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Effect of Foliar Nutrient Sprays on Summer Greengram (*Vignaradiata* L.) Under Sub Mountain Zone Of Maharashtra

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Abstract

An agronomic investigation to study the Effect of Foliar Sprays on Economics ofSummer Greengram (*Vignaradiata* L.) was conducted at R.C.S.M. College of Agriculture, Kolhapurin randomized block design with seven treatments and replicated thrice during summer season of 2017-18. The attributing characters like plant height, Number of branches plant^{-1}, plant spread (cm), Leaf area (dm^2) and Dry matter plant^{-1} are increased significantly due to application of foliar spray of 12:61:00 (1.5%) before flowering over other treatments. However,it was on par with foliar spray of DAP (1.5%) and 19:19:19 (1.5%). Yield contributing characters *viz*., Number of pods plant^{-1}, number of seeds pod^{-1}, length of pods plant^{-1}, test weight (g), grain and straw yield was increased significantly due to application of foliar spray of 12:61:00 (1.5%) before flowering over other treatments. However, it was on par with foliar spray of DAP (1.5%) and 19:19:19 (1.5%) before flowering.

Key words : Foliar spray, nutrients, yield, greengram.

Nutrient play a pivotal role in increasing the seed yield in pulses.foliar application of major plant nutrients like nitrogen and potassium was found tobe good as soil application (Subramanian and Planiaappan, 1981). According to Kalita *et al*., (1994), supplementing urea at the reproductive stage significantly enhanced the seed yield by delaying leaf senescence in mungbean.

Application of fertilizer to soil and due to formation of certain soil complexes the uptake of necessary element becomes difficult for the plants. The applied fertilizers are not fully utilized by the plants in order to avoid or eliminate these situation foliar application of nutrients is important (Velu and Srinivasan, 1984).

It is now well established fact that plants can utilize water soluble nutrients through their foliage,when applied in the from of foliar sprays. The nutrients enter in the cells by penetrating the cuticle of the leaf through stomata. When problems the cuticle of the leaf through stomata. When problems of excessive leaching of nutrients exits,foliar application constitutes the most effective means of fertilizer application. This practice may be useful to early maturing crops under rainfed conditions where moisture is limiting factor. Inorganic phosphatic fertilizers when added to soil undergo various reaction with soil constituents rendering some of the added phosphate unavailable to plants. Foliar application of nutrients using water soluble fertilizer is one of the possible way to avoid such loss of phosphatic fertilizer (Pandrangi *et al*., 1991).

Materials and methods

The field experiment was laid out in a randomized block design with three replications in summer, 2017. There were 7 treatments with foliar spray of fertilizers on summer greengram. The treatment were absolute control (No spray), urea (1.5%), DAP (1.5%), 13:00:45 (1.5%),

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19:19:19 (1.5%), 00:52:34 (1.5%) and 12:61:00 (1.5%). The foliar spray of nutrients were applied just before flowering 32 DAS. The RDF 20:40:00 N:P:K kg ha^{-1} was applied uniformly to all treatments at the time of sowing. The soil of experimental field wassandy loam, neutral in reaction (pH 7.6) with low available nitrogen (257.75kg ha^{-1}), medium in available phosphorous (16.17 kg ha^{-1}), high available potassium (261.09 kg ha^{-1}), and medium in organic carbon (0.54 per cent).The greengram crop was sown on 15 February,2017 with spacing of 30 x 10 cm.

Result and discussion

Plant height : The highest plant height (68.73cm) was observed at harvest due to foliar spray of 12:61:00 (1.5%) before flowering and it is on par with DAP (1.5%) and 19:19:19 (1.5%) before flowering. The lowest plant height was recorded in absolute control (51.97 cm). The plant height was increased due to proper application of nitrogen through irrigation at 8-10 days interval. Similar result were observed by Patel and Patel (1994) and Verma *et al.*, (2011).

Branches plant^{-1} : The highest number of branches plant^{-1} were observed due to foliar spray of 12:61:00 (1.5%) before flowering and it is on par with DAP (1.5%) and 19:19:19 (1.5%). The lowest branches plant^{-1} was recorded in absolute control. The rest of treatments on par with each other.The increase in number of branches plant^{-1} might be due to foliar application of nitrogen and phosphorus. Nitrogen plays an important role in vegetative growth of plant. Verma *et al*., (2011) also observed the same results.

Dry matter : The highest dry matter plant^{-1} was observed due to foliar spray of 12:61:00 (1.5%) before flowering and it is on par with DAP (1.5%) and 19:19:19 (1.5%) before flowering. The lowest dry matter was recorded in absolute control. The rest of treatments on par with each other. The increase in total dry matter production plant^{-1} may be ascribed to beneficial effect of foliar application of nitrogen and phosphorus on growth of plant. The sufficient amount of nitrogen accumulation in plant is essential for dry matter accumulation. The results are in close conformity to Chandrasekhar and Bangarusamy (2003), Selvi *et al*. (2004).

