

## WW17-010 Fungicide timing response monitoring in winter wheat at Morley, Sutton Scotney and Caythorpe

**Trial Code** : WW17-010

**Centre** : Morley, Sutton Scotney, Benniworth (Caythorpe)

**Crop** : Winter Wheat

**Variety** : Revelation

### Objective

To record and monitor the yield responses to each of the component spray timings within a fungicide spray programme on wheat.

### Summary

Foliar disease levels were low at all sites in 2017.

The mean yield response across three sites to a T1 + T2 spray was only 0.83 t/ha in 2017.

The mean yield response to a T0 spray was 0.14 t/ha.

The mean yield response to a T3 spray was 0.04 t/ha but this varied considerably with site.

The 31 year mean responses at Morley are T0 0.10 t/ha, T1+T2 1.87 t/ha and T3 0.34 t/ha which amount to a 2.23 t/ha response to fungicide use. The average response across all three sites was 1.01 t/ha in 2017.

Specific weights showed limited response to fungicide use but tended to increase with fungicide use at T1, T2 and T3.

### Treatments

Treatment No.	GS 30 T0	GS 32 T1	GS 39 T2	GS 65 T3	Description
	Unt	-	-	-	Untreated
2	-	Adexar + Bravo (1.0 + 1.0 l/ha)	-	-	T1 alone
3	-	-	Adexar (1.25 l/ha)	-	T2 alone
4	-	-	-	Prosaro (0.66 l/ha)	T3 alone
5	-	Adexar + Bravo (1.0 + 1.0 l/ha)	Adexar (1.25 l/ha)	-	T1 + T2
6	-	Adexar + Bravo (1.0 + 1.0 l/ha)	-	Prosaro (0.66 l/ha)	T1 + T3

Treatment No.	GS 30 T0	GS 32 T1	GS 39 T2	GS 65 T3	Description
7	-	-	Adexar (1.25 l/ha)	Prosaro (0.66 l/ha)	T2 + T3
8	-	Adexar + Bravo (1.0 + 1.0 l/ha)	Adexar (1.25 l/ha)	Prosaro (0.66 l/ha)	T1, T2 & T3
9	Cherokee (1.0 l/ha)	-	Adexar (1.25 l/ha)	Prosaro (0.66 l/ha)	T0, T2 & T3
10	Cherokee (1.0 l/ha)	Adexar + Bravo (1.0 + 1.0 l/ha)	Adexar (1.25 l/ha)	Prosaro (0.66 l/ha)	T0, T1, T2 & T3

The east site is part of a long term experiment that has run at Morley for 31 years (supported by The Morley Agricultural Foundation). The southern and northern sites are funded by NIAB TAG membership. The experiment records a snapshot of the yield response to fungicide input and spray programme components in winter wheat each year.

With regard to data interpretation, the "T1+T2" response is based on a comparison of treatments 5 and 1; the "T3" response is based on treatments 8 and 5 and the "T0" is a comparison of treatments 10 and 8.

## Results

Table 1: Disease incidence at Caythorpe, Lincs, Morley, Norfolk and Sutton Scotney in Hampshire

Disease on Untreated	Caythorpe 20/06/17	Morley 30/06/17	Sutton Scotney 03/07/17
S.tritici	10.7 Leaf 2%	Little or no disease detectable	7.3% Leaf 2
Yellow Rust	0%		0%
Brown Rust	0%		19% Leaf 1
Powdery mildew	6% Leaf 2		0%
Morley - 3% or less disease detectable on top three leaves			

Disease levels were low across all sites and particularly in the east at Morley. This was a reflection of the relatively dry conditions in spring/summer 2017.

Table 2: Yields at all sites and three site mean

	Yield Caythorpe (t/ha)	Yield Morley (t/ha)	Yield S.Scotney (t/ha)	Mean of 3 Sites (t/ha)
Untreated	6.77	10.98	9.37	9.04
T1 alone	6.90	11.03	8.65	8.86
T2 alone	7.23	11.30	10.21	9.58
T3 alone	7.01	11.47	9.07	9.18
T1+T2	7.04	11.61	10.95	9.87
T1+T3	6.94	11.64	10.33	9.64
T2+T3	6.89	11.49	10.60	9.66
T1+T2+T3	7.72	11.42	10.60	9.91

	Yield Caythorpe (t/ha)	Yield Morley (t/ha)	Yield S.Scotney (t/ha)	Mean of 3 Sites (t/ha)
T0+T2+T3	7.53	11.53	10.11	9.72
T0+T1+T2+T3	7.31	11.59	11.25	10.05
LSD	0.49	0.37	1.29	
CV%	3.97	1.87	7.45	

The three site mean yields (Table 2; Figure 1), show relatively low responses to fungicide inputs with three of nine treatments not yielding significantly differently from the untreated.

