

Effect of Quinalphos and Carbofuran on the Nodulation of Blackgram

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ABSTRACT

The effect of two granular insecticides viz., quinalphos and carbofuran on nodulation by *Rhizobium* in blackgram was studied. These chemicals did not affect the nodulation growth, dry weight and total nitrogen of the plant.

INTRODUCTION

Blackgram (*Phaseolus mungo* L.) is commonly grown in the rice fallows of Tamil Nadu. For controlling the insects and diseases various chemicals are applied to the soil. The effect of these chemicals on the soil microflora was studied by many workers (Eno and Everett, 1958; Pareek and Gaur, 1969; 1970; Oblisami *et al.*, 1973; Kandasamy *et al.*, 1974, 1975). The soil application of disyston at 12 ppm and DDT at 20 ppm was reported to enhance the symbiotic nitrogen fixation in groundnut (Ramani, 1974). Dasanit, Ekalux and Solvirex have no adverse effect on nodulation, shoot and root length and dry weight of groundnut (Oblisami *et al.*, 1976). The results on the effect of two granular insecticides viz., quinalphos (Ekalux) and carbofuran (Furadan) on the nodulation in blackgram are presented in this paper.

MATERIALS AND METHODS

Soil was collected from paddy field,

filled into circular pots of the size 30 cm diameter and treated with quinalphos and carbofuran at the rate of 1 kg a. i./ha. Blackgram seeds were surface-sterilized and inoculated with a suspension of *Rhizobium* sp. Both inoculated and uninoculated seeds were sown into the pots. The plants were watered periodically. The plants were removed at random on 30th and 45th day and their height was measured. They were oven dried at 105°C for 24 hr and dry weight determined. The root and shoot materials were separated in 30th and 45th day samplings, oven dried at 60°C and their total nitrogen estimated by microkjeldhal method (Bremner, 1960). The number of both pink and white nodules were counted in 30th and 45th day samplings separately. The leghemoglobin content of the nodules was estimated (Schiffman and Lobel, 1970).

RESULTS AND DISCUSSION

The results revealed that the treatment with quinalphos and carbofuran

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TABLE I. Effect of quinalphos and carbofuran on nodulation and Leghemoglobin content in Blackgram inoculated with *Rhizobium* sp.

Treatment	Total no. of nodules/plant*			Leghemoglobin content <i>Rhizobium</i> mg/g of fresh nodules
	Pink	White	Total	
Seed alone (uninoculated control)	4	6	10	1.92
Seed + (inoculated control)	5	7	13	2.07
Seed + quinalphos (1 kg a.i./ha)	6	10	16	2.08
Seed + quinalphos	9	10	19	2.20
Seed + Carbofuran (1 kg a.i./ha)	4	6	10	1.95
Seed + Carbofuran	6	6	12	2.10

*Average of 10 plants on 30th day

had no effect on the nodulation (Table I). These results are in agreement with the findings of Oblisami *et al.* (1974) on the effect of quinalphos and carbofuran on the nodulation in groundnut. A slight increase in the leghemoglobin content of the nodules raised from *Rhizobium* inoculated seeds was also observed due to quinalphos or carbofuran application. Sardeshpande *et al.* (1973) have reported an increase in dry weight, nodulation and leghemoglobin content of nodules of groundnut plants due to seed treatment with captan first followed by inoculation of *Rhizobium* sp. Quinalphos had no significant effect on shoot and root growth in both inoculated and uninoculated plants. Interestingly a slight increase in the dry weight and total nitrogen content of shoot was recorded in quinalphos treated and *Rhizobium* inoculated plants. Carbofuran also

TABLE II. Effect of quinalphos and carbofuran on the growth, dry weight and total nitrogen content in blackgram inoculated with *Rhizobium* sp.

Treatment	30th day						45th day			
	Growth (cm/plant)		Dry Weight* (mg/plant)	Total N (g/100g)		Growth (cm/plant)		Dry weight* (mg/plant)	Total N (g/100 g)	
	Root ^{ab}	Shoot ^{ab}		Root ^{ab}	Shoot ^{ab}	Root ^{ab}	Shoot ^{ab}		Root ^{ab}	Shoot ^{ab}
Seed alone (Uninoculated control)	8.0	14.0	0.210	2.24	2.30	9.5	16.5	0.235	2.50	2.66
Seed + <i>Rhizobium</i> (inoculated control)	10.0	18.0	0.250	2.35	2.69	11.2	20.5	0.290	2.80	3.08
Seed + quinalphos (1 kg a.i./ha)	10.0	17.5	0.268	2.41	2.69	11.8	20.0	0.315	2.67	2.94
Seed + <i>Rhizobium</i> + quinalphos	12.0	18.5	0.270	2.52	2.86	13.7	22.5	0.320	2.72	3.66
Seed + carbofuran (1 kg a.i./ha)	10.0	18.0	0.233	2.35	2.52	12.5	20.8	0.265	2.59	2.66
Seed + <i>Rhizobium</i> + carbofuran	11.0	1.90	0.254	2.41	2.74	13.0	21.8	0.275	2.80	2.64

* Significant at 5% level

** Significant at 1% level

slightly increased the shoot and root growth but had no effect on dry weight and total nitrogen content (Table II). All the treatments increased the growth, dry weight and total nitrogen content over the uninoculated control.

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