

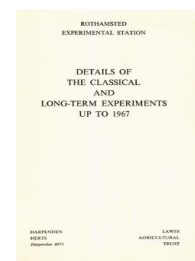
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Hoosfield - Barley

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HOOSFIELD BARLEY, 1852 ONWARDS

Before the experiment started the land carried turnips (FYM and superphosphate) 1847, barley 1848, clover 1849, wheat 1850, barley (ammonium salts) 1851. The first experimental crop was harvested in 1852, and with the exception of 1912, 1933, 1943 and 1967, when the plots were bare fallowed, barley has been grown every year since. The manurial treatments are given in Table 3.

TABLE 3
Manures applied annually since 1852

(Unless otherwise stated)

(i) *Symbols, materials and rates of application*

| | |
|-----|--|
| N | Sulphate of ammonia to supply 43 lb N (1) |
| N* | Nitrate of soda to supply 43 lb N (2) |
| P | 363 lb superphosphate (18% P ₂ O ₅) to supply 65 lb P ₂ O ₅ (about 30 lb P) (3) |
| K | 200 lb sulphate of potash (49% K ₂ O) supplying 98 lb K ₂ O (about 80 lb K) (4) |
| Na | 100 lb sulphate of soda supplying about 14 lb Na (4) |
| Mg | 100 lb sulphate of magnesia supplying about 10 lb Mg |
| Si | 400 lb silicate of soda (5) |
| FYM | 14 tons farmyard manure |
| R | Castor meal to supply 86 lb N (6) |

(ii) *Treatments*

| | | |
|------|------------|-----------|
| Plot | | |
| 1-O | None | |
| 2-O | P | |
| 3-O | KNaMg | |
| 4-O | PKNaMg | |
| 5-O | PK | (7) |
| 1A | N | |
| 2A | NP | |
| 3A | NKNaMg | |
| 4A | NPNaMg | |
| 5A | NPK | (8) |
| 1AA | N* | |
| 2AA | N*P | |
| 3AA | N*KNaMg | |
| 4AA | N*PKNaMg | |
| 1AAS | N*Si | |
| 2AAS | N*PSi | |
| 3AAS | N*KNaMgSi | |
| 4AAS | N*PKNaMgSi | |
| 1C | R | |
| 2C | RP | |
| 3C | RKNaMg | |
| 4C | RPKNaMg | |
| 7-1 | None | (9) |
| 7-2 | FYM | |
| 6-1 | None | |
| 6-2 | None | (10) |
| 1N | N* | (11) |
| 2N | N* | (11) (12) |

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Notes

- (1) Until 1916 the ammonium salts were equal parts of ammonium sulphate and chloride. From 1917 onwards only ammonium sulphate has been used. From 1964 to 1966 43 lb and 86 lb N. (See under 'Variety' below.)
- (2) The nitrate of soda treatment in the AA and AAS series started in 1868. Originally ammonium salts at 86 lb N 1852-57; the dressing of ammonium salts was halved from 1858 to 1867. From 1964 to 1966 43 lb and 86 lb N.
- (3) Until 1887 made from 200 lb bone ash and 150 lb sulphuric acid. From 1888 supplied ready made from mineral phosphate. (1898-1902 basic slag (400 lb) used in place of superphosphate.)
- (4) From 1852 to 1857 the K_2O was 147 lb and the sulphate of soda 200 lb. Potassium dressings were omitted in 1917 and 1918.
- (5) Silicate at 200 lb sodium silicate and 200 lb calcium silicate was first applied in 1862: since 1868 400 lb sodium silicate was given.
- (6) 2000 lb rape cake until 1857; 1000 lb until 1940 (except 1917-20 when none was available); 1000 lb castor meal 1941-54; since 1955 the castor meal was adjusted to supply 43 lb N. From 1964 to 1966 castor meal to supply 43 lb and 86 lb N. In 1967 a balancing dressing supplying 129 lb N was applied to the sub-plots receiving the lower rate in 1964-66.
- (7) Ammonium salts also in 1852 only.
- (8) Sulphate of ammonia at 86 lb N in 1880 only (with PK).
- (9) 1852-71 14 tons farmyard manure.
- (10) Ashes 1852-1932 (except 1928, 1929). (1852-1916 20 bushels of clay and weed-ashes as used to mix with the mineral manures to aid their distribution. 1917-1932 sifted ashes from the laboratory furnace.)
- (11) In 1852 plots 1N and 2N received 65 lb P_2O_5 and 147 lb K_2O but no nitrogen; the nitrate of soda treatment began in 1853. From 1964 to 1966 43 lb and 86 lb N.
- (12) 86 lb N 1853-57. From 1964 to 1966 43 lb and 86 lb N.

