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# Results of the Classical and Other Long-term Experiments - 2017



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Classical and other  
Long-term Experiments  
2017

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## 17/R/BK/1 Broadbalk

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Results of the Classical and other Long-term Experiments 2017

17/R/BK/1 BROADBALK

**Object:** To study the effects of organic manures and inorganic fertilisers on continuous winter wheat and wheat in rotation. From 1968 two three-year rotations were included: potatoes, beans, winter wheat and fallow, winter wheat, winter wheat. In 1979 the first rotation was changed to fallow, potatoes, winter wheat. In 1980 the second rotation reverted to continuous winter wheat. Since 1985 part of the second rotation was added to the first to extend the rotation to fallow, potatoes, winter wheat, winter wheat, winter wheat. In 1996 the fallow was replaced by winter oats and potatoes replaced by maize in 1997.

The 175<sup>th</sup> year, winter wheat, winter oats and forage maize.

For previous years see 'Details' 1967 and 1973, Station Report for 1966, pp. 229-231; Station Report for 1968, Part 2; Station Report for 1982, Part 2, pp 5-44 and Yield Books for 74-16/R/BK/1.

**Areas harvested <sup>a</sup>:**

| Wheat: | Section     |         |
|--------|-------------|---------|
|        | 0           | 0.00305 |
|        | 1           | 0.00561 |
|        | 4,8,7 and 6 | 0.00463 |
|        | 9           | 0.00488 |
| Oats:  | 2           | 0.00463 |
| Maize: | 3           | 0.00189 |

<sup>a</sup> The new Haldrup combine has a slightly smaller cut width (2.0m) than the previous Sampo combine (2.1m). Consequently, from 2017 cereal yields were based on a 2.0m cut width. Maize yields are calculated using a row spacing of 0.7m. Maize yields for 2009-2016 were recalculated to account for the increase in row width from 0.6m to 0.7m in 2009. The corrected yields are given in the 2016 yield book.

**Treatments:**

In 2001 some of the treatments were changed. The treatments are now:

Whole plots

| PLOT             | Fertilizers and organic manures |                                  |
|------------------|---------------------------------|----------------------------------|
|                  | Treatments                      |                                  |
|                  | Plot                            | From 2001                        |
| 01 (FYM)N4       | 01                              | N4                               |
| 21FYMN3          | 2.1                             | FYM N2 <sup>(1)</sup>            |
| 22FYM            | 2.2                             | FYM                              |
| 03Nil            | 03                              | None                             |
| 05(P)KMg         | 05                              | (P) K Mg                         |
| 06N1 (P) KMg     | 06                              | N1 (P) K Mg                      |
| 07N2(P)KMg       | 07                              | N2 (P) K Mg                      |
| 08N3(P)KMg       | 08                              | N3 (P) K Mg                      |
| 09N4(P)KMg       | 09                              | N4 (P) K Mg                      |
| 10N4             | 10                              | N4                               |
| 11N4PMg          | 11                              | N4 P Mg                          |
| 12N1+3+1(P)K2Mg2 | 12                              | N1+3+1 (P) K2 Mg2 <sup>(2)</sup> |
| 13N4PK           | 13                              | N4 P K                           |
| 14N4PK*(Mg*)     | 14                              | N4 P K* (Mg*)                    |
| 15N5(P)KMg       | 15                              | N5 (P) K Mg                      |

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|              |    |               |
|--------------|----|---------------|
| 16N6(P)KMg   | 16 | N6 (P) K Mg   |
| 17N1+4+1PKMg | 17 | N1+4+1 P K Mg |
| 18N1+2+1PKMg | 18 | N1+2+1 P K Mg |
| 19N1+1+1KMg  | 19 | N1+1+1 K Mg   |
| 20N4KMg      | 20 | N4 K Mg       |

- (1) FYM N3 since 2005  
 (2) N1+3+1 (P) KMg since 2006

Winter oats; Nitrogen and farmyard manure were not applied.

N1, N2, N3, N4, N5, N6: 48, 96, 144, 192, 240, 288 kg N as 33.5% N; to be applied at the same time as the second dressings in the split nitrogen plots for wheat and to the seedbed for forage maize.

Split N to wheat

N1+1+1, 1+2+1 etc: Rates as above. Timings: first two weeks of March, GS31 or mid-April (whichever comes first) and GS37/mid-May.

Split N to forage maize

N2+1, 2+2, 2+3,2+4: Rates as above. Timings: to the seedbed and post-emergence.

P: 35 kg P as triple superphosphate

(P): (none since 2001), to be reviewed in 2018/19.

K: 90 kg K as potassium sulphate.