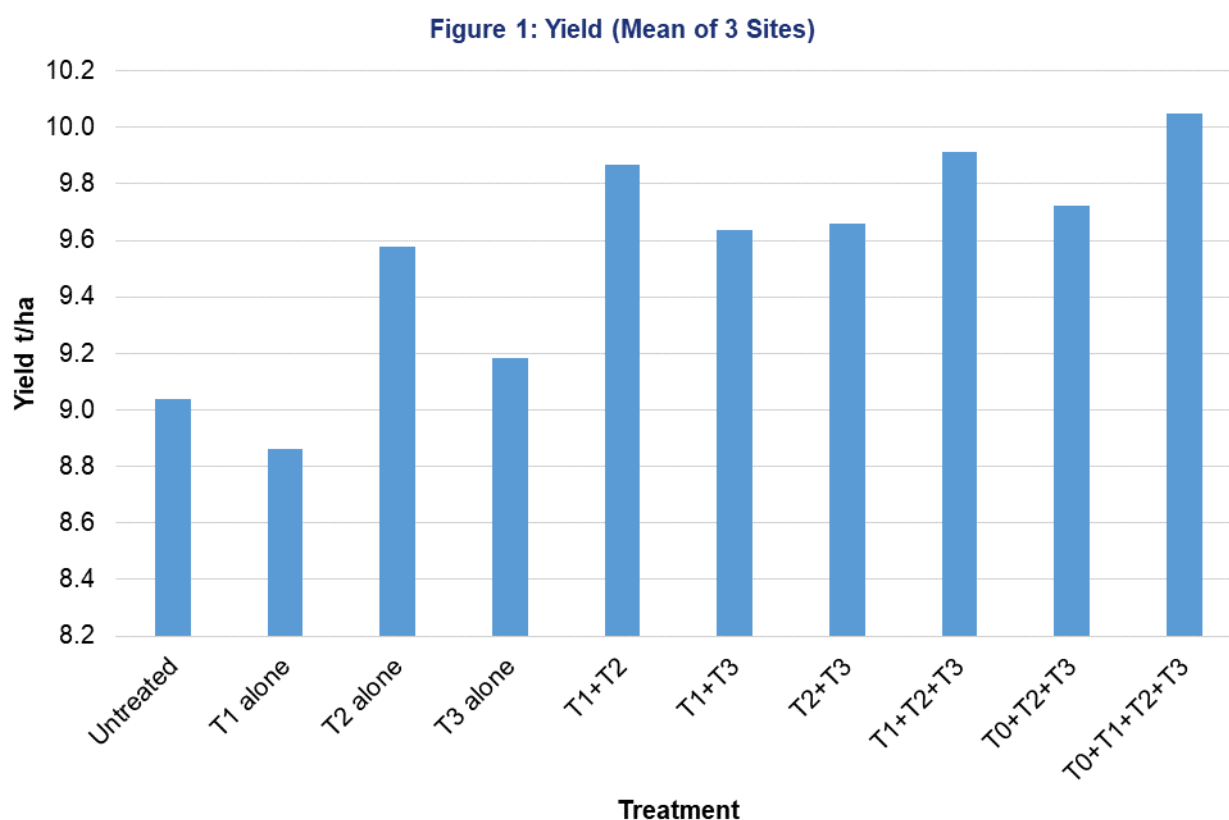


Table 3: Mean 3 site yield and output benefits from fungicide treatments

Comparison	3 Site Mean Yield Response 2017 vs Standard Programme (t/ha)	Gross Output Response in 2017/ha @ £138/t	Additional Fungicide Spend to Achieve this gross output £/ha
Benefit of T1 + T2 vs untreated	0.83	£115	£76
Benefit of T3 vs Standard T1+T2	0.04	£6	£21
Benefit of T0 vs Standard T1+T2+T3	0.14	£19	£11
Benefit of T1 alone vs untreated	0.00	£0	£37
Benefit of T2 alone vs untreated	0.54	£75	£39
Benefit of T3 alone vs untreated	0.14	£19	£21

