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EFFECT OF PHORATE ON GROWTH CHARACTERISTICS AND NITROGEN CONTENTS OF COWPEA PLANTS

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The growth characteristics of plants have been reported to be affected by the application of insecticides in soil. Enhanced growth of cowpea plants by phorate application was reported by Ivy *et al.* (1957) and Parencia *et al.* (1978). Decrease in growth, dry matter weight and nitrogen contents of groundnut were recorded by Chandrayan and Prasad (1976). The results of studies made on the response of cowpea plants to different doses of phorate under Rhizobium treated and untreated conditions are presented in this paper.

Materials and Methods

Cowpea seeds were treated with rhizobium culture obtained from the Tamil Nadu Agricultural University and sown in pots (30 cm x 30 cm) containing 20 Kg red soil per pot. Another set of pots was kept where the seeds were sown without any rhizobium treatment. A single seed was sown in each pot. The pots were irrigated daily. Phorate 10G was applied to give dosages of 1, 2 and 3 Kg ai/ha. There was control both for Rhizobium treated and untreated series. The treatments were replicated thrice. Determinations on height, fresh weight, dry weight, root length, fresh weights of roots and total nitrogen contents (TNC) of plants were estimated by the method of Poiduvin and Robinson (1965).

Results and Discussion

The Rhizobium treated plants are superior to untreated plants in the different physical features and TNC (Table 1). In the Rhizobium treated plants, phorate treatment had resulted in significant increase in the height of plants and length of roots. Among the other features, fresh weight of plants, Dry weight and TNC have been favourably influenced by phorate treatment only at 2 kg ai/ha level. Root weight was not affected significantly. In cowpea plants not treated by Rhizobium, the height of plants was increased by 1 and 3 Kg ai/ha of phorate, TNC, root length and root weighl showed increase at all the doses of phorate. Here also, phorate at 2 kg ai/ha dose alone was seen to be favourable for such features as fresh and dry weights of plants and weights of plants and weight of roots. The special feature of 2 kg ai/ha dose of phorate has already been noted in the case of such factors as number of nodules on adventitious roots, size of nodules of tap roots, fresh weight of nodules and dry weight of nodules in Rhizobium treated plants and size of nodules on the adventitious roots in the plants not treated with Rhizobium culture (Visalakshy, 1977).

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Table I

The physical features and TNC of cowpea under different doses of phosphorus and rhizobial treatments (means)

Parameters	Rhizobium treated plants					Untreated plants				
	T0	T1	T2	T3	Statistical significance	T0	T1	T2	T3	Statistical significance
Height of Plants (cm)	108.7	129.9	134.8*	123.0	CD. 17.61*	100.9	108.1	98.3	133.2*	CD:24.1
Fresh weight of plants (g)	108.4	79.5	104.8*	95.0	CD. 5.19	80.7	78.7	98.1	78.8	NS
Dry weight of plants (g)	18.5	18.2	18.8	17.8	NS	19.8	12.4	18.4	11.9	NS
Root length (cm)	89.0	40.5	48.8*	50.8	CD. 8.87	45.4	45.5	49.0	50.5	NS
Fresh weight of roots (g)	18.8	18.8	14.9	15.9	NS	18.9	14.6	14.7	15.8	NS
Total nitrogen contents (TNC) %	4.5	8.8	4.7*	8.7	CD. 15.00	1.6	2.1	2.8	1.7*	CD.0.8

T_0 Control, T_1–1 kg ai/ha, T_2–2 kg ai/ha, T_3–3 kg ai/ha, NS–Non-significant.

*Significant at 5 % level,

With the native Rhizobium, the TNC of plants have been Enhanced by application of phorate at all the three dosages while with the inoculated Rhizobium the TNC is seen to be increased only at the 2 kg ai/ha dosage of phorate.

Summary

Studies were made on the effect of phorate applied as granule with seeds treated/untreeted with Rhizobium on growth characterstics and total nitrogen contents of cowpea. In rhizobium treated plants, plant height and root length were significantly increased due to phorate treatment while the other factors such as fresh and dry weights of plants and TNC were increased only at 2 kg ai/ha level. In cowpea plants not treated with Rhizobium the height of the plant and TNC were significantly increased in general by phorate application.

സംഗ്രഹം

ഫോറേറ്റ് തരികൾ വിത്തോടൊപ്പം fflsml^oJ ചേർത്താൽ റൈസോബിയ പ്രയോഗം നടത്തിയ പയർചെടികളിൽ തണ്ടിന്റെയും വേരിന്റെയും ദൈർഘ്യം ഗണ്യമായി വർദ്ധിച്ചു കണ്ടു. ചെടികളുടെ ആകെയുള്ള തൂക്കവും അവയിലെ നൈട്രജൻ അംശവും ഹെക്ടറൊന്നിന് രണ്ടു കിലോഗ്രാം ഫോറേറ്റ് എന്ന തോതിൽ കൊടുത്ത ചെടികളിൽ മാത്രമേ വർദ്ധിച്ചു കണ്ടുള്ളൂ. റൈസോബിയ പ്രയോഗം നടത്താത്ത ചെടികളുടെ തണ്ടിന്റെ ദൈർഘ്യവും നൈട്രജന്റെ അംശവും മാത്രമേ വർദ്ധിച്ചതായി കണ്ടുള്ളൂ.

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