K2: 180 kg K as potassium sulphate (plus 450 kg K autumn 2000 only)

K\*: 90 kg K as potassium chloride

Mg: 12 kg Mg as kieserite.

Mg2: 24 kg Mg as kieserite (plus 60kg Mg, autumn 2000 only).

(Mg\*): (none since 2001), to be reviewed in 2018/19

FYM: Farmyard manure at 35 t

**Previous treatment:**

Whole plots

| PLOT    | Plot | Fertilizers and organic manures:- |                      |                             |
|---------|------|-----------------------------------|----------------------|-----------------------------|
|         |      | Treatments until 1967             | Treatments from 1968 | Treatments from 1985 – 2000 |
| 01DN4PK | 01   | -                                 | D N2 P K             | D N4 P K                    |
| 21DN2   | 21   | D                                 | D N2                 | D N2                        |
| 22D     | 22   | D                                 | D                    | D                           |
| 030     | 03   | None                              | None                 | None                        |
| 05F     | 05   | P K Na Mg                         | P K (Na) Mg          | PK Mg                       |
| 06N1F   | 06   | N1 P K Na Mg                      | N1 P K (Na) Mg       | N1 P K Mg                   |
| 07N2F   | 07   | N2 P K Na Mg                      | N2 P K (Na) Mg       | N2 P K Mg                   |
| 08N3F   | 08   | N3 P K Na Mg                      | N3 P K (Na) Mg       | N3 P K Mg                   |
| 09N4F   | 09   | N*1 P K Na Mg                     | N4 P K (Na) Mg       | N4 P K Mg                   |
| 10N2    | 10   | N2                                | N2                   | N2                          |
| 11N2P   | 11   | N2 P                              | N2 P                 | N2 P                        |
| 12N2PNA | 12   | N2 P Na                           | N2 P Na              | N2 P Na                     |
| 13N2PK  | 13   | N2 P K                            | N2 P K               | N2 P K                      |

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|          |    |               |                   |                     |
|----------|----|---------------|-------------------|---------------------|
| 14N2PKMG | 14 | N2 P Mg       | N2 P K Mg         | N2 P K Mg           |
| 15N5F    | 15 | N2 P K Na Mg  | N3 P K(Na) Mg     | N5 P K Mg           |
| 16N6F    | 16 | N*2 P K Na Mg | N2 P K (Na) Mg    | N6 P K Mg           |
| 17N1+3FH | 17 | N2 (A)        | N2 ½[P K (Na) Mg] | N1+3 ½[P K Mg] (A)+ |
| 18N0+3FH | 18 | P K Na Mg (A) | N2 ½[P K (Na) Mg] | N0+3 ½[P K Mg] (A)+ |
| 19(C)    | 19 | C             | C                 | (C) (since 1989)    |
| 20N2KMG  | 20 | N2 K Na Mg    | N2 K (Na) Mg      | N2 K Mg             |

(A) Alternating each year

+ This change since 1980. Treatments shown are those to winter wheat; autumn N alternates. Maize received N3 ½[PK Mg] on both plots 17 and 18. These treatments shown incorrectly in 1999-2002 Yield books.

Winter oats; Nitrogen and dung were not applied.

N1, N2, N3, N4, N5, N6: 48, 96, 144, 192, 240, 288 kg N as sulphate of ammonia until 1967, except N\* which was nitrate of soda. All as 'Nitro-Chalk' in spring from 1968 to 1985, as 34.5% N since 1986.

N0+3; N1+3: None in autumn + 144 kg N in spring; 48 kg N in autumn + 144 kg N in spring.

P: 35 kg P as triple superphosphate in 1974 and since 1988, single superphosphate in other years

K: 90 kg K as sulphate of potash

Na: 55 kg Na as sulphate of soda

(Na): 16 kg Na as sulphate of soda until 1973

Mg: 30kg Mg annually to Plot 14 (applied at 26 kg 1990 to 2000), 35 kg Mg every third year to other plots since 1974 (applied at 30 kg in 1991, 1994, 1997 and 2000 and at 15 kg on half rate treatments). All as kieserite since 1974, previously as sulphate of magnesia annually.

D: Farmyard manure at 35 t

(C): Castor meal to supply 96 kg N until 1988, none since

F: Full rate P K (Na) Mg as above

H: Half rate of above.

