Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2017; SP1: 971-973

Sonu Dey
Department of Agronomy, (Agroforestry), Banaras Hindu University, Varanasi, Uttar Pradesh, India

Sant Prasad
Department of Agronomy, (Agroforestry), Banaras Hindu University, Varanasi, Uttar Pradesh, India

Prabhat Tiwari
Department of Agronomy, (Agroforestry), Banaras Hindu University, Varanasi, Uttar Pradesh, India

Prashant Sharma
Department of Agronomy, (Agroforestry), Banaras Hindu University, Varanasi, Uttar Pradesh, India

Correspondence
Sonu Dey
Department of Agronomy, (Agroforestry), Banaras Hindu University, Varanasi, Uttar Pradesh, India

Effect of urea, KCl, Zinc placement & spray on growth of cowpea

Sonu Dey, Sant Prasad, Prabhat Tiwari and Prashant Sharma

Abstract
Field experiment was conducted to find out the influence of Urea, KCl, Zn placement and spray on growth of Cowpea crop. Crop during Kharif season 2017 under guava based agri-horti system. The experiment was laid out in simple RBD design and replicated thrice. The treatments were nine. Application of various levels of KCl, Zinc and Urea which significantly increased dry matter production/plant, plant height, number of branches/plant, number of trifoliate/plant, total nodule / plant. Foliar nutrient sprays viz., 2% urea, 2% KCL, 1.5% ZnSO4 Foliar spray treatment with the aqueous solution of nutrients was done to the 15 and 30 DAS of Cowpea crop. Significant increase was recorded in plant height, dry matter production, Maximum growth was recorded when spread with 2% urea spray followed by 2% KCl at flowering and 15 days later is the viable nutrient management package to the Cowpea for getting higher income through higher productivity.

Keywords: simple RBD, cowpea crop, trifoliate, foliar nutrient

Introduction
Cowpea [*Vigna unguiculata* (L.) Walp] commonly known as lobia is one of the important kharif pulse crop grown for grain, forage and green manuring. The crop has heavy vegetative growth which covers the ground fully and checks the soil erosion in problem areas. It can be later ploughed down for green manuring. It has considerable promise as an alternative pulse crop in dry land farming. Cowpea is highly responsive to fertilizer application. The dose of fertilizer depends on the initial soil fertility status and moisture availability conditions. Foliar fertilization is gaining importance in plant nutrition these days. The foliar applied nutrients are more effective as compared to soil appliednutrients because of higher uptake efficiency, an effort, therefore, was made in this study to find out the role of foliar application of fertilizers along with fertility levels on growth and productivity of cowpea. Being a legume, cowpea is a promising crop for controlled ecological support system, since foliage, green pod and seeds are edible with low fat, high complex carbohydrate, moderate proteins and adequate minerals. It also improves the soil health by enrich the organic matter and nitrogen recycling. Therefore, it is known as potential crop for human as well as soil health. It is also well suited in Agroforestry system. Besides being a rich source of protein, they maintain soil fertility through biological nitrogen fixation in soil and thus play a vital role in furthering sustainable (Balusamy andMeyyazhagan,2000) [2]. India is the largest producer and consumer of pulses in the world accounting for 33.6 percent of the world area and 24 percent of the world production of pulses (Pramanik, 2009) [4]. The area under pulse crop is increasing continuously but productivity is decreasing year by year. Due to decreasing soil fertility especially macro and micronutrients, imbalanced use of fertilizer. To overcome these problem, additional nutrition through foliar feeding is play a vital role in pulse production by stimulating root development, nodulation, energy transformation, various metabolic processes and increasing pod setting and thereby increasing the yield. This is one of the most efficient ways of supplying essential nutrients to a growing crop. Considering the above facts the experiment was conducted to incredulous this problem by foliar feeding of nutrients (Ali, *et al.* 2010) [1].

Material and Methods
The field experiment was conducted during kharif season 2017 under Guava based Agri-Horty system at Rajiv Gandhi South Campus (BHU) Mirzapur, which is situated in the South-East of Mirzapur in Vindhyan region at 25º 10’ latitude, 82º 37’ longitude and an altitude of 147 meters above mean sea level occupying over an area of more than 1000 ha of land. The area falls in a belt of semi-arid to sub-humid climate. On an average, out of the total annual rainfall major fraction (75 %) is received from June to September. The soil of the experimental field was Red lateritic comes under rain-fed and invariably poor fertility status.

This region comes under agro-climatic zone III A (semi-arid eastern plain zone).sandy clay loam in texture with the available nitrogen 376.32 kg ha-1, phosphorus 16.76 kg ha-1, potassium 294.24 kg ha-1 and organic carbon content 0.30%. The experiment was laid out in simple Randomized Block Design and replicated thrice, assigning cowpea crops with nine treatment (T1-control), (T2-2% Urea spray), (T3- KCl @30kg/ha), (T4-2% KCl spray), (T5-2% KCl spray+ Urea Spray), (T6- Zn@5kg/ha), (T7- Zn@5kg/ha + 2%Urea spray), (T8- Zn@5kg +KCl@30kg/ha), (T9- 1.5% Zn spray +2% urea spray + 2%KCl spray) Good viable Kashi Kanchan Variety of Cowpea seed was used.. The seeds were sown at 60 cm between rows and 45 cm between seed to seed to maintain optimum plant population. The recommended fertilizer dose of DAP ha-1 were applied as basal in lines and incorporated at the time of sowing. Foliar application was done at flowering and pod filling stages of crop growth using high volume sprayer with a spray volume of 500 liter ha^{-1}. Recommended crop management practices including plant protection remained common to all the treatments. The data collected for Cowpea crop was statistically analyzed **(**Gomez KA and Gomez AA,2010) [3]. Whenever significant difference existed, critical difference was constructed at five per cent probability level.