For further information on manurial dressings see Reference (2).

Size of plots. Mostly 0.18 acre; none less than 0.09 acre.

Variety. From 1917 onwards the variety has been Plumage Archer. Previously Chevalier 1852-80, Archer's Stiff Straw 1881-90, Carter's Paris Prize 1891-97, Archer's Stiff Straw 1898-1916 except 1902-05, Hallett's Pedigree Chevalier. In 1929-32 the plots were drilled in 18 inch rows to allow inter-row cultivation. Alternate strips of Plumage Archer and Spratt Archer were compared 1927-32, except 1928. From 1964 to 1966 Plumage Archer (receiving 43 lb N on N, N* and R plots) was compared with Maris Badger (receiving 86 lb N on N, N* and R plots). Varieties and N rates were on the same sub-plots each year. For 1965 and 1966 seed of Plumage Archer from Hoosfield was sown back on the field. Prior to 1965 new seed was bought each year.

Weed control. Commencing in 1944 the barley was sprayed with DNOC until 1956; since 1957 various selective weedkillers have been used. In autumn 1958, 1959 and 1961 the stubble was sprayed with 2,4-D to check coltsfoot (*Tussilago farfara*). In 1962-64 dalapon was used in autumn to control perennial grass weeds. Aminotriazole and ammonium thiocyanate were used in autumn 1966.

Plot areas were reduced by pre-harvest cuts in 1948, 1952, 1954, and 1955 to control wild oats (*Avena fatua*) which were hand-pulled in the reduced area taken for yield. In 1953 the wild oats were so bad that the whole field was cut green and the produce removed.

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Liming. In winter 1954–55, 5 tons of CaCO_3 as ground chalk were applied to strips 3 and 4 including plots 5A and 5-O. Regular chalk supplements to all plots receiving sulphate of ammonia and castor meal were prescribed at the rate of 100 lb CaCO_3 per 14 lb N as ammonium sulphate and 50 lb CaCO_3 per 14 lb N as castor meal. These supplements were given every five years at a rate corresponding to all the sulphate of ammonia and castor meal used over this period. Dressings were applied in spring 1955, 1960, 1965 and 2/5 dressings in 1967. See Reference (3). In 1967 additional chalk was applied at 23 cwt to plots 1N, 1C, 4A, 4C, 7-1 and 46 cwt to 2C, 5A, 6-1 and 6-2.

Harvesting. Plots originally cut by hand, first cut by binder in 1910 and then from 1915 to 1957. From 1958 the plots were harvested by combine harvester.

References

1. Russell, E. J. & Watson, D. J. (1938) The Rothamsted field experiment on barley 1852–1937. Parts I and II. *Emp. J. exp. Agric.* 6, 268–314; Part III, 7, 193–220.
2. *Memoranda of the Field Experiments, Rothamsted, 1901*, 26–27.
3. *Rep. Rothamsted exp. Stn for 1954*, 146–148.
4. Warren, R. G. & Johnston, A. E. (1967) Hoosfield Continuous Barley. *Rep. Rothamsted exp. Stn for 1966*, 320–338.

For yields see Table 4 on page 22.