Leaf area plant^{-1} : The highest leaf area plant^{-1} was observed due to foliar spray of 12:61:00 (1.5%) before flowering and it is on par with DAP (1.5%) and 19:19:19 (1.5%) before flowering. The lowest leaf area plant^{-1} was recorded in absolute control.The rest of treatments on par with each other.The increase in leaf area may be due to the promotive effect of foliar application of Nin leaf growth and in turn on leaf area (Kalita et al., 1994). Application of higher quantity of nitrogen has favoured rapid growth enlargement of tissue resulting higher leaf area. Similar result were observsed by Sritharan *et al.* (2005) and Mondal *et al.* (2011).

Plant spread : The highest plant spread was observed due to foliar spray of 12:61:00 (1.5%) before flowering and it is on par with DAP (1.5%) and 19:19:19 (1.5%) before flowering. The lowest plant spread was recorded in absolute control .The rest of treatments on par with each other. The increase in leaf area may be due to the promotive effect of foliar application of N in leaf growth and in turn on leaf area (Kalita et al., 1994). Application of higher quantity of nitrogen has favoured rapid growth enlargement of tissue resulting higher leaf area. Similar result were observsed by Mondal *et al*. (2011).

Pods plant^{-1} : The mean number of pods Plant^{-1} were (22.44) and it was significantly influenced by different foliar spray of nutrients.

The highest number of pods plant^{-1} (25.97) foliar spray of 12:61:00 (1.5%) before flowering and it is on par with DAP (1.5%) (24.36) and 19:19:19 (1.5%) (24.78) before flowering. The lowest leaf area plant^{-1} was recorded in absolute control (18.15). The rest of treatments on par with each other. The increase in pod yield was due to more nutrient supply to crop through foliar spray of 12:61:00. This might have caused more number of pods and efficient translocation of photosynthates from source to sink (Kuttimani and Velayutham, 2011). The results are close conformity to Patel and Patel (1994), Sarkar and Pal (2006), Godase *et al.* (2011), Mondal *et al*. (2011) and Verma *et al*. (2011).

Number of seeds pod^{-1} : The mean number of seeds pod-I was 9.63. The mean number of seeds pod^{-1} was significantly influenced by different foliar spray of nutrients. Foliar spray of 12:61:00 recorded the highest number of seeds pod-I (10.78). The lowest number of seeds pod-I was recorded in absolute control (8.51). The similar results were found by Patel and Patel (1994), Sarkar and Pal (2006) and Verma *et al.* (2011).

Weight of Seeds Plant^{-1} : The mean Weight of seeds plant^{-1} was 6.03.The mean weight of seeds plant^{-1}was significantly influenced by different foliar spray of nutrients.Foliar spray of 12:61:00 recorded the highest number of weight of seeds plant^{-1} (7.92). The lowest Weight of seeds plant^{-1} was recorded in absolute control (4.55). The similar results were found by Patel and Patel (1994), Sarkar and Pal (2006) and Verma *et al*. (2011).

Length of Pod Plant^{-1} : The mean length of pod plant^{-1} (6.97) was the meanwas significantly influenced by different foliar spray of nutrients.Foliar spray of 12:61:00 before flowering recorded the highest number of length of pod plant^{-1} (7.93) before flowering. The lowest length of pod plant^{-1} was recorded in absolute control (6.27). The similar results were found by Patel and Patel (1994), Sarkar and Pal (2006) and Verma *et al*. (2011).

Test Weight : The mean test weight was 42.08 g. The mean test weight (g) was significantly influenced by different foliar spray of nutrients.The foliar spray of 12:61:00 before flowering recorded the highest test weight (43.89 g). The lowest test weight was recorded in absolute control (39.71g). The size of seeds might be increased due to the foliar application of proper quantity of nitrogen. The finding confirms the results of Patel and Patel (1994),

Table 1. Effect of foliar sprays on growth attributes of summer greengram

Treatments	Plant height (cm)	Branches plant^{-1}	Dry matter plant^{-1}	Leaf area plant^{-1} (dm^2)	Plant spread (cm)	Days to 50% flowering	Days to maturity
T_1 : Control (No spray)	51.97	6.28	25.33	5.99	46.74	38	70.17
T_2 : Urea (1.5 %spray)	62.64	6.46	25.56	7.07	50.19	38	69.50
T_3 : DAP (1.5% spray)	68.52	7.44	32.16	9.21	51.96	37	67.90
T_4 : 13:00:45 (1.5% spray)	60.21	6.58	27.86	8.09	48.63	38	69.16
T_5 : 19:19:19 (1.5% spray)	67.36	7.04	30.59	9.05	51.95	37	68.22
T_6 : 00:52:34 (1.5% spray)	60.48	6.45	26.78	7.98	47.89	38	69.34
T_7 : 12:61:00 (1.5% spray)	68.73	7.58	33.84	10.04	52.82	36	67.71
S.Em±	1.67	0.10	1.16	0.40	0.11	0.64	1.30
C.D at 5%	5.01	0.31	3.49	1.22	0.35	1.93	NS
General mean	62.84	6.83	28.30	8.38	50.02	37.28	68.85

Kalita *et al*. (1995) and Godase *et al*. (2011), Verma *et al.* (2011).

