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Short communication

Foliar fertilization as a supplement on seed crop of garden pea under mid hill conditions of North Western Himalayas

N.K. Hedau*, Shri Dhar, A. Gahalain, Gyanendra Singh, K.S. Hooda and S.R.K. Singh
Vivekananda Parvatiya Krishi Anusandhan Sansthan (I.C.A.R) Almora 263 601

Garden pea is an important vegetable crop extensively grown as off-season vegetable during summer in higher hills and winter in mid - hills as cash crops. The seed production is very much influenced by fertilization and also with the plant types. It is being realized that the productivity of crop is being adversely affected in different areas due to the deficiency of macro and micro- nutrients. The information is scanty on nitrogen, phosphorus and potassium fertilization aspect in garden pea seed production under hills.

The experiment was laid out in a randomized block design with three replications at Experimental Farm, Hawalbagh, VPKAS, Almora during 2005-06 and 2006-07 using garden pea varieties viz., VL *Ageti Matar* 7 and *Vivek Matar* 8. The seven treatments consisted of 0.5% Tracel (3% Zn, 1.5% Fe, 0.5% Cu and 0.5% B), 0.5% ZnSO4, 0.1% Nitrophospho, 5% SSP, 0.5% ammonium molybdate, 1% urea and control (water). Tracel from Rallis, Nitrophos from COMPO and other nutrient from Merck were used. These treatments were applied as foliar application at three stages of plant growth, two sprays before flowering and one spray at flowering stage. Fifteen plants in each treatment were selected for taking observations on plant height, No. of branches/ plant, pod length and No. of pods/plant were measured at fruiting stage of the crop whereas, no. of seeds per pod, 1000-seed weight and seed yield (kg/plot) were measured at dry pod stage (after harvesting).

Four replications of 100 seeds each were placed within double layered blotter paper, moistened with water equivalent to 2.5 times the substratum weight and germinated on petri plates at 25^{0}C (ISTA, 3). Germination (%) counts were taken on the basis of number of normal seedlings at 4 and 21 days. The mean germination percentage was calculated for each treatment.

The two year data were analyzed as per the statistical procedure given by Panse and Sukhatme (7).

Plant growth characteristics (Plant height and No. of branches per plant) were significantly affected by various treatments. Maximum plant height was recorded in VL *Ageti Matar* 7 with the foliar application of Nitrophospho and SSP followed by Tracel, ammonium molybdate, $ZnSO_4$ and urea as compared to control. Whereas, *Vivek Matar* 8 had showed maximum plant height with nitrophospho and SSP followed by ammonium molybdate, $ZnSO_4$, Tracel and urea as compared to control. Almost similar trend was noticed in case of no. of branches per plant with both the varieties (Table 1). These findings are in consonance with those of Datta *et al.* (2) and Sharma and Jat (8).

Table 1. Effect of foliar spray of nutrients on growth, pod length and No. of pods/plant of garden pea.

Treatment	Plant height (cm)		No. of branches/plant		Pod length (cm)		No. of pods/plant	
	VL Ageti Matar 7	Vivek Matar 8	VL Ageti Matar 7	VL Ageti Matar 8	VL Ageti Matar 7	Vivek Matar 8	VL Ageti Matar 7	Vivek Matar 8
Tracel	42.1	64.2	1.6	2.4	6.5	6.5	6.6	7.5
$ZnSO_4$	40.4	64.3	1.6	2.2	6.4	6.6	6.5	7.2
Nitrophospho	44.2	67.4	1.7	3.0	6.7	6.8	7.0	8.0
SSP	43.5	67.3	1.7	2.7	6.6	6.9	7.1	8.0
Amm. molb.	41.5	64.7	1.6	2.5	6.4	6.6	6.7	7.3
Urea	40.3	64.1	1.5	2.0	6.5	6.6	6.5	7.2
Control	38.8	63.5	1.3	1.9	6.4	6.6	6.0	7.2
CD at 5%	2.45	1.21	0.59	0.46	NS	NS	0.49	0.57

*Corresponding author' E-mail: hedaunirmal_2003@yahoo.co.in

Table 2. Effect of foliar spray of nutrients on seed yield, its contributing traits and seed germination of garden pea.

Treatment	No. of seed/pod		1000 seed wt. (g)		Seed yield (q/ha)		Germination (%)	
	VL Ageti Matar 7	Vivek Matar 8	VL Ageti Matar 7	VL Ageti Matar 8	VL Ageti Matar 7	Vivek Matar 8	VL Ageti Matar 7	Vivek Matar 8
Tracel	6.6	7.6	205	182	12.4	13.5	77.3	75.2
$ZnSO_4$	6.5	7.5	200	172	12.3	12.9	76.3	75.5
Nitrophospho	7.0	7.9	218	185	14.4	15.8	89.7	86.8
SSP	7.1	8.0	222	189	14.8	15.5	97.2	92.5
Amm. Molb.	6.6	7.5	206	170	12.8	13.7	79.9	79.5
Urea	6.5	7.6	201	164	11.6	12.8	76.3	76.7
Control	6.6	7.6	198	161	11.2	12.5	77.7	76.6
CD at 5%	NS	NS	5.6	6.1	1.41	1.29	5.06	4.37

Maximum seed germination was recorded with SSP followed by Nitrophospho and rest of the treatments were found non-significant with regard to seed germination in VL *Ageti Matar* 7 and *Vivek Matar* 8 (Table 2). Earlier Modi and Asanzi (5) also found increased seed germination with the application of phosphorus in maize.

Seed yield and its contributing traits (no. of pods/ plant and 1000-seed weight) were significantly affected by the treatments applied. Maximum values for seed yield, no. of pods/plant and 1000-seed weight were recorded with the application of SSP followed by nitrophospho and ammonium molybdate in VL *Ageti Matar* 7. In case of *Vivek Matar* 8, the highest values for No. of pods/plant and 1000-seed weight were recorded with nitrophospho followed by SSP and Tracel whereas, maximum seed yield was observed with the application of nitrophospho (15.8 q/ha) followed by SSP (15.5 q/ha) and ammonium molybdate (13.7 q/ha). However, treatment effect on pod length and No. of seeds/pod were found non significant with both the varieties (Tables 1 & 2). Seed yield and quality of fennel was increased with the foliar application of nitrogen and phosphorus (Khan *et al.,* 4). Bairwa and Fageria (1) found that 7.5 kg zinc/ha along with recommended fertilizers application in bottle gourd gave maximum number of fruits per plant, number of seeds per fruit and seed yield per plot. Naruka and Singh (6) found that both urea and gibberellic acid application enhanced the growth and fruit yield of okra significantly. Silberbush (9) stated that foliar fertilization is widely used practice to correct nutritional deficiencies in plants caused by improper supply of nutrients to roots. Foliar feeding is the practice of applying liquid fertilizers to plant leaves. Foliar fertilizers are absorbed right at the site where they are applied as quite fast acting, whereas, much of the soil fertilizers may never get used by plants.

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