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Reactions of molybdenum with soil affecting its availability to wheat plants v. initial residual effectiveness for a range of acidic yellow-brown sandy soils

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11. REACTIONS OF MOLYBDENUM WITH SOIL AFFECTING ITS AVAILABILITY TO WHEAT PLANTS
V. INITIAL AND RESIDUAL EFFECTIVENESS FOR A RANGE OF ACIDIC, YELLOW-BROWN SANDY SOILS
87GL2/1213 EX

Aim: To relate the molybdenum adsorption capacities of a range of acidic, yellow-brown sandy soils to the initial and residual effectiveness of molybdenum added to these soils for the growth of wheat.

Location: Glasshouse, School of Agriculture, University of Western Australia

Soil: Thirteen virgin topsoils (0-10 cm) collected throughout the wheatbelt, sieved through 3.86 mm, and potted in 3.5 kg aliquots.

Treatments:

I. Nil.

II. Molybdenum as 0.428 mg $Na_2MoO_4.2H_2O$/pot (equivalent to 200 g/ha) incubated at 30°C for 60 days in root-cooling tanks with soils at field capacity.

III. Molybdenum added fresh i.e. same rate after incubation.

Table 16. Effects of fresh and incubated additions of molybdenum on the growth and fresh weights of shoots of wheat grown on a range of acidic, yellow-brown sandy soils, and the concentrations of molybdenum in the shoots*

Soil	Molybdenum added	Zadoks growth stage	Fresh weight of shoots (g/pot)	Concentration Mo in shoots (ng/g)
Pindar	Nil	16.7/21.9/32	44.9	88
	Incub	16.7/21.8/32	45.6	228
	Fresh	16.7/21.6/32	43.0	317
Gutha	Nil	16.7/21.4/32	41.8	51
	Incub	17/21.5/32	45.9	183
	Fresh	17/21.5/32	45.7	250
Perenjori	Nil	17/21.3/32	49.1	59
	Incub	17/21.1/32	48.0	241
	Fresh	17/21.2/32	49.4	376
Wongan Hills	Nil	17/20.8/32	41.1	92
	Incub	17/21.1/32	47.2	1170
	Fresh	17/21.0/32	44.5	1710
Beacon	Nil	16.5/21.2/32	30.6	31
	Incub	16.7/21.4/32	40.3	87
	Fresh	17/21.3/32	42.2	177
Yelbeni	Nil	16.5/21.1/32	26.4	28
	Incub	16.7/21.4/32	33.2	37
	Fresh	16.7/21.1/32	33.2	45
Merredin	Nil	16/20.6/32	25.2	43
	Incub	16.5/20.6/32	31.0	72
	Fresh	16.5/20.8/32	33.6	97
Carrabin	Nil	17.5/21.6/32	55.4	58
	Incub	17.2/21.8/32	56.2	355
	Fresh	17.5/21.7/32	58.6	740
Bodallin	Nil	17.5/21.5/32	52.7	67
	Incub	17.5/21.6/32	54.0	328
	Fresh	17.5/21.5/32	51.2	620
Belka	Nil	17.2/21.3/32	45.8	80
	Incub	17/21.2/32	44.3	303
	Fresh	17/21.2/32	44.4	400
Mt Walker	Nil	17/21.8/32	53.0	52
	Incub	17.5/21.6/32	59.4	450
	Fresh	17.5/21.8/32	64.6	650

Table 16. continued

Soil	Molybdenum added	Zadoks growth stage	Fresh weight of shoots (g/pot)	Concentration Mo in shoots (ng/g)
Hyden	Nil	17/21.7/32	55.8	76
	Incub	17/21.7/32	57.6	324
	Fresh	17.2/21.8/32	56.7	730
Lake Grace	Nil	17/21.1/32	48.7	60
	Incub	17/21.1/32	52.8	575
	Fresh	17/21.1/32	48.6	1200

* Concentration of Mo in dry shoots without YEB's, results of analyses of YEB's not yet available.

Results:

Results of analyses of YEB for concentrations of molybdenum, and determinations of molybdenum adsorption isotherms for each soil have yet to be completed. Preliminary results suggest:

1. Responses in the fresh weights of wheat shoots to the soil application of sodium molybdate occurred in the Gutha, Beacon, Yelbeni, Merredin and Mt Walker soils. These soils also had the lowest concentrations of molybdenum in the shoots where no molybdenum had been applied.

2. There appears to be very large differences between the soils in the initial effectiveness of freshly applied Na_2MoO_4.