Comparison	3 Site Mean Yield Response 2017 vs Standard Programme (t/ha)	Gross Output Response in 2017/ha @ £138/t	Additional Fungicide Spend to Achieve this gross output £/ha
LSD	0.37		

Table 3 shows a low mean responses to a standard T1 + T2 spray of less than 1 t/ha and little response from the T3 spray. The T3 spray cost more in fungicide than the return in yield. The T0 was relatively average and did return its investment..

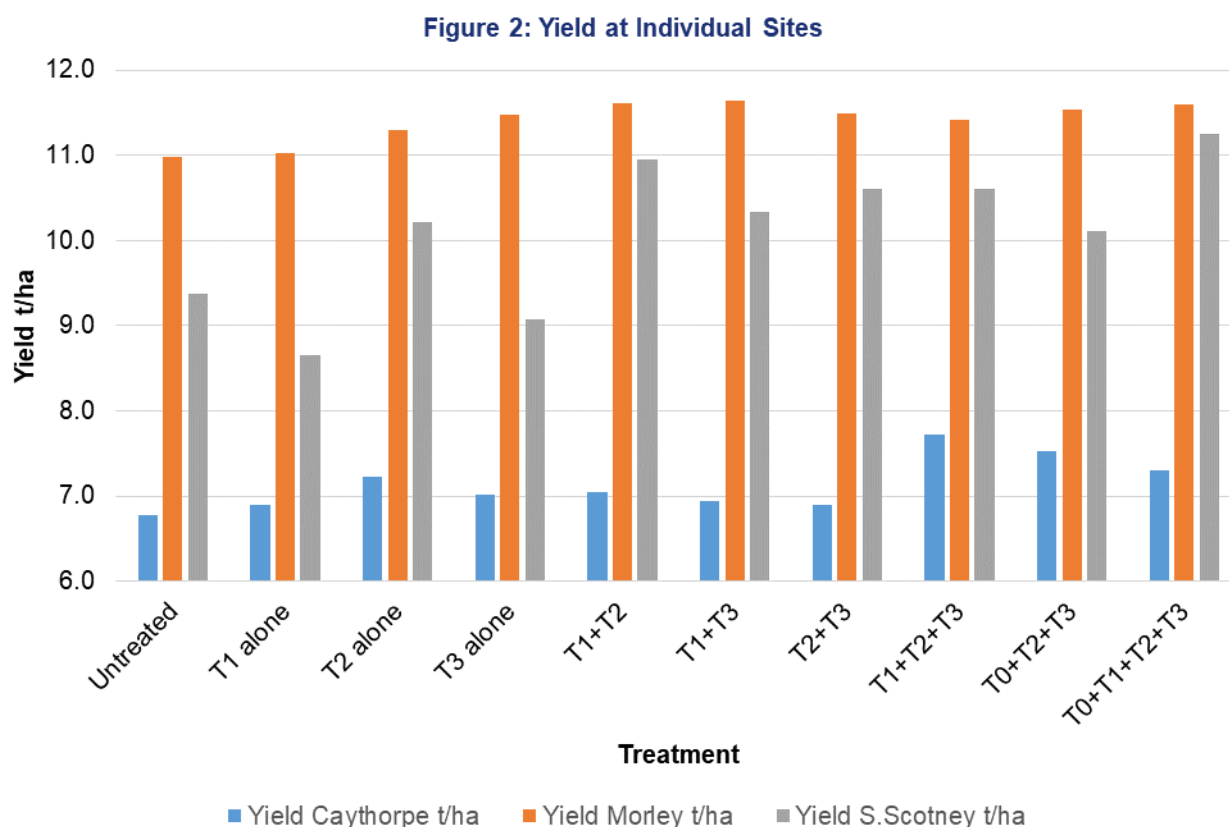


Figure 2 shows the treatment yields at each site. Responses at Caythorpe were particular low across all the treatments. Fungicide responses across all sites were low and table 4 shows the component elements.

