

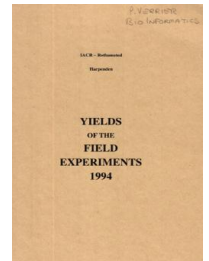
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94/R/SU/2 Botrytis, Honeybees and Pollen Beetles - Sunflowers

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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:

BEE ADDN Presence of bees or pollen beetles and introduction of a bacterium (*Bacillus subtilis*) 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 m².
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 *****

BEE ADDN

-	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 ***

BEE ADDN

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