Strips of sub-plots: Until 1967 wheat alone was grown on the experiment, with some bare fallowing. From 1968, the experiment was divided into 10 sections with the following cropping:

**SECTION**

| Section | 1 | 9 | 0* | 8+ | 6** | 5 | 3 | 7  | 4  | 2  |
|---------|---|---|----|----|-----|---|---|----|----|----|
| Year    |   |   |    |    |     |   |   |    |    |    |
| 1968    | W | W | W  | W  | F   | W | W | P  | W  | BE |
| 1969    | W | W | W  | W  | W   | F | W | BE | P  | W  |
| 1970    | W | W | W  | W  | W   | W | F | W  | BE | P  |
| 1971    | W | W | W  | W  | F   | W | W | P  | W  | BE |
| 1972    | W | W | W  | F  | W   | F | W | BE | P  | W  |
| 1973    | W | W | W  | W  | W   | W | F | W  | BE | P  |
| 1974    | W | W | W  | W  | F   | W | W | P  | W  | BE |
| 1975    | W | W | W  | W  | W   | F | W | BE | P  | W  |
| 1976    | W | W | W  | W  | W   | W | F | W  | BE | P  |

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| Section            | 1 | 9 | 0* | 8+ | 6** | 5 | 3 | 7  | 4 | 2  |
|--------------------|---|---|----|----|-----|---|---|----|---|----|
| Year               |   |   |    |    |     |   |   |    |   |    |
| 1977               | W | W | W  | W  | F   | W | W | P  | W | BE |
| 1978               | W | W | W  | W  | W   | F | W | BE | P | W  |
| 1979               | W | W | W  | W  | W   | W | F | W  | P | F  |
| 1980               | W | W | W  | W  | W   | W | W | F  | W | P  |
| 1981               | W | W | W  | F  | W   | W | W | P  | F | W  |
| 1982               | W | W | W  | W  | W   | W | W | W  | P | F  |
| 1983               | W | W | W  | W  | W   | W | W | F  | W | P  |
| 1984               | W | W | W  | W  | W   | W | W | P  | F | W  |
| 1985               | W | W | W  | W  | W   | F | W | W  | P | W  |
| 1986               | W | W | W  | W  | W   | P | F | W  | W | W  |
| 1987               | W | W | W  | W  | W   | W | P | W  | W | F  |
| 1988               | W | W | W  | F  | W   | W | W | F  | W | P  |
| 1989               | W | W | W  | W  | W   | W | W | P  | F | W  |
| 1990               | W | W | W  | W  | W   | F | W | W  | P | W  |
| 1991               | W | W | W  | W  | W   | P | F | W  | W | W  |
| 1992               | W | W | W  | W  | W   | W | P | W  | W | F  |
| 1993               | W | W | W  | W  | W   | W | W | F  | W | P  |
| 1994               | W | W | W  | F  | W   | W | W | P  | F | W  |
| 1995               | W | W | W  | W  | W   | F | W | W  | P | W  |
| 1996               | W | W | W  | W  | W   | P | O | W  | W | W  |
| 1997               | W | W | W  | W  | W   | W | M | W  | W | O  |
| 1998               | W | W | W  | W  | W   | W | W | O  | W | M  |
| 1999               | W | W | W  | W  | W   | W | W | M  | O | W  |
| 2000               | W | W | W  | W  | W   | O | W | W  | M | W  |
| 2001               | W | W | W  | F  | W   | M | O | W  | W | W  |
| 2002               | W | W | W  | W  | W   | W | M | W  | W | O  |
| 2003               | W | W | F  | W  | W   | W | W | O  | W | M  |
| 2004               | W | W | F  | W  | W   | W | W | M  | O | W  |
| 2005               | W | W | W  | W  | W   | O | W | W  | M | W  |
| 2006               | W | W | W  | W  | W   | M | O | W  | W | W  |
| 2007               | W | W | W  | W  | W   | W | M | W  | W | O  |
| 2008               | W | W | W  | F  | W   | W | W | O  | W | M  |
| 2009               | W | W | W  | W  | W   | W | W | M  | O | W  |
| 2010               | W | W | W  | W  | W   | O | W | W  | M | W  |
| 2011               | W | W | W  | W  | W   | M | O | W  | W | W  |
| 2012               | W | W | W  | W  | W   | W | M | W  | W | O  |
| 2013               | W | W | W  | W  | W   | W | W | O  | W | M  |
| 2014               | W | W | W  | W  | W   | W | W | M  | O | W  |
| 2015 <sup>++</sup> | W | W | W  | F  | W   | O | W | W  | M | W  |
| 2016               | W | W | W  | F  | W   | M | O | W  | W | W  |
| 2017               | W | W | W  | W  | W   | W | M | W  | W | O  |

W = winter wheat, O = winter oats (spring oats 2001), P = potatoes, BE = spring beans, F = fallow, M = forage maize

\* Straw incorporated since autumn 1986. \*\* No sprays except weedkillers since 1985.

+ No weedkillers.