Table 4: Component yield responses at each site

Comparison	Yield Response Caythorpe (t/ha)	Yield Response Morley (t/ha)	Yield Response S.Scotney (t/ha)
Benefit of T1 + T2 vs untreated	0.27	0.63	1.58
Benefit of T3 vs Standard T1+T2	0.68	-0.19	0.00
Benefit of T0 vs Standard T1+T2+T3	-0.41	0.17	0.65
Benefit of T1 alone vs untreated	0.13	0.05	0.00
Benefit of T2 alone vs untreated	0.46	0.32	0.84
Benefit of T3 alone vs untreated	0.24	0.49	0.00
LSD	0.49	0.37	1.29

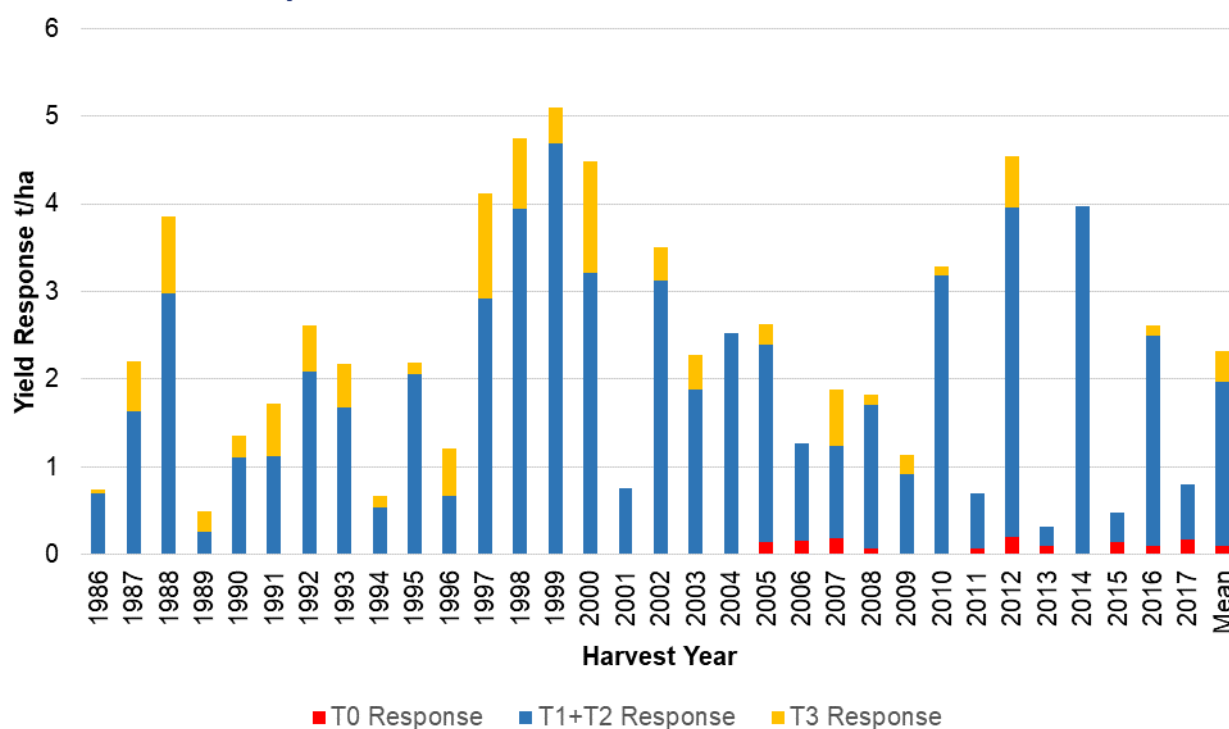
Comparison	Yield Response Caythorpe (t/ha)	Yield Response Morley (t/ha)	Yield Response S.Scotney (t/ha)
CV%	3.97	1.87	7.45

Caythorpe had a particularly high response to the T3 spray but little or no response otherwise.

Sutton Scotney had a more normal range of responses with a good response to T1 + T2 and no response to a T3. The T0 response was unusually high.

