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Research Paper :

Effect of molybdenum and carbofuran on growth, yield and biochemical pararmeters of greengram (*Vigna radiate* L.)

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ABSTRACT

The experiment was carried out to study the interaction between molybdenum and carbofuran on physical and biochemical levels of greengram. On the basis of findings, it is concluded that the treatment combination T_7 *i.e.* 2 kg Mo+5.6kg carbofuran/ha showed the best performance particularly with respect to plant height, crop yield and protein content, while maximum nodules formation was recorded in T_6 *i.e.* 2kg Mo+0kg carbofuran.

Key words : Greengram, Molybdenum, Carbofuran, Growth, Yield, Test weight and Protein content

India is one of the major countries for pulse production. Pulses are an excellent source of dietary protein, energy, minerals and vitamins for the predominantly vegetarian population of India. Pulses form an integral part of cropping system for the farmers all over the country because they fit well in crop rotation. In addition pulses, enrich the soil through symbiotic nitrogen fixation from atmosphere. Therefore, pulses play an important role both in human nutrition as well as soil nutrition and enrichment. In global context the requirement of pulses is increasing on account of ever multiplying human population. Among all the pulses which are grown in our country greengram is one of the important pulse crop and is a rich source of various essential amino acids, phosphoric acid and minerals. Mungbean, also known as greenbean, mung, moong, mash bean, munggo or, green gram, and green soy, is the seed of *Vigna radiata* which is native to India and Pakistan. The split bean is known as moong dal, which is green with the husk, and yellow when dehusked. The beans are small, ovoid in shape, and green in color. The mung bean is one of many species recently moved from the genus *Phaseolus* to *Vigna* and is still often seen cited as *Phaseolus aureus* or *Phaseolus radiatus*. It can be grown as rain fed *kharif* crop on water retentive soil like loamy or heavy soil. In order for a crop to give optimum yield it is necessary that mineral nutrition as well as other needs of the growing plants is well looked after which includes water supply, fertilizer, insecticides etc. Since leguminous crops fulfill their own requirement of nitrogen from atmosphere therefore nitrogenous fertilizers are not much required. However, proper micro-nutrient supply to the crop is a requisite for healthy crop development which increase the yield of the crops (Saha *et al.*, 1996). It is one of the important factors which help towards optimizing yields in such crops. Molybdenum an important micro-nutrient required for legume plant, act as a co-factor for the enzymes in the process of fixation of atmospheric nitrogen. It is present in small amount in soil which has been found necessary for nodule formation in plants. In legumes crops the yield is affected by various insects, the use of insecticides is also necessary to fully optimize the yield of the crop and controlling the pest/insects (Gupta and Singh, 1992). Among insecticides, Carbofuran being water soluble, enters through the roots and transported to each and every part of the plant. It is a systematic granular carbamate insecticide containing 3%G by weight of Carbofuran as its active ingredient. Little attention has been paid on the interaction of micronutrient (molybdenum) and insecticide (carbofuran) in greengram. Therefore, keeping in view the above facts the present investigations were carried out to study the response of Molybdenum and Carbofuran on physical and biochemical parameters of green gram.

MATERIALS AND METHODS

The investigations were carried out at the research

plot of Department of Agricultural Biochemistry, Allahabad Agricultural Institute (Deemed University) Allahabad, during the *kharif* season. The experiment was laid out in factorial Randomized Block Design with three levels of Molybdenum (Mo) and Carbofuran(C) alone and in combination and replicated thrice. The particulars of the treatments were T_0 = Control, T_1 = 0kg Mo + 5.6 kg C, T_2 = 0kg Mo+ 7.2 kg C, T_3 = 1kg Mo +0 kg C, T_4 = 1kg Mo +5.6 kg C, T_5 = 1kg Mo +7.2 kg C, T_6 = 2 kg Mo +0 kg C, T_7 = 2 kg Mo +5.6 kg C, T_8 = 2 kg Mo +7.2 kg C. The variety cv.-T44 of *Vigna radiata* L. was selected for experiment. After the chemical and mechanical analysis of soil, initial status of organic carbon was 0.48 per cent, available nitrogen 48kgha^{-1}, P_2O_5 29 kg ha^{-1}, K_2O 18 kg ha^{-1} whereas, class of the soil was observed sandy clay loam. The experimental plot was irrigated, and then ploughed thrice with tractor. It was very difficult to record the observation of each and every plant, the technique of representative samples was adopted for recording the physical parameters of the plants, and 3 plants from each plot were randomly selected for study. Determination of protein in moong seeds was done by Microkjeldhal method (Nitrogen % x 6.25).

RESULTS AND DISCUSSION

Perusal of the data presented in Table 1 showed that height of the plant increased from beginning to 60DAS.In comparison to control (38.15) maximum plant height was observed in T_7(49.60) followed by T_6(48.94). Height of the plant showed considerable increase with the increase in level of Molybdenum and Carbofuran. Maximum no. of leaves was recorded in T_7 (9.75) followed by T_8 (9.33) as compared to control (7.25). An increase about more than 30% shows that with increase of level of Mo increase the no. of leaves also increased while different levels of carbofuran have no effect on number of leaves. Data presented in Table 1 also shows that no. of nodules concomitantly increased with the age of plants and were maximum at 45 DAS. Maximum no. of nodules were recorded in T_6 (49.50) followed by T_7 (45.50) which is comparatively more as compared to control (19.00).The result shows that Mo increased the no. of nodules till 45DAS, it attributes that carbofuran had no effect on no. of nodules. Similar observations were recorded by Choudhary *et al.* (1977) and Brar and Singh (1991). The maximum yield was observed in T_7 (9.5 q/ha) followed by T_8 (9.3q/ha) while in control maximum yield was about (6.5q/ha), both Mo and Carbofuran significantly increased the yield by 46%. Similar results have been obtained by Kamat *et al.* (1981), Hamid (1988). It is clear from the table that maximum test weight was recorded in level T_7 (29.20) as compared to control (24.63). Test weight of seeds increased with the application of Mo and Carbofuran in combination. It is also evident from the data that the protein content in grains increased with increase in the dose of Mo and Carbofuran. The maximum protein content was recorded in T_7 (28.30%) followed by T_6 (28.26%) whereas in control protein content was about (17.55%). Statistical observation at 5% reveals that Mo and Carbofuran have significant effect on grain yield of mung which coincide with the finding of Kamat *et al.* (1981), that application of Molybdenum increased the protein content.

Table 1: Effect of Molybdenum and Carbofuran on physical and biochemical parameters of green gram

Treatments	Plant height (cm)	No. of leaves (per plant)	No. of nodulation (per plant)	Grain yield (q/ha)	Test weight (1000 seed)	Protein content in grains (%)
T_0	38.15	7.25	19.00	6.5	24.63	17.55
T_1	41.46	8.00	20.83	7.2	27.60	19.44
T_2	41.01	8.08	20.83	7.3	26.83	19.58
T_3	47.55	8.25	39.00	8.1	27.60	24.26
T_4	46.67	8.58	36.00	8.5	28.53	24.96
T_5	43.87	8.66	41.00	9.1	26.73	23.91
T_6	48.94	8.75	49.50	8.7	28.30	28.26
T_7	49.60	9.75	45.50	9.5	29.20	28.30
T_8	48.30	9.33	40.83	9.3	28.23	28.12
C.D. (P=0.05)	3.8	0.44	4.31	0.16	N.S	3.75

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