<sup>++</sup> Spring Wheat in 2015

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### NOTES:

- (1) For a fuller record of treatments see 'Details' etc.
- (2) From autumn 1975 to autumn 1986, chalk was applied at 2.9t each autumn to all plots in sets of Sections on a three-year cycle. Year 1: Sections 1, 2, 3. Year 2: Sections 6, 7, 8, 9. Year 3: Sections 0, 4, 5. From autumn 1988 until autumn 1992 a five-year cycle was used. Year 1: Sections 1, 3. Year 2: Sections 2, 8. Year 3: Sections 7, 9. Year 4: Sections 4, 6. Year 5: Sections 0, 5 (omitted). No chalk was applied after autumn 1991 until autumn 2007 when differential amounts were applied to selected plots (see "Results 2008"). Chalk was applied again to selected plots in autumn 2013, see 14/R/BK/1 diary information.
- (3) In 2003 and 2004 section 0 was used for an experiment (CS/595) investigating different herbicides to control *Equisetum arvense*.
- (4) In 2013 the wheat variety changed from Hereward to Crusoe, but it was sown very late (22<sup>nd</sup> February 2013) because of the very wet autumn and winter of 2012-13.
- (5) Spring wheat (var Mulika) and winter oats (var Gerald) were sown in March 2015, instead of in autumn/winter 2014, because the very wet soil conditions in autumn 2014 prevented sowing of a winter crop. The whole site was spring-tine cultivated in March 2015 instead of being ploughed. Section 8 was left in bare fallow in 2015 & 2016 and had two in-season cultivations (inversion ploughing) each year to control weeds.

### 17/R/BK/1 Experimental Diary:

| Date                | Application  | Rate | Units |
|---------------------|--|------|-------|
| <b>All Sections</b> |  |      |       |
| 20/09/2016          | a Batwing Topped   | -    | -     |
| 26/09/2016          | f Applied TSP - to strips 18, 17, 14, 13 + 11  | 171  | kg/ha |
| 26/09/2016          | f Applied MOP - to strip 14  | 181  | kg/ha |
| 27/09/2016          | a Started Ploughing - Thrown South   | -    | -     |
| 06/10/2016          | a Cultipressed All Ground  | -    | -     |
| 10/10/2016          | a Ring Rolled all field  | -    | -     |
| 12/10/2016          | a Ring Rolled  | -    | -     |
| 08/11/2016          | f Applied Major Slug Pellets   | 5    | kg/ha |
| 21/03/2017          | f Applied Kieserite - to strips 5, 6, 7, 8, 9, 11, 12, 15, 16, 17, 18, 19 + 20; All Sections | 80   | kg/ha |
| 29/03/2017          | f Applied SOP - to strips 5, 6, 7, 8, 9, 11, 12, 15, 16, 17, 18, 19 + 20; All Sections       | 217  | kg/ha |
| 11/04/2017          | a Flexitined surrounding fallow areas  | -    | -     |
| 05/06/2017          | a Cut out all paths  | -    | -     |
| 26/06/2017          | a cut all paths  | -    | -     |
| 27/07/2017          | a cut all paths  | -    | -     |
| 25/08/2017          | a Harvested paths  | -    | -     |
| 29/08/2017          | a Baled all discard and remaining swaths   | -    | -     |
| 07/09/2017          | a Baled all remaining commercial swath   | -    | -     |
| 07/09/2017          | a Completed Straw Weights  | -    | -     |

