on the site.

**Phosphate starter fertiliser** – Phosphate starter fertiliser applications were made with Diammonium Phosphate (DAP) drilled alongside the maize at the time of drilling at rates of 30, 60 and 125 kg of product per ha.

Table 1 Starter Phosphate Treatments included in trial

DAP (kg Product/ha)	30	60	125
P <sub>2</sub> O <sub>5</sub> / ha	14	28	58

The treatments were replicated 3 times and compared to a control where no phosphate was applied.

A spray-applied tank mix of Boost (molasses-based biostimulant) and Rise P (bacteria) was applied to the trial and replicated 3 times on 23/4/20. A second application of Boost was applied on 18/5/20. Treatments were replicated 3 times.

Table 2 Liquid treatments applied to the starter fertiliser trial.

	23/4/20	18/5/20
Boost	20/l/ha	20/l/ha
Rise P	150 gms/ha	

**Nitrogen** – four different application rates of nitrogen were compared with a zero-nitrogen treatment. Treatments were replicated 4 times.

Application rates above 50 kg/ha were split with 50 applied pre-emergence and the remainder applied post emergence.

Table 3 Five different treatments included in the Nitrogen Trial

Treatment (kgN/Ha)	0	135*	50	100	150
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\*The MGA Nitrogen Predictor indicated a requirement of 135 kg/N/ha

**Drilling Date/Depth** – Replicated (3 replicates) plots of maize were drilled at 5 cm and 10 cm deep on the early (20/4) and late (21/5) drilling dates.

**Undersowing** – Two different blends of Italian Rye Grass (IRG) were drilled at two different seed rates (5 and 10 kg seed per ha) on 4/6/2020. Each treatment was replicated 3 times.

## Results

### Phosphate starter fertiliser

Table 4 - DM% at harvest, DM yield (t/ha), Starch % and Starch Yield (t/ha) Energy (MJ/kg DM) Cell Wall Digestibility (CDW) (%) and ME Yield (1000Mj/ha) data from the starter fert trial

	DM%	DMYLD	Starch %	Starch Yield	ME	CWD	ME Yield/ha
		t/ha		t/ha		%	1000Mj/ha
Zero	37.22	16.74	37.36	6.3	11.99	59.10	201
30kg DAP/ha	36.95	16.89	35.77	6.0	11.65	56.78	197
60kg DAP/ha	36.10	16.00	36.10	5.8	11.87	58.88	190
125kg DAP/ha	36.85	16.66	37.93	6.3	11.96	58.18	199
Boost + Rise P	36.92	16.49	37.84	6.2	11.95	58.52	197
LSD	2.872	1.095					
P value	0.915	0.445					
CV%	4.1	3.5					
e.s.e.	0.881	0.336					
Residual DF	14	14					

**No significant differences in DM% at harvest or DM yield were identified.**

## Nitrogen Results

Table 5 - DM% at harvest, DM yield (t/ha), Starch % and Starch Yield (t/ha) Energy (MJ/kg DM) Cell Wall Digestibility (CDW) (%) and ME Yield (1000Mj/ha) of the different nitrogen treatments.

Treatment	DM (%)	DM YLD (t/ha)	Starch (%)	Starch Yield (t/ha)	ME (Mj/kg DM)	CWD (%)	ME Yield/ha (1000Mj/ha)
0	37.50	16.04	38.19	6.1	12.09	59.72	194
MGA	40.24	17.07	38.80	6.6	11.89	57.72	203
50 kg/ha N	38.89	17.15	38.95	6.7	12.01	58.65	206
100 kg/ha N	38.73	17.05	36.57	6.2	11.76	57.59	200
150 kg/ha N	39.29	17.40	36.01	6.3	11.70	57.54	204
LSD	2.189	0.697					
P value	0.168	0.01					
CV%	3.7	2.7					
e.s.e.	0.711	0.226					
Residual DF	19	19					

**DM Yields are all statistically different from Zero Nitrogen**  
**There is no statistical difference between treatments receiving different levels of nitrogen**

## Drilling Date and Drilling Depth

Table 6 - DM% at harvest, DM yield (t/ha), Starch % and Starch Yield (t/ha) Energy (MJ/kg DM) Cell Wall Digestibility (CDW) (%) and ME Yield (1000Mj/ha) of the drilling date and depth trial.

Treatment	DM (%)	DM YLD (t/ha)	Starch (%)	Starch Yield (t/ha)	ME (Mj/kg DM)	CWD (%)	ME Yield/ha (1000Mj/ha)
Early drilled @ 5 cm depth	34.63	15.03	34.72	5.2	11.72	57.55	176
Early drilled @ 10 cm depth	35.15	15.22	35.88	5.5	12.02	59.41	183
Late drilled @ 5 cm depth	26.52	13.07	16.15	2.1	11.07	59.04	145
Late drilled @ 10 cm depth	26.52	11.8	14.52	1.7	11.06	59.56	131
LSD	1.283	1.993					
P value	0.001	0.019					
CV%	2	6.9					
e.s.e.	0.353	0.548					
Residual DF	10	10					

**Dry Matter content (%) between Early and Late drilling are all statistically different.**

**Late drilling at 10cm deep had statistically lower DM yield than early drilling at 10 cm**

## Undersowing

Table 7 - DM% at harvest, DM yield (t/ha), Starch % and Starch Yield (t/ha) Energy (MJ/kg DM) Cell Wall Digestibility (CDW) (%) and ME Yield (1000Mj/ha) of the undersown plots

Treatment	DM (%)	DMYLD (t/ha)	Starch (%)	Starch Yield (t/ha)	ME (Mj/ha)	CWD (%)	ME Yield/ha (1000Mj/ha)
No undersowing	36.66	15.89	37.36	5.9	11.99	59.10	191
IRG Blend 5 kg/ha	36.13	16.22	36.69	5.9	12.01	59.26	195
IRG Blend 10kg/ha	37.11	16.63	37.56	6.2	12.03	58.7	200
Sprint 5 kg/ha	36.46	16.07	37.03	5.9	12.01	58.91	193
Sprint 10 kg/ha	35.95	16.26	35.78	5.8	11.89	58.44	193
LSD	2.529	0.936					
P value	0.7	0.54					
CV%	3.5	2.9					
e.s.e.	0.731	0.27					
Residual DF	11	11					

- Sprint IRG blend used as across various MGA undersowing sites in 2020

**No statistical differences in maize yield were identified between undersown and not undersown maize**

## Conclusions

- Very fertile arable field following overwintered cover crop which in turn is following winter wheat (harvest 2019)
- An even, replicated, trial was established providing confidence in consistency of results
- No significant yield or quality differences were observed in the Starter Fertiliser trial. Such a result should not be surprising bearing mind the very high phosphate status of the field.
- All treatments in the nitrogen trial yielded significantly more than the plots receiving Zero nitrogen. Trial results suggest very little difference between treatments receiving different levels of nitrogen. Crops receiving nitrogen were less mature at harvest than the zero treatments.
- The maturity at harvest (DM%) of the early drilled maize was significantly higher than that drilled late.
- The later, deep (10cm), drilled maize yielded significantly less maize than the earlier drilled crop.
- The difference in maturity (approx. 9% DM) at harvest between early and late drilling suggests that the months difference in drilling date was carried through to a month's difference in maturity at harvest.
- No statistical differences were observed between crops that were, and were not, undersown with Italian Rye Grass.

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Full Report – An electronic copy, including graphical results and photographs taken during the trial season is available from the MGA office.