

THE EFFECT OF AMMONIUM CALCIUM NITRATE, SULPHATE OF AMMONIA, UREA AND POULTRY MANURE ON DISEASES OF BEANS (Phaseolus vulgaris L.).

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ABSTRACT

The effect of calcium ammonium nitrate (CAN), sulphate of ammonia (SA), urea and poultry manure on bean rust (Uromyces phaseoli (Reben) Wint.) and angular leaf spot (Phaseoisariopsis griseola Sacc.) were studied in a split plot design replicated four times. High levels of nitrogen in the form of urea, SA, CAN or poultry manure significantly increased the incidence of rust and angular leaf spot (ALS). However, the influence of fertilizer types on severity of rust and ALS differed significantly. Rust severity was significantly low in plots fertilized with urea. SA suppressed ALS and promoted rust. CAN increased the severity of ALS but suppressed rust significantly.

INTRODUCTION

The impact of nitrogen fertilizers on crop diseases has been studied extensively and in the past eighteen years reviewed by (Huber and Watson, 1974). Generally, high levels of nitrogen promote diseases in crops. However, with the advancements in research it has now been established that the form rather than the amount of nitrogen will influence disease severity or resistant of the host. Management of certain diseases of crops have now been possible using forms of nitrogen. But this depend in many factors and it is not the same for all host-parasite relationships. A given form may reduce one disease and favour another.

While there are increasing reports advocating the use of nitrogen in beans, very little has been studied to establish the effect of such fertilizers on development of diseases. The objective of the work reported here was to evaluate the varying levels of SA, CAN, urea and poultry manure on the incidence of rust and angular leaf spot in beans.

MATERIAL AND METHODS

Experiments were carried out in soils classified as Oxisols (pH=5.3, total nitrogen=0.18 (medium), exchangeable K=0.48 me/100 g (medium), exchangeable P=8.1 ppm (low)). Plants were planted in plots of 4 m² and spaced 50 cm. between rows and 10 cm. between plants. Nitrogen fertilizers; CAN, SA, urea and poultry manure were applied 14 days after planting in two levels; 30 and 60 Kg. N ha⁻¹. Dimecron 40 EC was applied at the rate of 800 ai ha⁻¹ to control insect pest. Severity of ALS and rust was assessed using the scale of CIAT, 1987.

RESULTS AND DISCUSSION

Results of the effect of urea, CAN, SA and poultry manure on disease severity and on yield is shown in Table 1.

Table 1. The effect of CAN, SA, urea and poultry manure on the severity of bean rust, angular leaf spot and on yield.

Nitrogen Forms	Fertilizer rates Kgha ⁻¹	Disease severity		
		Rust	ALS	Yield Kgha-1
SA	30	2.0	3.7	495.8
	60	3.1	4.3	578.9
CAN	30	3.6	3.5	386.1
	60	3.8	4.0	451.6
Urea	30	1.8	3.5	491.1
	60	2.0	3.7	610.0
Poultry manure	30	1.9	2.9	479.6
	60	2.1	3.1	366.7
Control		2.0	1.6	362.0
LSD(P=0.05)		0.1	0.2	31.5
CV %		9.4	7.7	32.7

Plots fertilized with high levels of nitrogen (60 Kg N ha⁻¹) as urea, SA, CAN or poultry manure had high incidence of rust and ALS compared to plots received the normal amount of nitrogen (30 Kg^{-ha}) (Table 1). Plants which were not fertilizer (control) progressed with low level of rust and ALS. Severity of rust and ALS in plants however, differed significantly between treatments (fertilizer types). SA suppressed rust and promoted ALS. CAN increased the severity of ALS and reduced rust. Plots fertilized with urea nitrogen had low incidence of rust. The effectiveness of urea to suppress rust in beans is also reported by (Cosper and Schuster, 1953). Poultry manure decreased the incidence of rust and ALS.

The results of this trial have shown that there could be advantages of using SA, CAN, urea or poultry manure to minimize the incidence of diseases of beans such as rust and ALS provided that they are applied at normal recommended rates.

REFERENCES

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