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**W Wheat**

|            |   |  |      |                      |
|------------|---|--|------|----------------------|
| 27/09/2016 | f | Applied FYM - to strips 2.1, 2.2 excluding Section 2   | 35   | t/ha                 |
| 11/10/2016 | s | Drilled WW Crusoe trt Redigo Pro + Deter; Sections 0, 1, 4, 5, 6, 7, 8 + 9                         | 350  | seeds/m <sup>2</sup> |
| 13/10/2016 | p | Sprayed Liberator  | 1    | lt/ha                |
| 13/10/2016 | p | Sprayed Defy   | 3    | lt/ha                |
| 14/03/2017 | f | Applied Nitram @ 34.5%N - to strips 12, 17, 18 + 19 excluding Sections 2 and 3                     | 139  | kg/ha                |
| 15/03/2017 | p | Sprayed Pacifica - Sections 0, 1, 4, 5, 6, 7 + 9 only  | 500  | g/ha                 |
| 15/03/2017 | p | Sprayed Chex - Sections 0, 1, 4, 5, 6, 7 + 9 only  | 250  | ml/ha                |
| 15/03/2017 | p | Sprayed Bio Power - Sections 0, 1, 4, 5, 6, 7 + 9 only   | 1    | lt/ha                |
| 05/04/2017 | p | Sprayed Artemis - Sections 0, 1, 4, 5, 7, 8 + 9 only   | 1    | lt/ha                |
| 05/04/2017 | p | Sprayed Claw500 - Sections 0, 1, 4, 5, 7, 8 + 9 only   | 51   | lt/ha                |
| 05/04/2017 | p | Sprayed Moddus - Sections 0, 1, 4, 5, 7, 8 + 9 only  | 125  | ml/ha                |
| 05/04/2017 | p | Sprayed 3c Chlormewuat750 - Sections 0, 1, 4, 5, 7, 8 + 9 only                                     | 1.25 | lt/ha                |
| 07/04/2017 | f | Applied Nitram @ 34.5%N - to strip 19; Sections 0, 1, 4, 5, 6, 7, 8 + 9                            | 139  | kg/ha                |
| 07/04/2017 | f | Applied Nitram @ 34.5%N - to strips 7, 18; Sections 0, 1, 4, 5, 6, 7, 8 + 9                        | 278  | kg/ha                |
| 07/04/2017 | f | Applied Nitram @ 34.5%N - to strips 2.1, 8, 12; Sections 0, 1, 4, 5, 6, 7, 8 + 9                   | 417  | kg/ha                |
| 07/04/2017 | f | Applied Nitram @ 34.5%N - to strips 1, 9, 10, 11, 13, 14, 17, 20; Sections 0, 1, 4, 5, 6, 7, 8 + 9 | 556  | kg/ha                |
| 07/04/2017 | f | Applied Nitram @ 34.5%N - to strips 15; Sections 0, 1, 4, 5, 6, 7, 8 + 9                           | 696  | kg/ha                |
| 07/04/2017 | f | Applied Nitram @ 34.5%N - to strips 16; Sections 0, 1, 4, 5, 6, 7, 8 + 9                           | 835  | kg/ha                |
| 25/04/2017 | p | Sprayed Keystone - Sections 0, 1, 4, 5, 7, 8 + 9   | 600  | ml/ha                |
| 25/04/2017 | p | Sprayed Epic - Sections 0, 1, 4, 5, 7, 8, + 9  | 400  | ml/ha                |
| 25/04/2017 | p | Sprayed Balear 720 - Sections 0, 1, 4, 5, 7, 8, + 9  | 700  | ml/ha                |
| 08/05/2017 | f | Applied Nitram - to strips 12, 17, 18, 19; Sections 0, 1, 4, 5, 6, 7, 8 + 9                        | 139  | kg/ha                |
| 25/05/2017 | p | Sprayed, Cortez - sections, 0, 1, 4, 5, 7, 8, + 9  | 350  | ml/ha                |
| 25/05/2017 | p | Sprayed, Vortex - sections, 0, 1, 4, 5, 7, 8, + 9  | 1    | lt/ha                |
| 19/06/2017 | p | Sprayed, Fezan, (Tebuconazole)- Sections, 0, 1, 4, 5, 7, 8, + 9                                    | 750  | ml/ha                |

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|            |   |  |   |   |
|------------|---|--|---|---|
| 28/08/2017 | a | harvested all WW plots for grain yield               | - | - |
| 29/08/2017 | a | Chopped Straw using Claas Tucano back onto Section 0 | - | - |
| 02/09/2017 | a | Straw Weights on Sections 8 & 5                      | - | - |
| 07/09/2017 | a | Straw Weights on Sections 1                          | - | - |

**W Oats**

|            |   |  |     |                      |
|------------|---|--|-----|----------------------|
| 11/10/2016 | a | Drilled Mascani trt Beret Gold; Section 2 only | 350 | seeds/m <sup>2</sup> |
| 08/11/2016 | p | Sprayed Excalibur - Section 2 only             | 180 | gm/ha                |
| 08/11/2016 | p | Sprayed Hallmark - Section 2 only              | 50  | ml/ha                |
| 10/05/2017 | p | Sprayed Cyflamid - Section 2 only              | 150 | ml/ha                |
| 10/05/2017 | p | Sprayed Envoy - Section 2 only                 | 1   | lt/ha                |
| 10/05/2017 | p | Sprayed Stabilan - Section 2 only              | 2   | lt/ha                |
| 28/08/2017 | a | harvested all OW plots for grain yield         | -   | -                    |
| 07/09/2017 | a | Straw Weights on Sections 2                    | -   | -                    |

