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Short communication

EFFECT OF VARIETIES AND NUTRIENTS APPLICATION ON YIELD ATTRBUTES AND YIELD OF COWPEA

JITENDRA GHOSHLYA, A.K. GUPTA, S.K. CHOUDHARY AND ROHIT KHANDELWAL

S.K.N. College of Agriculture Jobner, Jaipur (Rajasthan)
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Cowpea (*Vigna unguiculata* (L.) Walp) is an important pulse crop grown mainly in *Kharif* season under rainfed condition. It is grown for grain, fodder, vegetable and green manuring purposes. Cowpea is short duration, high yielding and quick growing crop and provided quick and thick cover on the ground thus helping in conservation of soil. It is grown as alternative crop in dry land farming. The application of nutrient is a must for sustaining optimum yields and profits. Different cultivars may have variable nutrient acquisition capacity. Information on such aspects is lacking. Hence, there is a need to generate information on response of different varieties to applied nutrients for increasing fertilizers use efficiency.

A field experiment was conducted during *kharif*, 2006 at Jobner (Rajasthan). The soil was loamy sand, having 8.2 pH, 1.3 dSm^{-1} electrical conductivity, 3.2 g kg^{-1}organic carbon, 136 kg ha^{-1} available nitrogen, 8 ha^{-1} available phosphorus and 146 kg ha^{-1} available potassium, 8.2 mg kg^{-1} available sulphur and 0.42 mg kg^{-1} available zinc.The experiment comprising seven nutrient application, control and recommended level of N+P, N+S, P+S, N+P+S, N+P+Zn, N+P+Zn+S and two varieties (RC-19 and RC-101) making 14 treatment combinations was laid out in randomized block design with four replication. Crop was sown during second week of July and harvested in second week of September, 2006. The sources of nutrients were urea, diammonium phosphate, single superphosphate and zinc oxide for N, P, S and Zn, respectively. Seed was inoculated with *Rhizobium* and PSB culture using 12 gram culture per kg seed before sowing. Intercultural operations *viz.*, thinning, hoeing and weeding were done after 20 days of sowing to maintain recommended spacing, proper aeration and weed control. For weed management, pendimethalin 1.0 kg a.i. per ha was applied as pre-emergence to control the weeds in early stage of the crop. Fully matured and developed pods from randomly selected five plants from each plot were plucked and number of seeds was counted. The average number of pods and seeds per plants was worked out. After threshing and winnowing the weight of seeds for each net plot area was recorded in kg per plot and then converted in to q ha^{-1}.

Table 1: Effect of varieties and nutrients application on yield attributes and yield of cowpea

Treatments	Pods per plant (no.)	Seeds per pod (no.)	Test weight (g)	Grain yield (q ha^{-1})	Straw yield (q ha^{-1})	Biological yield (q ha^{-1})
Variety						
RC-19	6.69	8.12	74.07	8.92	14.90	23.82
RC-101	6.94	8.71	77.04	9.52	15.87	25.39
CD (P = 0.05)	0.34	0.41	0.37	0.51	0.99	1.17
Balanced fertilizer						
Control	5.48	6.81	71.81	7.31	12.69	20.00
NP	6.48	7.90	75.00	8.70	14.82	23.52
NS	6.53	7.71	73.69	8.61	14.35	22.96
PS	6.55	8.10	73.94	8.98	15.00	23.98
NPS	6.83	8.60	78.00	9.35	15.46	24.82
NPZn	7.43	9.50	76.63	10.37	17.04	27.41
NPZnS	8.40	10.29	79.81	11.20	18.34	29.54
CD (P = 0.05)	0.55	0.67	0.60	0.83	1.60	1.90

Corresponding author Email: suraj_rau@yahoo.co.in,

Data (Table 1) reveal that the combined application of fertilizer i.e. 15 kg N, 30 kg P_2O_5, 20 kg S and 5 kg Zn ha^{-1} produced significantly higher pods per plant, seeds per pod and test weight, seed yield, straw yield and biological yield compared to other treatments. The enhancement in yield attributes could be ascribed to the role which might have been played by the nutrients supplied to the plants. It is relevant to mention here that adequate supply of nitrogen to plants not only promotes the manufacture of food but also its subsequent partitioning in sink. Similarly, phosphorus plays a unique role in laying down the floral primodria. Application of sulphur might have improved the overall nutritional micro environment in rhizosphere as well as in the plant system and ultimately the metabolic and photosynthetic activities resulting into better development of yield components. Zinc aids in the synthesis of auxins. The increase in yield attributes appears to have been brought about by cumulative effect of all the elements. The increase in number of pods per plant and increased number of seeds per pod led to higher grain yield due to balanced fertilization consisting of N, P, Zn and S. Similarly, higher straw yield could be attributed to profuse vegetative growth. It is interesting to note that application of N, P, S and Zn increased the grain yield by 53 % over control. This calculation indicated more response to a micro nutrient as well as synergistic effect between nutrients. These results corroborate with the findings of Sareen and Sharma (2010), Tripathi *et al.* (2011) and Singh and Singh (2012). The cowpea genotype RC-101 recorded significantly higher pods per plant (6.94), seeds per pod (8.71), test weight (77.04), seed yield (9.52 qha^{-1}), straw yield (15.87 q ha^{-1}) and biological yield (25.39) and increases in these characters were by 3.73, 0.59, 2.97, 6.66, 097 and 1.57 % increases over genotype RC-19 . The higher grain yield from RC-101 may be attributed to better vegetative growth and the cumulative effect of yield attributing characters. Better vegetative growth in RC-101 is expected to harness more of sunlight and make efficient use of moisture resulting in higher grain yield than that from RC-19. Paksen and Artik (2004) also found wide differences in yield of cowpea due to genotypes.

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