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## Yields of the Field Experiments 1994

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### Sunflowers

#### Rothamsted Research

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94/R/SU/1

SUNFLOWERS

VARIETIES & DISEASE

**Object:** To assess early maturing varieties of sunflowers and their susceptibility to *Botrytis cinerea* and other fungal diseases - Ex-allotments.

**Sponsors:** V.J. Church, H.A. McCartney.

**Design:** 4 randomised blocks of 6 plots.

**Whole plot dimensions:** 3.5 x 10.0.

**Treatments:**

**CULTIVAR**

|     |           |
|-----|-----------|
| 345 | SAM 345   |
| 348 | SAM 348   |
| AV  | Avante    |
| AL  | Allegro   |
| PAN | PAN 9405  |
| AGC | AGC 92445 |

**Experimental diary:**

01-Nov-93 : B : Sting CT at 4.0 l in 200 l.  
06-Dec-93 : B : Ploughed.  
27-Apr-94 : B : Heavy spring-tine cultivated.  
28-Apr-94 : B : Rotary harrowed.  
29-Apr-94 : T : **CULTIVAR** 345, 348, AV, AL, PAN, AGC: Varieties, dressed, drilled at 14 seeds per m<sup>2</sup>.  
03-May-94 : B : 34.5% N at 145 kg.  
04-May-94 : B : Rolled.  
06-May-94 : B : Stomp 400 at 5.0 l in 200 l.  
20-May-94 : B : Decis at 300 ml in 200 l.  
13-Jun-94 : B : Laser at 2.25 l with Actipron at 1.8 l in 220 l.  
24-Aug-94 : T : **CULTIVAR** 345: Hand harvested, threshed by stationary combine.  
25-Aug-94 : T : **CULTIVAR** AV, AL, AGC: Reglone at 3.0 l with Vassgro Spreader at 0.44 l in 440 l.  
02-Sep-94 : T : **CULTIVAR** AV, AL, AGC: Hand harvested, threshed by stationary combine.  
22-Sep-94 : T : **CULTIVAR** PAN: Reglone at 3.0 l with Vassgro Spreader at 0.44 l in 440 l.  
                  : T : **CULTIVAR** 348: Hand harvested, threshed by stationary combine.  
29-Sep-94 : T : **CULTIVAR** PAN: Hand harvested, threshed by stationary combine.

Previous crops: W. wheat 1992, s. barley 1993.

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**NOTE:** Plant populations, growth stages, diseases and head size were monitored throughout the season, moisture content was measured prior to desiccation and grain density and oil content were measured after harvest.

**GRAIN (AT 90% DRY MATTER) TONNES/HECTARE**

\*\*\*\*\* Tables of means \*\*\*\*\*

**CULTIVAR**

|     |      |
|-----|------|
| 345 | 2.41 |
| 348 | 3.15 |
| AV  | 2.59 |
| AL  | 2.63 |
| PAN | 3.35 |
| AGC | 2.68 |

|      |      |
|------|------|
| Mean | 2.80 |
|------|------|

\*\*\* Standard errors of differences of means \*\*\*

**CULTIVAR**

0.189

\*\*\*\*\* Stratum standard errors and coefficients of variation \*\*\*\*\*

| Stratum  | d.f. | s.e.  | cv% |
|----------|------|-------|-----|
| BLOCK.WP | 15   | 0.267 | 9.5 |

GRAIN MEAN DM% 69.7

PLOT AREA HARVESTED 0.00150

94/R/SU/2

SUNFLOWERS

BOTRYTIS, HONEYBEES AND POLLEN BEETLES

**Object:** To determine whether visits by honeybees and pollen beetles to sunflower heads during flowering affects subsequent development of *Botrytis cinerea* - Long Hoos V 2.

**Sponsors:** J.R. Simpkins, N.L. Carreck, V.J. Church.

**Design:** 4 randomised blocks of 6 plots.

**Whole plot dimensions:** 2.74 x 2.74.

**Treatments:**

|                 |   |
|-----------------|---|
| <b>BEE ADDN</b> | Presence of bees or pollen beetles and introduction of a bacterium ( <i>Bacillus subtilis</i> ) or fungicide (pyrimethanil) as a powder or spray: |
| -               | None  |
| B               | Bees only   |
| BB              | Bees plus bacterium   |
| P               | Pollen beetles only   |
| BF              | Bees plus fungicide powder  |
| F               | No bees plus fungicide spray  |

**NOTE:** Bacterium and fungicide powder were mixed with talc and 'biobeads' for spreading by bees. Pyrimethanil was an experimental fungicide. Insect cages, each 2.74m x 2.74m, were placed on each plot.

**Experimental diary:**

08-Mar-94 : B : Ploughed.  
14-Mar-94 : B : Heavy spring-tine cultivated.  
17-Mar-94 : B : Heavy spring-tine cultivated.  
24-Mar-94 : B : Rolled.  
03-May-94 : B : 34.5% N at 145 kg.  
          : B : Rotary harrowed twice, Avante, dressed, drilled at 14 seeds per m<sup>2</sup>.  
04-May-94 : B : Rolled.  
06-May-94 : B : Stomp 400 at 5.0 l in 220 l.  
15-Jul-94 : T : **BEE ADDN** B, BB, BF: Honey bee colonies introduced.  
18-Jul-94 : T : **BEE ADDN** P: Pollen beetles introduced into cages.  
          : T : **BEE ADDN** BB, BF: Bacterium and fungicide powder respectively introduced each day until 03-Aug.  
20-Jul-94 : T : **BEE ADDN** F: Pyrimethanil spray at 4 kg in 220 l. plots.  
22-Jul-94 : B : Irrigated.  
25-Jul-94 : B : Irrigated.  
27-Jul-94 : B : Irrigated.  
02-Aug-94 : B : Irrigated.  
04-Aug-94 : T : **BEE ADDN** B, BB, BF: Honey bee colonies removed.  
06-Sep-94 : B : Reglone at 3.0 l with Vassgrow Spreader at 400 ml in 440 l.  
08-Sep-94 : B : Hand harvested, threshed by stationary combine.

94/R/SU/2

Previous crops: Mustard 1992, potatoes 1993.

- NOTES:** (1) Plots were netted against birds from after sowing to harvest. Irrigation for 1-2 hours on each occasion, was applied to increase disease spread. Plants were assessed for disease during the season and individual grain weights were measured.
- (2) The harvested seed was mixed in error on two plots, with the treatments P and BF. Estimated values were used in the analysis.

**GRAIN (AT 90% DRY MATTER) TONNES/HECTARE**

\*\*\*\*\* Tables of means \*\*\*\*\*

| <b>BEE ADDN</b> |      |
|-----------------|------|
| -               | 1.94 |
| B               | 1.78 |
| BB              | 2.02 |
| P               | 1.83 |
| BF              | 1.82 |
| F               | 1.77 |
| Mean            | 1.86 |

\*\*\* Standard errors of differences of means \*\*\*

| <b>BEE ADDN</b> |       |
|-----------------|-------|
|                 | 0.190 |

\*\*\*\*\* Stratum standard errors and coefficients of variation \*\*\*\*\*

| Stratum  | d.f. | s.e.  | cv%  |
|----------|------|-------|------|
| BLOCK.WP | 13   | 0.269 | 14.5 |

GRAIN MEAN DM% \*

PLOT AREA HARVESTED 0.0001