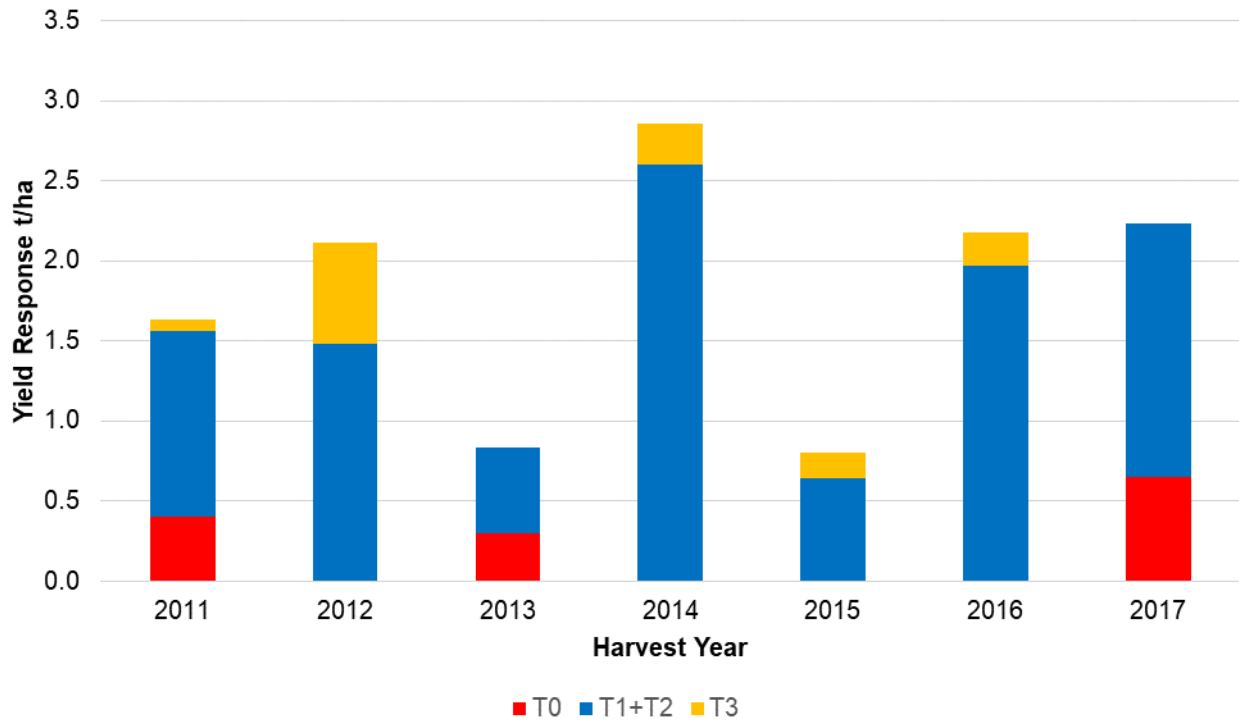
Morley had no response to the T3 and an average response to the T0. However, the response to the T1 + T2 was low reflecting the disease pressure in 2017.

**Figure 3: Long-term Fungicide Yield Response Data from Morley**  
 2017: T0 = 0.17 t/ha, T1+T2 = 0.63 t/ha, T3 = 0.0 t/ha  
 31 year mean: T0 = 0.10 t/ha, T1+T2 = 1.87 t/ha, T3 = 0.34 t/ha