**Maize**

|            |   |  |     |                      |
|------------|---|--|-----|----------------------|
| 27/09/2016 | f | Applied FYM - to strips 2.1, 2.2; Not Section 2                              | 35  | t/ha                 |
| 12/04/2017 | a | Drilled Severus Maize trt Mesurol - Section 3 only                           | 10  | seeds/m <sup>2</sup> |
| 08/05/2017 | f | Applied Nitram @ 34.5%N - to strip 19; Section 3 only                        | 139 | kg/ha                |
| 08/05/2017 | f | Applied Nitram @ 34.5%N - to strips 7, 18; Section 3 only                    | 278 | kg/ha                |
| 08/05/2017 | f | Applied Nitram @ 34.5%N - to 2.1, 8, 12; Section 3 only                      | 417 | kg/ha                |
| 08/05/2017 | f | Applied Nitram @ 34.5%N - to strips 1, 9, 10, 11, 13, 14, 17; Section 3 only | 556 | kg/ha                |
| 08/05/2017 | f | Applied Nitram @ 34.5%N - to strips 15; Section 3 only                       | 696 | kg/ha                |
| 08/05/2017 | f | Applied Nitram @ 34.5%N - to strips 16; Section 3 only                       | 835 | kg/ha                |
| 24/05/2017 | f | Applied Nitram @ 34.5%N - to strip 19; Section 3 only                        | 139 | kg/ha                |
| 24/05/2017 | f | Applied Nitram @ 34.5%N - to strip 18; Section 3 only                        | 278 | kg/ha                |
| 24/05/2017 | f | Applied Nitram @ 34.5%N - to strip 12; Section 3 only                        | 417 | kg/ha                |
| 24/05/2017 | f | Applied Nitram @ 34.5%N - to strip 17; Section 3 only                        | 556 | kg/ha                |
| 12/06/2017 | p | Sprayed Samson Extra - Section 3 only  | 750 | ml/ha                |
| 12/06/2017 | p | Sprayed Callisto - Section 3 only  | 2   | lt/ha                |
| 14/09/2017 | a | Harvested Maize for Yield - Section 3 only                                   | -   | -                    |
| 15/09/2017 | a | Cut all remaining maize – Section 3 only                                     | -   | -                    |
| 19/09/2017 | a | Baled and removed maize – Section 3 only                                     | -   | -                    |



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### Wilderness

20/12/2016 a Topped Broadbalk wilderness

NOTE: Samples of grain and straw were taken for chemical analysis. Unground grain and straw samples from selected treatments were archived.

### YIELDS

#### WINTER WHEAT

Grain Tonnes/Hectare (85% DM)

*Tables of means*

| Section Plot     | 5/W1  | 4/W2 | 7/W3 | 6/W40 | 0/W13 | 1/W51 | 9/W59 | 8/W1 | Mean |
|------------------|-------|------|------|-------|-------|-------|-------|------|------|
| 01 (FYM) N4      | 9.94  | 7.83 | 5.67 | 5.36  | -     | -     | -     | -    | 7.20 |
| 21 FYM N3        | 10.49 | 9.51 | 6.43 | 5.78  | 4.48  | 4.61  | 7.12  | 5.00 | 6.68 |
| 22 FYM           | 7.10  | 6.40 | 6.37 | 6.48  | 4.34  | 4.63  | 6.37  | 6.18 | 5.98 |
| 03 NIL           | 2.27  | 1.00 | 1.26 | 1.54  | 0.74  | 0.68  | 0.44  | 3.26 | 1.40 |
| 05 (P) KMg       | 2.00  | 1.20 | 1.78 | 1.38  | 1.13  | 0.96  | 0.97  | 5.44 | 1.86 |
| 06 N1 (P) KMg    | 4.29  | 2.77 | 3.02 | 3.28  | 2.11  | 2.13  | 3.43  | 5.40 | 3.30 |
| 07 N2 (P) KMg    | 6.53  | 4.12 | 3.55 | 4.25  | 2.67  | 2.57  | 4.03  | 5.05 | 4.09 |
| 08 N3 (P) KMg    | 8.09  | 4.75 | 3.76 | 4.76  | 3.85  | 2.98  | 4.96  | 6.42 | 4.95 |
| 09 N4 (P) KMg    | 9.06  | 5.88 | 4.04 | 5.88  | 3.20  | 2.69  | 3.96  | 7.82 | 5.32 |
| 10 N4            | 7.35  | 2.04 | 3.00 | 2.95  | 1.81  | 1.35  | 2.48  | 3.15 | 3.02 |
| 11 N4 PMg        | 7.67  | 5.46 | 3.01 | 4.44  | 3.34  | 2.37  | 3.07  | 4.39 | 4.22 |
| 12N1+3+1 (P) KMg | 10.38 | 7.85 | 5.39 | 6.39  | 4.18  | 3.72  | 5.46  | 7.04 | 6.30 |
| 13 N4 PK         | 9.22  | 4.90 | 3.96 | 5.97  | 3.71  | 2.49  | 4.94  | 5.66 | 5.11 |
| 14 N4 PK* (Mg*)  | 8.69  | 5.10 | 4.42 | 6.51  | 4.55  | 4.15  | 5.51  | 6.79 | 5.71 |
| 15 N5 (P) KMg    | 9.82  | 4.88 | 4.78 | 6.32  | 3.68  | 3.60  | 4.39  | 5.30 | 5.35 |
| 16 N6 (P) KMg    | 10.41 | 7.02 | 4.88 | 6.91  | 4.62  | 4.16  | 4.26  | 4.61 | 5.86 |
| 17 N1+4+1PKMg    | 10.64 | 8.23 | 5.12 | 7.12  | 4.90  | 4.42  | 6.03  | 2.53 | 6.13 |
| 18 N1+2+1PKMg    | 8.89  | 5.86 | 4.46 | 5.56  | 4.30  | 3.51  | 4.89  | 3.19 | 5.08 |
| 19 N1+1+1KMg     | 7.55  | 3.56 | 5.30 | 3.83  | 3.88  | 3.09  | 5.27  | 3.86 | 4.54 |
| 20 N4 KMg        | -     | -    | -    | -     | 0.81  | 0.37  | -     | -    | 0.59 |
| Mean             | 7.92  | 5.18 | 4.22 | 4.99  | 3.28  | 2.87  | 4.31  | 5.06 | 4.73 |
| Grain Mean DM%   | 88.0  |      |      |       |       |       |       |      |      |