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TABLE 4
Barley: Hoosfield, 1852-1966

| Plot | Treatment | Ten-year means Grain: cwt | | | | | | | | | | Means, 1852-1966 Grain Straw | No. of years | 1964-66 Maris Badger | | |
|------|------------------|---------------------------|---------|---------|---------|-----------|---------|---------|---------|---------|---------|------------------------------------|-----------------|----------------------------|----------------|------|
| | | 1852-61 | 1862-71 | 1872-81 | 1882-91 | 1892-1901 | 1902-11 | 1912-21 | 1922-31 | 1932-41 | 1942-51 | | | | (4) 1952-61 | |
| 1-0 | O | 11.4 | 8.8 | 6.8 | 6.2 | 5.3 | 5.2 | 6.5 | 3.7 | 6.9 | 9.3 | 7.4 | 7.0 | 7.8 | 111 | 8.3 |
| 2-0 | P | 13.9 | 11.8 | 9.0 | 9.6 | 7.1 | 9.3 | 10.2 | 6.7 | 11.6 | 11.7 | 10.6 | 10.1 | 9.6 | 111 | 11.1 |
| 3-0 | KNaMg | 12.5 | 10.2 | 7.8 | 6.0 | 4.8 | 5.5 | 7.5 | 3.8 | 9.0 | 11.7 | 7.6 | 7.8 | 8.8 | 111 | 7.5 |
| 4-0 | PKNaMg | 15.3 | 12.4 | 8.8 | 8.2 | 6.6 | 8.4 | 10.9 | 6.4 | 13.5 | 15.8 | 10.9 | 10.6 | 11.5 | 111 | 9.4 |
| 5-0 | PK | 12.3 (a) | 10.9 | 7.5 | 7.4 | 6.2 | 6.9 | 7.3 | 4.8 | 10.9 | 15.0 | 8.9 | 8.9 | 9.9 | 110 | 9.3 |
| 1A | N | 17.0 | 15.8 | 13.2 | 12.0 | 8.8 | 10.7 | 11.2 | 5.4 | 10.4 | 11.5 | 10.8 | 11.5 | 13.0 | 111 | 14.5 |
| 2A | NP | 22.9 | 24.7 | 20.4 | 18.0 | 15.5 | 16.1 | 16.2 | 11.8 | 18.8 | 15.9 | 16.8 | 18.0 | 19.3 | 111 | 25.6 |
| 3A | NKNaMg | 17.8 | 17.8 | 15.0 | 12.4 | 11.8 | 11.0 | 11.3 | 6.0 | 13.2 | 14.4 | 13.4 | 13.2 | 15.8 | 111 | 26.3 |
| 4A | NPKNaMg | 23.2 | 23.8 | 20.9 | 20.0 | 18.0 | 20.1 | 18.2 | 13.1 | 20.9 | 17.8 | 18.9 | 19.8 | 22.2 | 111 | 39.8 |
| 5A | NPK | 21.7 | 23.1 | 19.8 | 15.0 | 14.1 | 15.2 | 16.1 | 10.9 | 19.5 | 14.2 | 19.8 (e) | 17.6 | 21.9 | 110 | 38.2 |
| 1AA | N* | 16.0 | 16.0 | 14.2 | 14.0 | 11.6 | 12.6 | 12.3 | 7.1 | 12.1 | 13.0 | 12.9 | 12.3 | 15.3 | 95 | 13.0 |
| 2AA | N*P | 24.0 | 24.0 | 21.1 | 21.0 | 19.4 | 20.3 | 19.7 | 14.7 | 22.0 | 18.5 | 20.2 | 20.0 | 22.4 | 95 | 32.3 |
| 3AA | N*KNaMg | 16.5 | 16.5 | 15.1 | 14.2 | 12.8 | 11.6 | 12.1 | 6.3 | 14.4 | 15.9 | 13.9 | 13.1 | 16.7 | 95 | 21.2 |
