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Influence of Mother Crop Nutrition on Seed Yield and Quality of Blackgram

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Pulses occupy a strategic position in agricultural economy of India. Pulse crops are grown on an area of 23.84 lakh ha accounting for nearly 33 percent of world acreage and consumed by 2.2 percent of world' s population . Among the pulses, blackgram is widely considered as an excellent source of high quality protein with good digestibility. Pulses normally produce a large number of flowers but only a few are retained and developed into pods. Although the inflorescence is profuse, the yield is low due to poor pod setting and harvest index.

Foliar application of nutrients constitutes one of the important milestones in the progress of agricultural production. Fertilizer applied to the soil at the time of sowing is not fully available to the plants as the crop approaches maturity. Supplemental foliar application is one of the many techniques in seed agronomy that caters to seed nutrition at the most vulnerable stage *i.e* seed filling (Shibles *et al.,* 1975). Care of seed during crucial stages of filling and maturation will lead to realization of final quality that losts even during storage (Krishnasamy, 1982). The techniques of supplemental foliar application and pre-harvest sanitation spray are simple, cost effective and can be advocated to any seed crop. Foliar application is credited with the advantage of quick and efficient utilization of nutrients, elimination of losses through leaching and fixation and helps in regulating the uptake of nutrients by plants (Barik and Rout, 1996). Hence, the present investigation was undertaken to know the effect of different nutrients on seed yield attributes and storage potential of carry over seeds of blackgram.

The material consists of seeds of black gram variety APK 1 and the nutrients namely, $ZnSO_4$1%(T1), Borax1%(T2), $FeSO^4$1%(T3), $MnSO_4$1%(T4), $Na_2MoO_4$1% (T5), DAP2.0% (T6), Urea1% (T7), and KCl 1% (T8) along with control (T9). The experiment was conducted at Agricultural Research Station, Bhavanisagar, Tamil Nadu Agricultural University. Foliar spraying was done at initial and fifty percent flowering stages of the crop. The observations on 100 seed weight, seed yield, germination and vigor index were recorded. Seeds were subjected to germination test by sowing 25 seeds in paper medium in four replications. Germination count was made eight days after sowing and germination was expressed as percentage of seeds which produced normal seedlings. The ten random seedlings were then measured for root and shoot length. The vigor index was derived from the following formula by Abdul Baki and Anderson (1973).

Vigour Index =Percentage germination x seedling length (cm)

The resultant seeds from foliar spraying treatments were kept in storage under ambient condition (28+2^{o}C temperature; 70 + 5% RH) for a period of 12 months. The samples were drawn at bimonthly intervals and analyzed for seed quality attributes like germination per cent, root length, shoot length and vigor index and for its storage potential. The experiments were set up

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in a Randomized Block Design. The results were subjected to analysis of variance and tested for significant differences (P = 0.05) as per Panse and Sukhatme (1967).

The results of present experiment revealed that blackgram crop sprayed with DAP 2.0% followed by urea spray (1.0%) showed superior performance by recording maximum 100 seed weight (5.6, 5.5 gm), seed yield (1240, 1040 kg/ha), germination (92, 88%) and vigor index (3690, 3256) respectively (Table 1). Similarly 51% increase in yield and increase in plant height, number of branches and leaves were recorded in sesame due to DAP application (Chaplot *et al.,* 1992).

Improving the performance of plants derived from aged seeds of cotton foliar fertilization has been reported to offset the deleterious effect of

Table 1. Effect of foliar spraying of nutrients on seed yield attributes of blackgram APK 1

Treatments	No. of pods/ plant	100 seed weight (gm)	Seed yield (kg/ha)	Germination (%)
T_1 – Spraying with $ZnSO_4$ 1.0%	40	5.2	710	86
T_2 – Spraying with Borax 1.0%	44	5.3	890	86
T_3 – Spraying with $FeSO_4$ 1.0%	49	5.3	895	87
T_4 – Spraying with $MnSO_4$ 1.0%	52	5.4	920	87
T_5 – Spraying with Na_2MoO_4 1.0%	48	5.4	870	87
T_6 – Spraying with DAP 2.0%	72	5.6	1240	92
T_7 – Spraying with Urea 1.0%	58	5.5	1040	90
T_8 – Spraying with KCl 1.0%	40	5.0	740	88
T_9 –Control (No spray)	38	4.8	860	80
Mean	**49**	**5.3**	**907**	**87**
CD (P=0.05%)	**5**	**0.1**	**16**	**2**

ageing in cotton by Sastri (1997). The initial low vigor could be made by spraying DAP, borax and magnesium sulphate and thereby achieve faster growth, earlier flowering, increased pollen viability and increase in seed set to an extent of 38% over plants not sprayed with solution. Similar studies were also reported in peas (Vakeswaran, 1998) and soybean (Sabir Ahamed, 1989) using DAP spray. Foliar application of DAP and $MnSO_4$ to sesame contributed to increase in number of seeds per capsule in soybean (Terman, 1977). The supplementary foliar application was also suggested to greengram and blackgram (Rajendran,1990)

Phosphorus was applied as solution of single super phosphate (0.5%) to blackgram (Subramanian and Palaniappan, 1980) and 1.5% to Bengalgram (Shetty *et al.,* 1992). Supplementary foliar application is done to improve seed quality and to enrich the source so as to feed the sink. Application during flowering was found to increase seed set and prevent pre-mature abortion of embryos. Ashley and Goodson (1972) reported the synergistic effect of combined application of urea and DAP helped in realizing better yield in soybean.

The seeds fed with foliar nutrients *viz.,* DAP (2.0%) and Urea (1%) maintained the shelf life in storage. The seed crop fed with DAP 2% and Urea 1% above nutrients maintained its storability with good germination (74 & 70%) and vigour index (2088, 1820) respectively up to a period of

Table 2. Effect of Foliar spraying of nutrients on seed quality attributes of blackgram APK 1

Treatments	Germination %		Root length (cm)		Shoot length (cm)		Vigour index	
	Months of storage							
	2	**12**	**2**	**12**	**2**	**12**	**2**	**12**
T_1 – Spraying with $ZnSO_4$ 1.0%	86	70	13	10	16	12	2494	1584
T_2 – Spraying with Borax 1.0%	88	70	12	10	15	11	2376	1554
T_3 – Spraying with $FeSO_4$ 1.0%	85	68	14	11	16	11	2550	1496
T_4 – Spraying with $MnSO_4$ 1.0%	85	65	15	10	17	10	2720	1360
T_5 – Spraying with Na_2MoO_4 1.0%	88	65	13	9	16	10	2552	1235
T_6 – Spraying with DAP 2.0%	90	74	19	14	22	15	3690	2088
T_7 – Spraying with Urea 1.0%	88	72	17	13	20	13	3256	1820
T_8 – Spraying with KCl 1.0%	88	65	14	10	15	12	2552	1430
T_9 –Control	84	60	11	9	14	10	2100	1140
Mean	**87**	**68**	**14**	**11**	**17**	**12**	**2698**	**1523**
CD (P=0.05%)	**3**	**3**	**2**	**3**	**2**	**2**	**26**	**26**

ten months of storage whereas control seeds maintain its viability only upto eight months of storage (Table 2). Improved germination of foliar sprayed seeds of soybean was reported by Palmertree (1981).

Hence, the spraying of nutrient solutions (DAP 2% and Urea 1%) is a viable technique in providing quick short term solutions to mother crop needs. Care must be taken to assess the nutrient needs of different crops during seed filling stage.

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