Results of the Classical and other Long-term Experiments 2017

Straw Tonnes/Hectare

*Tables of means*

| Section<br>Plot  | 5/W1  | 4/W2 | 7/W3 | 6/W40 | 0/W13 | 1/W51 | 9/W59 | 8/W1 | Mean |
|------------------|-------|------|------|-------|-------|-------|-------|------|------|
| 01 (FYM) N4      | 4.05  | -    | -    | -     | -     | -     | -     | -    | 4.05 |
| 21 FYM N3        | 5.18  | -    | -    | -     | -     | 2.98  | -     | 3.23 | 3.80 |
| 22 FYM           | 3.21  | -    | -    | -     | -     | 2.63  | -     | 5.51 | 3.79 |
| 03 NIL           | 0.54  | -    | -    | -     | -     | 0.50  | -     | 2.06 | 1.03 |
| 05 (P) KMg       | 0.36  | -    | -    | -     | -     | 0.54  | -     | 4.04 | 1.65 |
| 06 N1 (P) KMg    | 0.92  | -    | -    | -     | -     | 0.96  | -     | 4.42 | 2.10 |
| 07 N2 (P) KMg    | 1.53  | -    | -    | -     | -     | 1.43  | -     | 4.07 | 2.35 |
| 08 N3 (P) KMg    | 2.02  | -    | -    | -     | -     | 1.45  | -     | 4.87 | 2.78 |
| 09 N4 (P) KMg    | 2.38  | -    | -    | -     | -     | 1.30  | -     | 4.85 | 2.84 |
| 10 N4            | 1.72  | -    | -    | -     | -     | 1.01  | -     | 2.37 | 1.70 |
| 11 N4 PMg        | 1.80  | -    | -    | -     | -     | 1.52  | -     | 3.79 | 2.37 |
| 12N1+3+1 (P) KMg | 3.50  | -    | -    | -     | -     | 2.40  | -     | 5.20 | 3.70 |
| 13 N4 PK         | 2.42  | -    | -    | -     | -     | 1.36  | -     | 4.40 | 2.72 |
| 14 N4 PK* (Mg*)  | 2.19  | -    | -    | -     | -     | 2.03  | -     | 4.81 | 3.01 |
| 15 N5 (P) KMg    | 3.63  | -    | -    | -     | -     | 2.33  | -     | 4.46 | 3.47 |
| 16 N6 (P) KMg    | 4.60  | -    | -    | -     | -     | 2.98  | -     | 4.97 | 4.18 |
| 17 N1+4+1PKMg    | 5.20  | -    | -    | -     | -     | 2.61  | -     | 4.78 | 4.20 |
| 18 N1+2+1PKMg    | 2.79  | -    | -    | -     | -     | 2.07  | -     | 5.25 | 3.37 |
| 19 N1+1+1KMg     | 2.67  | -    | -    | -     | -     | 1.94  | -     | 4.68 | 3.10 |
| 20 N4 KMg        | -     | -    | -    | -     | -     | 0.41  | -     | -    | 0.41 |
| Mean             | 2.67  | -    | -    | -     | -     | 1.71  | -     | 4.32 | 2.87 |
| Straw Mean DM%   | 89.50 |      |      |       |       |       |       |      |      |

**WINTER OAT**

Tonnes/Hectare (85% DM)