| 4AA | N*PKNaMg | 24.0 | 24.0 | 21.6 | 20.1 | 18.5 | 19.8 | 18.9 | 13.3 | 21.8 | 21.4 | 19.9 | 19.9 | 22.7 | 95 | 38.7 |
| 1AAS | N*Si | 18.7 | 18.7 | 17.7 | 17.1 | 16.0 | 14.9 | 14.9 | 8.6 | 16.4 | 16.1 | 17.0 | 15.6 | 18.3 | 95 | 20.2 |
| 2AAS | N*PSi | 24.6 | 22.3 | 22.3 | 22.2 | 20.3 | 19.5 | 19.7 | 14.9 | 21.4 | 20.4 | 22.9 | 20.8 | 23.3 | 95 | 30.2 |
| 3AAS | N*KNaMgSi | 21.5 | 19.4 | 19.4 | 17.5 | 16.7 | 15.5 | 14.2 | 8.4 | 16.7 | 17.3 | 18.3 | 16.4 | 19.7 | 95 | 32.0 |
| 4AAS | N*PKNaMgSi | 25.5 | 23.6 | 23.6 | 22.1 | 20.2 | 21.4 | 17.9 | 14.1 | 23.1 | 22.5 | 23.3 | 21.5 | 24.5 | 95 | 39.3 |
| 1C | R | 23.4 | 22.5 | 19.8 | 17.5 | 16.0 | 17.5 | 13.5 | 11.4 | 18.4 | 15.6 | 17.2 | 17.7 | 19.7 | 111 | 34.2 |
| 2C | RP | 23.9 | 23.7 | 21.2 | 19.1 | 17.1 | 18.3 | 14.6 | 14.8 | 21.3 | 20.9 | 19.5 | 19.7 | 21.2 | 111 | 38.6 |
| 3C | RKNaMg | 22.1 | 22.4 | 19.0 | 16.8 | 15.1 | 17.4 | 12.2 | 10.0 | 17.6 | 21.1 | 17.0 | 17.6 | 19.9 | 111 | 36.6 |
| 4C | RPKNaMg | 23.8 | 24.4 | 21.3 | 17.8 | 16.6 | 19.9 | 13.0 | 14.0 | 21.6 | 23.7 | 20.0 | 19.9 | 22.2 | 111 | 38.7 |
| 7-1 | D until 1871 | 17.4 | 17.4 | 17.4 | 13.0 | 10.6 | 9.7 | 11.0 | 7.0 | 13.4 | 15.1 | 11.7 | 12.0 | 13.4 | 91 | 8.6 |
| 7-2 | D | 22.7 | 26.7 | 25.7 | 23.7 | 22.9 | 23.6 | 18.6 | 15.0 | 26.1 | 26.7 | 28.0 | 24.0 | 28.6 | 111 | 39.8 |
| 6-1 | None | 12.6 | 9.6 | 6.9 | 7.7 | 5.6 | 5.4 | 8.2 | 3.4 | 8.7 | 10.3 | 6.9 | 7.7 | 8.6 | 111 | 5.7 |
| 6-2 | Ashes until 1932 | 12.1 | 10.2 | 7.7 | 8.2 | 6.1 | 7.1 | 9.9 | 4.4 | 8.9 | 9.8 | 8.7 | 8.4 | 9.2 | 111 | 7.2 |
| 1N | N* | 19.0 (b) | 18.8 | 15.6 | 15.6 | 14.1 | 13.5 | 11.5 | 6.2 | 14.1 | 14.6 | 12.1 | 13.9 | 17.1 | 110 | 8.2 |
| 2N | N* | 18.0 (c) | 20.5 | 17.9 | 17.0 | 16.8 | 16.8 | 14.8 | 9.4 | 17.5 | 18.1 | 15.9 | 16.5 | 19.3 | 105 | 23.6 |

(1) Omitting 1912 (all plots followed). (a) Omitting 1852.
 (2) Omitting 1933 (all plots followed). (b) Omitting 1852.
 (3) Omitting 1943 (all plots followed). (c) Omitting 1853-57.
 (4) Omitting 1953 (no yields recorded). (d) Omitting 1868-71.
 (e) Omitting 1954 (no yield recorded).