Seed yield ha^{-1} : The foliar spray of 12:61:00 before flowering recorded the highest seed yield (16.26 q ha^{-1}) and it was at par with foliar spray of DAP (15.78 q ha^{-1}) and 19:19:19 (15.66 q ha^{-1}. The lowest seed yield was recorded in absolute control (11.29 q ha^{-1}).The yield was increased due to the increased dry matter production and efficient assimilate translocation to the developing sink lending to increased pods and higher seed yield (Dixit and Elamnthi 2007). It may be due to increased supply of nitrogen to leaf cell, which is essential for photosynthesis. The increase in yield was due to decrease in flower drop per plant imparted by the foliar application of nutrients. Mungbean, through produces more number of flower, most of them get abscised without forming pods. The retention of flower and pod can be increased by foliar application of nutrients as reported by Chandrasekhar and Bangarusam (2003).These results are supported by Patel and Patel (1994), Satyanarayanamma *et al.* (1996), Godase *et al.* (2011), Kuttimani and Velayutham (2011) and Verma *et al.* (2011).

Straw yield ha^{-1} : The foliar spray of 12:61:00 recorded the highest straw yield (31.78 q ha^{-1}) and it was on par with foliar spray of, DAP (30.68 q ha^{-1}), 19:19:19(30.24 q ha-I) and 00:52:34 (28.37 q ha^{-1}). Lowest straw yield ha^{-1} was recorded in absolute control (25.39 q ha^{-1}).

The increase in straw yield might be due to increase in growth contributing characters like number of leaves, leaf area, dry matter etc, The nitrogen accumulation in sufficient amount in plant and it is essential for dry matter accumulation. There was increase in straw yield ha^{-1} which was due to increase in total dry matter production plant^{-1}.

The research finding confirms the result of Patel and Patel (1994), Dixit and Elamathi (2007), Kuttimani and veayutham (2011), Godase *et al.* (2011) and Verma *et al*. (2011).

Days to 50 Per cent Flowering : The significantly lower days required to 50 per cent flowering was recorded in treatment consisting foliar spray of 12:61:00 (1.5%) (36 DAS) and it was on par with foliar spray of DAP (1.5%) 37 DAS and 19:19:19 (1.5%). The mean number of days required to 50 % flowering was highest in treatments of urea (1.5%), 13:00:45 (1.5%), 00:52:34 (1.5%) and control (1.5%) 38 DAS.

Table 2. Effect of foliar sprays on yield attributing characters of summer greengram

Treatments	No. of pods plant^{-1}	Length of pod	No. of seeds pod^{-1}	Weight of seed plant^{-1}	Test weight (1000 seeds)	Seed yield (Kg ha^{-1})	Straw yield (kg ha^{-1})
T_1 : Control (No spray)	18.15	6.27	8.51	4.55	39.71	11.29	25.39
T_2 : Urea (1.5 %spray)	20.52	6.41	9.83	5.90	40.66	12.23	26.87
T_3 : DAP (1.5% spray)	24.36	7.53	10.55	6.72	43.64	15.78	30.68
T_4 : 13:00:45 (1.5% spray)	21.45	6.78	8.75	5.31	41.62	12.21	26.92
T_5 : 19:19:19 (1.5% spray)	24.78	7.19	10.23	6.58	42.86	15.66	30.24
T_6 : 00:52:34 (1.5% spray)	21.86	6.69	8.81	5.24	42.24	13.32	28.37
T_7 : 12:61:00 (1.5% spray)	25.97	7.93	10.78	7.92	43.89	16.26	30.72
S.Em±	0.42	0.05	0.20	0.51	0.06	0.96	1.04
C.D at 5%	1.30	0.15	0.60	1.52	0.19	2.88	3.13
General mean	22.44	6.97	9.63	6.03	42.08	13.82	28.45

Days to Maturity : The mean number of days to maturity was 68.85. The mean day to maturity was statistically non-significant due to different foliar sprays of different nutrients. But lower days required to maturity was recorded in treatment consisting foliar spray of 12:61:00 (1.5%) days to maturity (67.71 DAS).

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