channel with 600 gauge polyethylene black film gives most unsatisfactory service in preventing seepage loss of water. It is prone to weed penetration and is not durable. (iii) Embedded polyethylene black film of 600 gauge gives satisfactory service for sometime. (iv) Considering the cost of construction, durability and seepage loss in conveyance irrigation channel, lining with a mixture of cinder, sand and cement in the ratio of 5:2:1 to a thickness 2.5 cm gave the best results.

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A Study on the Effect of Phosphorus and Molybdenum on the Yields of Berseem Fodder

by

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Introduction: It has been reported by various workers that the application of molybdenum and P increases the yield of leguminous crops. The increase in the yield of berseem with the increasing doses of P on soils having low available P_2O_5 has been reported by Sen and Bains (1951, 1955) and Daljit Singh *et al.* (1957). Mehrotra and Gangwar (1964) reported an increase of 21% over control with molybdenum treatment. Rao and Raju (1964) reported that molybdenum when applied singly or in combination with boron did not affect the yield of alfalfa significantly. The present study was undertaken with a view to ascertain the suitable doses of P and molybdenum for the growth of berseem on the soils of Jobner tract which are sandy in nature and also to determine whether any interaction exists between the doses of P and molybdenum. It was also intended to adjudge the efficacy of soil and foliar application of molybdenum.

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Materials and Methods: Pot experiments were carried out to see the effect of P and molybdenum on the yield of berseem fodder grown on loamy sand soil (pH 8.4) during the *Rabi* season of 1966-67 and 1967-68. P in the form of superphosphate was applied to the soil at the time of sowing at three levels *viz.*, P_0, P_1 and P_2 (0, 30 and 60 kg P_2O_5/ha) and molybdenum as sodium molybdate was applied to the soil and as foliar spray at five levels *viz.*, M_0, M_1, M_2, M_3 and M_4 (0, 150, 300, 450 and 600 g sodium molybdate/ha). All treatments were replicated thrice. The yield obtained for a particular pot at different cuttings were pooled and analysed statistically.

The soil sample was taken before filling the pots and was analysed for available P_2O_5 and molybdenum which were found to be 1.5 % and 0.04 ppm respectively.

Result and Discussion: The mean yield of two seasons and the summary of statistical analysis are given in Tables 1 and 2 respectively.

Maximum yields were obtained under P_2M_2 in both soil or foliar application but they were not significantly greater than the corresponding yields under P_1M_2. Normally foliar spray of treatments is expected to be more efficient than soil application but in this study no difference between the overall effects of soil and foliar applications was observed. Most probably this was due to the higher pH value of the soil since the availability of molybdenum is more under neutral and alkaline conditions (Mitchell, 1964). Hence the molybdenum would have been equally available to the plants from soil as well as spray application.

The effect of P was significant and the difference in the yield of berseem fodder due to treatments P_1 or P_2 was remarkable over the treatment P_0. P_1 and P_2 resulted in an increase of the yield to the extent of 33.93% and 42.37% respectively. However, the additional yield due to the treatment P_2 over P_1 was found to be non-significant. The results obtained compared to a large extent with the findings of Sen and Bains (1951, 1955).

The effect of molybdenum was also significant and the treatments M_1, M_2, M_3 and M_4 gave an increase of 15.24, 34.7, 14.54 and 11.76% respectively over the control. Increase in the dose of molybdenum from M_0 to M_1 and from M_1 to M_2 produced significant increases in the fodder yield, whereas increased dose from M_2 to M_3 or M_4 significantly reduced the yield and statistically M_4 was not better than M_0. An increase in the yield due to molybdenum treatment has also been reported by Mehrotra and Gangwar (1964). The decrease in yield at higher doses of molybdenum may perhaps be due to some metabolic disorder in higher concentrations.

TABLE 1. *Average effect of treatments on the yield of Berseem Fodder (g/pot)*

Mode of application	T R E A T M E N T S															Mean	S. Em (methods of application)
	P_0M_0	P_0M_1	P_0M_2	P_0M_3	P_0M_4	P_1M_0	P_1M_1	P_1M_2	P_1M_3	P_1M_4	P_2M_0	P_2M_1	P_2M_2	P_2M_3	P_2M_4		
Soil	13.7	17.9	16.8	16.1	16.5	21.7	23.4	26.9	22.3	20.4	19.2	23.7	30.4	23.4	21.5	20.9	
Foliar spray	15.5	16.1	20.5	18.4	20.2	20.6	23.0	25.9	24.6	21.4	21.5	25.2	30.7	23.7	25.3	22.2	
Mean	14.6	17.0	18.65	17.25	18.35	21.15	23.20	26.40	23.45	20.90	20.35	24.45	30.55	23.55	23.40	21.55	0.56
S.Em.	(PM)	–	1.52														

TABLE 2. *Average effect of the doses of P and Molybdenum on the yield of Berseem Fodder (g/pot)*

Levels of P	P_0	P_1	P_2	C.D. at 5% level	S.Em	—	—	—
Mean	17.18	23.01	24.46	1.93	0.68			
Levels of Molybdenum	M_0	M_1	M_2	M_3		M_4	C.D. at 5% level	S.Em
Mean	18.7	21.55	25.19	21.42		20.90	2.49	0.88

NOTE: The figures given in Table 1 & 2 are the mean yields of two seasons because the findings showed the identical trend in both the seasons.

There was no interaction between P and molybdenum indicating that the effect of molybdenum is not at all dependent upon the level of P. The responses to the doses of molybdenum and P are independent of soil or foliar applications.

Conclusions: From the above study it may be concluded that the foliar application of molybdenum is not better than the soil application in soils having pH on the alkaline side. P and molybdenum at the rate of 30 kg P_2O_5/ha and 300 g sodium molybdate were found to be suitable doses for the good growth of berseem.

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