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72/R/WW/12 Winter Wheat Effects of Blue Green Algae

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72/R/WW/12

WINTER WHEAT

EFFECTS OF BLUE-GREEN ALGAE

Object: To study the establishment of blue-green algae in relation to culture type, method of application, irrigation and nitrogen fertiliser. Effects on yield of wheat are also tested - Great Field II.

Sponsor: P.J. Dart.

Design: A single replicate of 5 x 3 x 2 x 2 in 60 plots.

Whole plot dimensions: 2.13 x 4.57. Area harvested: 0.00081.

Treatments: All combinations of:-

1. Type of algal culture* (C):
 - None (0)
 - Nostoc elliposporium (isolated from Broadbalk Field) (1)
 - Nostoc punctiformum (isolated from Broadbalk Field) (2)
 - Anabaena cylindrica (3)
 - A mixture of the three species (4)
2. Irrigation (I): None (0), 50 mm (2 inches) during the first week in July (1), soil surface kept continually moist (2).
3. Method of application of algal inoculum* (M): In water as a spray (1), as a dry sand crust broadcast by hand (2).
4. N levels: 0, 50 kg as 'Nitro-Chalk'.

* Rates of application of inoculum were as follows:

(in g/ha of dry weight of algae)

Spray inoculum:	C1:	920
	C2:	920
	C3:	420
	C4:	670
Dry sand inoculum: (estimated weights)	C1:	450
	C2:	830
	C3:	260
	C4:	830

Basal applications: 280 kg (0:20:20) combine drilled.

Seed: Maris Ranger sown at 200 kg.

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Cultivations, etc.: Ploughed: 23 Sept, 1971. Seed combine drilled:
6 Oct. N and water cultures applied: 9 May, 1972. Sand cultures
applied: 15 May. Combine harvested: 31 Aug. Previous crops:
Barley 1970 beans 1971.

NOTE: Estimates were made of the extent of algal cover and species
involved and of recovery of inoculum types. N fixation was
measured by acetylene reduction assay.

Standard error per plot (estimated from 4 factor interaction).
Grain, tonnes/hectare: 0.543 or 8.2% (8 d.f.)

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TABLES OF MEANS

GRAIN: TONNES/HECTARE

	I			M		N: KG/HA		Mean
	0	1	2	1	2	0	50	
C								
0	6.23	6.60	6.92	6.70	6.47	5.70	7.47	6.58
1	7.07	6.48	6.76	6.75	6.78	6.00	7.54	6.77
2	6.47	6.37	6.44	6.67	6.18	5.38	7.47	6.42
3	6.74	6.59	6.73	6.72	6.65	5.64	7.74	6.69
4	6.77	6.46	6.45	6.61	6.52	5.76	7.36	6.56
		I						
		0		6.77	6.54	5.80	7.51	6.66
		1		6.60	6.40	5.54	7.46	6.50
		2		6.69	6.63	5.75	7.57	6.66
				M				
				1		5.79	7.59	6.69
				2		5.60	7.44	6.52
Mean						5.70	7.51	6.61

STANDARD ERRORS OF DIFFERENCES

C	I	M	N	C	C	I	C	I	M
				I	M	M	N	N	N
0.222	0.172	0.140	0.140	0.384	0.314	0.243	0.314	0.243	0.198

Mean D.M. %: 85.8