Results and Disscussion

Foliar spray to cowpea significantly enhanced the drymatter accumulation. Foliar spray of 2% Urea recorded the highest dry matter accumulation per meter row length (5.87 g) at 45 DAS. The favorable effect of foliar application of fertilizers might be due to on account of improved photosynthetic efficiency. The plant height and number of branches/plant also increased significantly with foliar spray of fertilizers, whereas 2% Urea spray recorded highest plant height and number of branches/plant at harvest. Foliar application of 2% urea significantly increased the number of root nodule of cowpea as compared to control. However, foliar application of 2% Urea produced significantly increased the plant height and number of branches plant-1, Trifoliate, Fresh weight, root nodules and dry weight in cowpea followed by spray of 2% KCl+Urea and KClspray, similar result are found by the Venkatesh and Basu (2011) [5] and Venkatesh *et al.* (2012) [6] however placement of KCl and Zn could not bring any significant increase in plant growth and yield as compare to foliar spray of KCl and zinc. This might be due to enhanced level of nutrient available in the rhizo-ecosystem of the foliar applied nutrients resulting in better plant growth and development. Application of nutrients would have resulted in better vegetative growth as observed by taller plants, more branches and efficient nodulation. This favorable influence of foliar application of nutrients could be ascribed to more and quick access to nutrients by plants at seedling and early development stages. The Plant height and dry matter production was increased with the foliar nutrition of 2% Urea and KCl and it was comparable with foliar spray of 2% KCl and 2% urea, 1.5% zinc at flowering and pod setting stage of pulse crop. This might be due to increased availability of nutrients to plants leading to maximum plant growth in terms of plant height and leaf area which in turn contributed higher DMP production. During this study we examined that foliar spray is a well-established tool to complete and to enrich plant nutrition. Foliar feeding can provide the nutrients needed for normal developments of crops in cases where absorption of nutrients from the soil is disturbed. As uptake of nutrients through the foliage is considerably faster than through roots, foliar sprays is also the method of choice when prompt correction of nutrient deficiencies is required.

Table 1: Effect of Urea, KCl, Zinc Spray on Growth parameter of Cowpea.

Treatment	Plant height		Branches		Trifoliate		Root Nodules		Fresh weight		Dry weight	
	15 DAS	45 DAS	15 DAS	45 DAS	15 DAS	45 DAS	15 DAS	45 DAS	15 DAS	45 DAS	15 DAS	45 DAS
T1	24.8	31.2	2.7	11.2	2.55	7.2	9.09	9.73	4.26	19.3	0.72	2.00
T2	24.9	48.7	2.8	22.8	3.46	11.5	9.66	17.49	5.52	44.5	0.74	5.87
T3	29.7	38.8	3.8	13.2	3.79	7.4	15.26	12.4	8.78	23.8	0.78	3.79
T4	28.3	45.9	3.7	16.0	3.66	8.6	11.89	13.88	7.55	28.5	1.11	5.03
T5	29.0	47.0	3.6	16.9	3.77	9.8	12.92	15.88	8.42	34.9	1.75	5.25
T6	28.1	35.3	3.7	13.02	3.62	7.2	10.12	12.11	6.98	23.0	1.08	2.44
T7	26.5	44.8	3.6	15.8	3.61	8.4	10.08	13.41	5.58	27.4	0.97	4.83
T8	28.4	39.3	3.7	13.44	3.74	7.6	12.42	12.67	8.02	24.9	1.22	4.66
T9	26.2	44.5	3.0	13.85	3.51	7.9	9.99	12.77	4.55	29.5	0.79	4.74
CD	3.29	4.29	0.79	1.73	0.68	1.14	1.08	1.72	1.40	3.43	0.38	1.16

Conclusion

The present study indicated that foliar application of 2% Urea resulted in higher grain yield in cowpea. Second highest growth was observed when i applied 2% urea with 2% KCl. Zinc also play a significant role in growth but when we apply it with 2% urea Which was followed by 2% KCl spray. The growth parameters and yield attributes were also found to be higher when 2% Urea is given as spray at flowering and pod filling stages. This may be due to balanced growth habit, which induced more flower and fruiting body production with timely supply of nutrients through foliar spray might have reduced shedding of flowers and fruits, which led to a positive source-sink gradient of photosynthates translocation due to growth regulator. Hence, foliar application of 2% Urea or 2% KCl will be viable and feasible option in order to get higher growth and yield in Cowpea crop. As compare to Placement and spray, Spray gives better result in cowpea.

References

1. Ali MA, Abbas G, Mohy-ud-Din Q, Ullah K, Abbas G, *et al.* Response of mungbean (*Vigna radiata* L.) to phosphatic fertilizer under arid climate. J Animal & Plant Sci. 2010; 20:83-86.
2. Balusamy M, Meyyazhagan M. Foliar nutrition to pulse crop. In: ProcSymp on recent advances in pulse up production technology, TNAU, Coimbatore, 2000.
3. Gomez KA, Gomez AA. Statistical procedures for agricultural research. 2nd edn. Wiley India PVT Ltd, India, 2010.
4. Pramanik SC. Rainwater management techniques for successful production of pulses in rain fed areas. Indian Farming. 2009; 58:15-18.
5. Venkatesh MS, Basu, PS. Effect of foliar application of urea on growth, yield andquality of chickpea under rainfed conditions. Food Legumes. 2011; 24(2):110-112.

6. Venkatesh MS, Basu PS, Vedram. Effect of foliar application of nitrogenous fertilizersfor improved productivity of chickpea under rainfed conditions. Legume Res. 2012; 35(3):231-234.