*Table of means*

| Plot | Treatment        | Grain | Straw |
|------|------------------|-------|-------|
| 12   | 01(FYM)[N4]      | 6.69  | 4.81  |
| 212  | 21[FYMN3]        | 8.08  | 6.91  |
| 222  | 22[FYM]          | 8.68  | 7.45  |
| 32   | 03Nil            | 2.53  | 1.36  |
| 52   | 05(P)KMg         | 3.08  | 1.71  |
| 62   | 06[N1](P)KMg     | 3.28  | 1.79  |
| 72   | 07[N2](P)KMg     | 4.24  | 1.90  |
| 82   | 08[N3](P)KMg     | 4.43  | 2.26  |
| 92   | 09[N4](P)KMg     | 3.49  | 1.83  |
| 102  | 10[N4]           | 4.52  | 2.02  |
| 112  | 11[N4]PMg        | 5.22  | 3.08  |
| 122  | 12[N1+3+1](P)KMg | 4.24  | 2.53  |
| 132  | 13[N4]PK         | 3.74  | 2.09  |
| 142  | 14[N4]PK*(Mg*)   | 4.19  | 2.00  |

Results of the Classical and other Long-term Experiments 2017

|     |                |      |      |
|-----|----------------|------|------|
| 152 | 15[N5](P)KMg   | 5.27 | 2.80 |
| 162 | 16[N6](P)KMg   | 5.72 | 3.26 |
| 172 | 17[N1+4+1]PKMg | 5.34 | 3.03 |
| 182 | 18[N1+2+1]PKMg | 2.89 | 1.50 |
| 192 | 19[N1+1+1]KMg  | 2.61 | 1.18 |
|     | Mean           | 4.64 | 2.82 |

Plot Area Harvested 0.00463

MAIZE

TONNES/HECTARE (100% DM)

*Tables of means*

| Plot                | Treatment    | Whole Crop |
|---------------------|--------------|------------|
| 13                  | 01(FYM)N4    | 11.02      |
| 213                 | 21FYMN3      | 14.40      |
| 223                 | 22FYM        | 17.83      |
| 33                  | 03Nil        | 1.95       |
| 53                  | 05(P)KMg     | 5.01       |
| 63                  | 06N1(P)KMg   | 8.70       |
| 73                  | 07N2(P)KMg   | 10.92      |
| 83                  | 08N3(P)KMg   | 11.17      |
| 93                  | 09N4(P)KMg   | 10.98      |
| 103                 | 10N4         | 4.22       |
| 113                 | 11N4PMg      | 6.49       |
| 123                 | 12N2+3(P)KMg | 14.21      |
| 133                 | 13N4PK       | 14.45      |
| 143                 | 14N4PK*(Mg*) | 14.08      |
| 153                 | 15N5(P)KMg   | 12.89      |
| 163                 | 16N6(P)KMg   | 12.91      |
| 173                 | 17N2+4PKMg   | 10.79      |
| 183                 | 18N2+2PKMg   | 12.79      |
| 193                 | 19N2+1KMg    | 7.20       |
|                     | MEAN         | 10.63      |
| Mean DM%            | 25.7         |            |
| PLOT AREA HARVESTED |              | 0.00189    |

Results of the Classical and other Long-term Experiments 2017

Section 8 Wheat Yields: Clean Grain (2.0-3.5mm), Tonnes/Hectare, after removing weed seed

| <b>YEAR</b>       | <b>2017</b> |
|-------------------|-------------|
| <b>SECTION</b>    | <b>8/W1</b> |
| <b>PLOT</b>       |             |
| 2.1 FYMN3         | 4.49        |
| 2.2 FYM           | 5.69        |
| 03 Nil            | 3.13        |
| 05 (P)KMg         | 4.97        |
| 06 N1(P)KMg       | 4.89        |
| 07 N2(P)KMg       | 4.68        |
| 08 N3(P)KMg       | 5.91        |
| 09 N4(P)KMg       | 7.31        |
| 10 N4             | 2.94        |
| 11 N4PMg          | 3.96        |
| 12 N1+3+1(P)K2Mg2 | 6.37        |
| 13 N4PK           | 5.23        |
| 14 N4PK*(Mg*)     | 6.04        |
| 15 N5(P)KMg       | 4.81        |
| 16 N6(P)KMg       | 3.80        |
| 17 N1+4+1PKMg     | 2.32        |
| 18 N1+2+1PKMg     | 2.85        |
| 19 N1+1+1KMg      | 3.52        |
| Mean              | 4.61        |

Note: All clean grain yields for section 8 are reported for the 2 - 3.5mm grain size fraction, excluding grain <2mm, as was the practice prior to 2012.