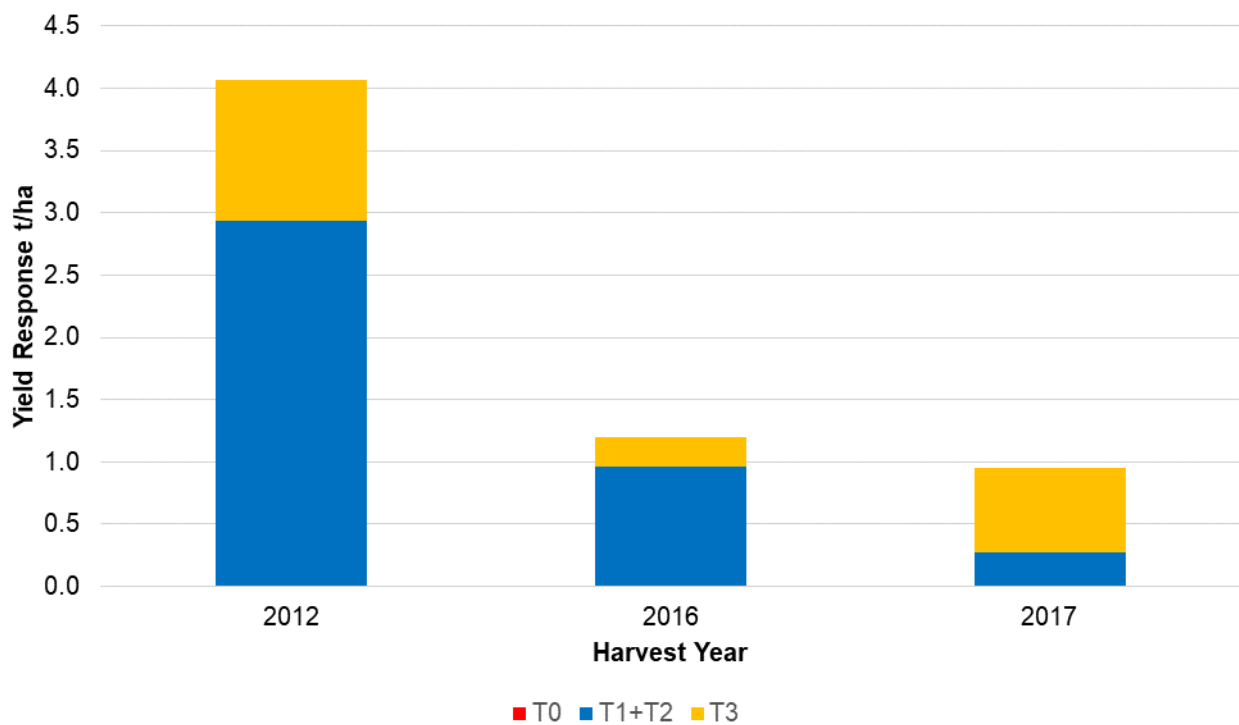
The Morley trial is in its 31st year and figure 3 compares 2017 with previous years. The 31 year mean responses are T0 0.10 t/ha, T1+ T2 1.87 t/ha and T3 0.34 t/ha which compares with the 2017 figures of T0 0.17 t/ha, T1 + T2 0.63 t/ha and T3 zero response.

**Figure 4: 7 Year Fungicide Response Data from S.Scotney**  
 2017: T0 = 0.65 t/ha, T1+T2 = 1.58 t/ha, T3 = 0.00 t/ha  
 7 Year Mean: T0 = 0.19 t/ha, T1+T2 = 1.42 t/ha, T3 = 0.19 t/ha



The trial has been running for 7 years at the Sutton Scotney site and figure 4 highlights this information. The mean responses are: T0 0.19 t/ha, T1+T2 1.42 t/ha and T3 0.19 t/ha.

**Figure 5: 3 Year Fungicide Response Data from Caythorpe**  
 2017: T0 = 0.0 t/ha, T1 + T2 = 0.27 t/ha, T3 = 0.68 t/ha  
 3 Year Mean: T0 = 0.0 t/ha, T1+T2 = 1.39 t/ha, T3 = 0.68 t/ha



At Caythorpe, (Figure 5) we have 3 years of data with a gap between 2012 and 2016. The very wet year in 2012 is starkly contrasted by the relatively low responses in 2016 and 2017. However, to date there has been no response to a T0 at this site, even in 2012.

Table 5 summarises the multi-year mean responses for all sites. Morley has the highest response to T1+T2 fungicides of all the sites. Responses to T0 are similar across the three sites but the T3 response is high at Caythorpe albeit from only 3 years including the highly responsive 2012.

Table 5: Mean multi-year yield responses at Morley, Sutton Scotney and Caythorpe

	No. of Years	T0	T1+T2	T3
Morley	31	0.10	1.87	0.34
S.Scotney	7	0.19	1.42	0.19
Caythorpe	3	0.00	1.39	0.68

Table 6: Specific weight by site and 3 site mean

	Sp Wt Caythorpe (kg/hl)	Sp. wt. Morley (kg/hl)	Sp. wt. S.Scotney (kg/hl)	Mean of 3 Sites (kg/hl)
Untreated	69.90	75.17	71.87	72.31
T1 alone	70.50	75.00	71.43	72.31
T2 alone	70.30	75.67	72.57	72.85
T3 alone	70.10	75.33	72.30	72.58
T1+T2	70.10	75.27	73.03	72.80
T1+T3	70.10	75.30	72.90	72.77
T2+T3	71.50	75.23	73.23	73.32
T1+T2+T3	71.00	75.57	73.60	73.39
T0+T2+T3	71.70	75.40	72.93	73.34
T0+T1+T2+T3	71.20	74.83	72.93	72.99
LSD	1.72	0.71	0.72	
CV%	1.08	0.55	0.58	

Table 6 and figures 6 and 7 show the specific weight responses to fungicide use. The response was very flat at Morley and relatively small at Caythorpe and larger at Sutton Scotney. Although often not significant, specific weights tended to increase with increased fungicide inputs at T1, T2 and T3 but less so at T0.

