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80/R/CS/240 Effects of Mycorrhiza on Response to P

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80/R/CS/240

EFFECTS OF MYCORRHIZA ON RESPONSE TO P

Object: To study the effects of inoculating mycorrhiza on the responses of crops to a range of rates of phosphate fertiliser - Delharding.

Sponsors: D.P. Stribley, P.B. Tinker.

The second year, potatoes.

For previous year see 79/R/CS/240.

Design: Single replicate of 24 plots.

Whole plot dimensions: 2.84 x 3.35.

Treatments: All combinations of:-

1. INOCULUM Mycorrhizal inocula:

NONE	None in 1979 & 1980
G MOSSE	Glomus mosseae in 1979 & 1980
G CALED	Glomus caledonius in 1980, Gigaspora sp. in 1979

2. P Rates of phosphate fertiliser (kg P), as superphosphate, in 1979 and in 1980:

0
20
40
60
80
100
120
140

- NOTES: (1) Leeks planted after potatoes in 1979 established and grew poorly. No treatment gave a yield greater than 0.1 tonnes and yields are not reported.
- (2) Four extra plots, used for tests on close-planted potatoes in 1979, were used in 1980 for tests on maize, yields were not taken.
- (3) Inoculum was prepared by growing leeks in pots of soil suitably infected with the mycorrhiza. After 20 weeks growth, soil and roots in the pots were chopped and applied to the potatoes at 0.5 kg per tuber. Uninoculated plots received soil and roots at the same rate from pots growing uninfected leeks.

Standard applications:

Leeks: Manures: N at 180 kg, K₂O at 115 kg as (25:0:16).
Potatoes and Maize: Manures: N at 160 kg, as 'Nitro-Chalk', K₂O at 300 kg, as muriate of potash, Mg at 5 kg, as Epsom salts.
Weedkillers: Linuron at 1.0 kg plus paraquat at 0.28 kg ion in 280 l.
Fungicide: Mancozeb at 1.3 kg in 280 l, applied twice, with the insecticide. Insecticide: Pirimicarb at 0.14 kg. Irrigation: 25 mm of water.

Seed: Potatoes: Pentland Crown.
Maize: Fronica.

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Cultivations, etc.:-

Leeks: Spring-tine cultivated: 20 Aug, 1979. NK applied, power harrowed, planted: 6 Sept. Hand harvested: 28 Feb, 1980.
Potatoes and maize: Chisel ploughed three times: 18 Apr. P, N, K & Mg applied, spike rotary cultivated: 22 Apr. Irrigated: 19 May.
Potatoes: Rotary ridged: 22 Apr. Planted: 28 Apr. Weedkillers applied: 22 May. Fungicide and insecticide applied: 3 July, 7 Aug.
Haulm cut by hand: 25 Sept. Potatoes lifted: 26 Sept.
Maize: Planted: 23 June. Harvested by hand: 26 Sept.

NOTE: Plots were sampled at intervals during the season to assess mycorrhizal infection, P content of leaves and soil.

TOTAL TUBERS TONNES/HECTARE

***** TABLES OF MEANS *****

P INOCULUM	0	20	40	60	80	100	120	140	MEAN
NONE	43.4	58.3	48.0	65.6	69.8	69.2	72.8	78.2	63.2
G MOSSE	44.2	41.1	52.6	67.7	60.8	66.5	70.9	78.2	60.3
G CALED	32.7	60.4	48.9	60.4	59.1	75.7	58.9	78.4	59.3
MEAN	40.1	53.3	49.8	64.6	63.3	70.5	67.5	78.3	60.9

PLOT AREA HARVESTED 0.00048