Figure 6: Specific Weight (Mean of 3 Sites)

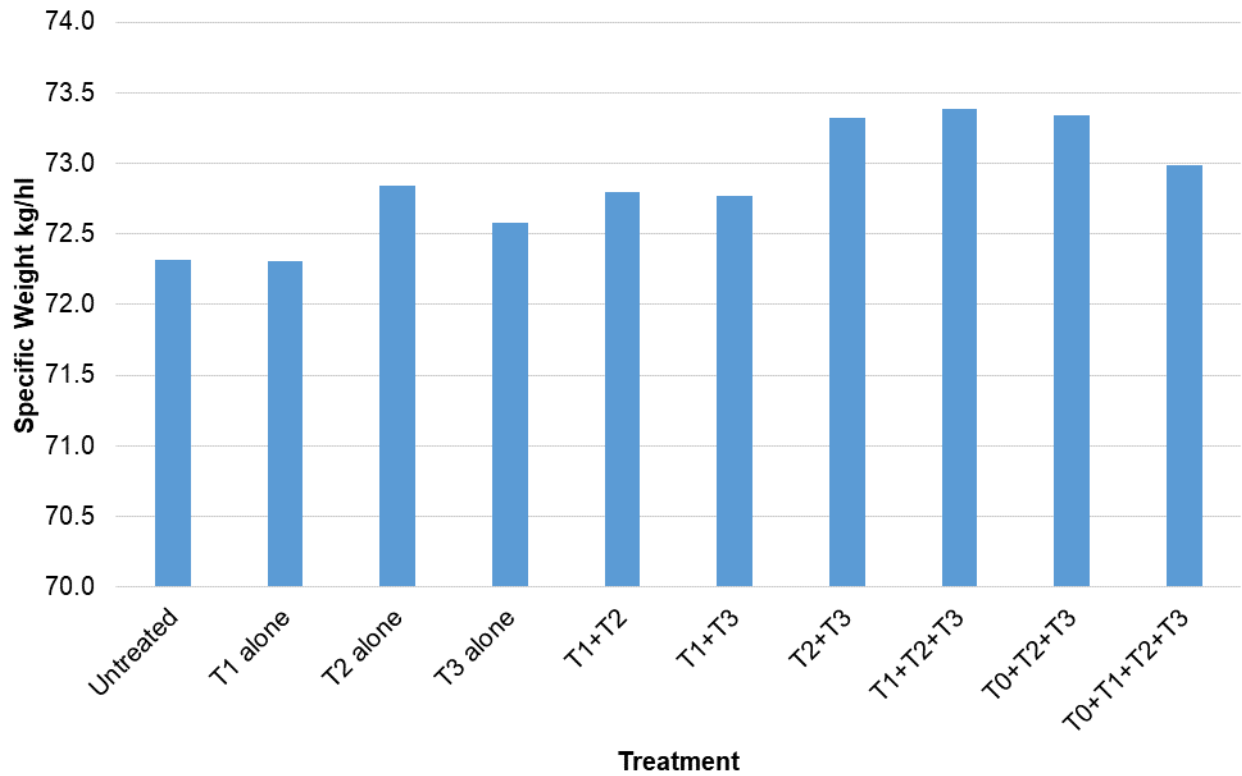
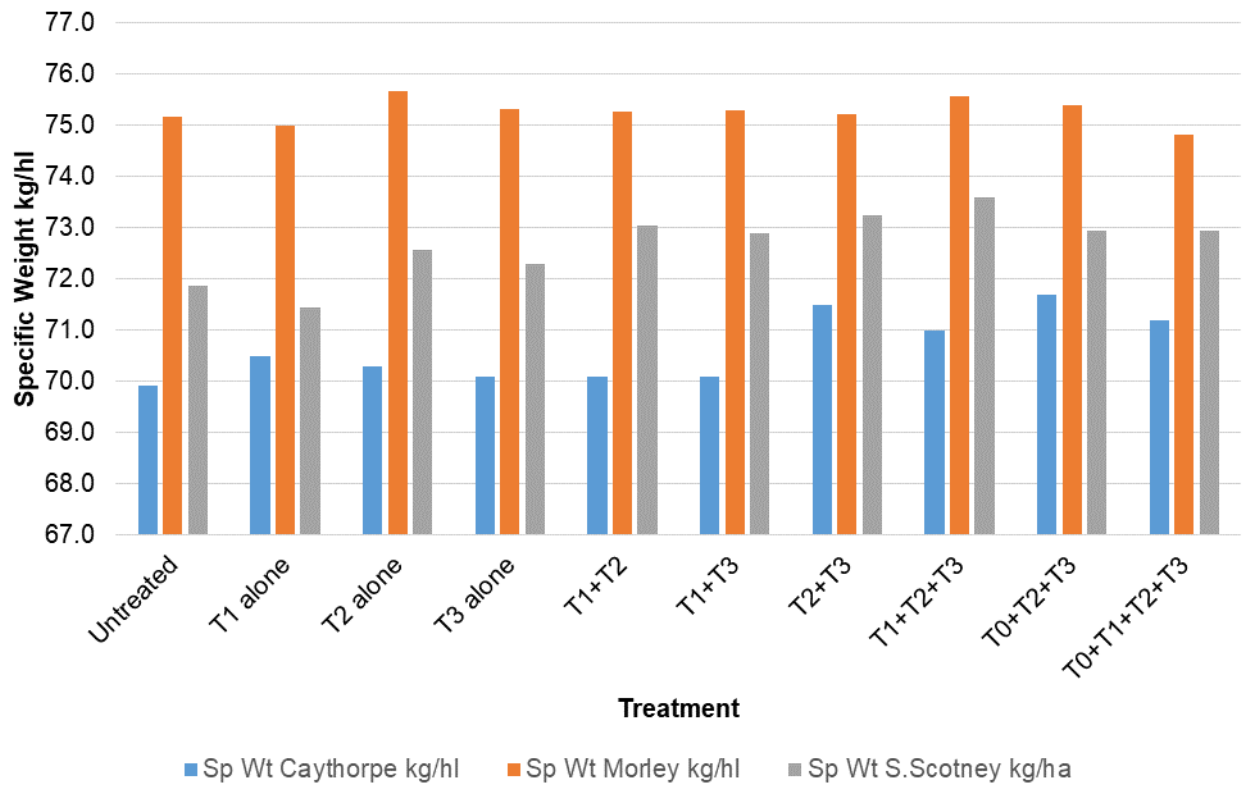


Figure 7: Specific Weight at Individual Sites



Appendix

Field details:



Trial Code	WW17-010MR	WW17-010SS	WW17-010BE
Trial Centre	Morley	Sutton Scotney	Benniworth
Trial Location	Morley	Sutton Scotney	Caythorpe
Crop	Winter Wheat	Winter Wheat	Winter Wheat
Previous Crop	Combining Peas	Winter Beans	Winter Wheat
Soil Type	Sandy Clay Loam	Sandy Silt Loam	Clay Loam
Soil Analysis	pH 7.8, OM 2.5%, 21 mgP/l, 92 mgK/l, 40 mgMg/l	pH 7.8, 38 mgP/l, 294 mgK/l, 38 mgMg/ha	pH 7.8, OM 2.7%, 29 mgP/l, 218 mgK/l, 58 mgMg/l
Soil Mineral Nitrogen	0-30cm 14 kgN/ha, 30-60cm 28 kgN/ha	10 kgN/ha	Not available
Total N/ha Applied	216 kgN/ha	240 kgN/ha	240 kgN/ha
Drill Date	11/10/16	19/10/16	06/10/16
Seed Rate	350 seeds/m <sup>2</sup>	350 seeds/m <sup>2</sup>	400 seeds/m <sup>2</sup>
Drilled Plot Size	2m x 12m	2m x 12m	2m x 12m
Replicates	3	3	3
Harvest Date	01/08/17	16/08/17	07/08/17

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