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Extended Abstract

Fertilizer Prescription Equation for Bhendi based on stcr

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Abstract:

The gradient and test crop experiments were conducted at farmer's holding of Karikalampakkam village in Nettapakkam commune of Puducherry district, U.T of Puducherry during 2017-2018. The study area comes under Bahour soil series which occupies 12.72 per cent of Puducherry district. This soil is classified as fine, mixed isohyperthermic, TypicUstropept. The fertility gradient experiment was conducted with hybrid maize (Kavery super 244) by adopting Ramamoorthy's inductive methodology and variations in soil fertility were created by applying three graded doses of fertilizer N, P2O5 and K2O viz.,N0P0K0, N1P1K1 and N2P2K2. After the creation of fertility gradient in the experimental field, the test crop experiment was conducted with bhendi hybrid (Green gold plus). The treatment consists of four levels of N (0,100,200 and 300 kg ha-1), P (0, 50,100 and 150 kg ha-1) and K (0, 50,100 and 150 kg ha-1) and three levels of FYM (0, 6.25 and 12.5 t ha-1). There were 21 fertilizer treatments along with three controls which were randomized in each strip in such a way that the treatments occurred in both directions, NPK alone, FYM applied @ 6.25 t ha-1 and 12.5 t ha-1 were super imposed across the strips and was conducted as fractional factorial design.

In the present investigation, variations in soil fertility pertaining to soil available N, P and K were created which were clearly reflected in terms of post-harvest soil available N, P and K status, yield and uptake by maize in the gradient experiment.

The results of test crop experiment with bhendi had shown that application of inorganic fertilizers along with FYM either 6.25 t ha-1 or 12.5 t ha-1 had registered higher biometrical observations viz.,plant height and number of branches per plant and yield parameters like number of fruits per plant, fruit length, girth, weight and yield. The quality parameters viz., starch and protein contents were influenced by the addition of NPK + IPNS, whereas the same treatment recorded the lowest crude fibre in bhendi fruit compared to NPK alone treatment and control.

Using the data on the yield, total uptake of N, P and K, initial soil available N, P and K and doses of fertilizer N, P2O5, K2O applied, the basic parameters viz., the nutrient requirement (NR), the per cent contribution of nutrition from soil (Cs), fertilizers (Cf) and FYM(Cfym) to total uptake of nutrients by bhendi were computed. Making use of the basic parameters, fertilizer prescription equations under NPK alone and IPNS were developed as furnished below.

FN = 2.00 T - 0.39 SN	FN = 2.00 T - 0.39 SN - 1.12 ON
FP2O5 = 1.13 T - 1.05 SP	FP2O5 = 1.13 T - 1.05 SP - 0.98 OP
FK2O = 0.93 T - 0.16 SK	FK2O = 0.93 T - 0.16 SK - 0.64 OK

Response of bhendi to fertilizer nutrients were obtained with the levels of N (N300), P2O5 (P100) and K2O (K100). There was a progressive increase in response for all the nutrients up to the level i.e. 300:100:100 kg ha-1of N:P2O5:K2O. The highest response ratio (RR) for N, P2O5 and K2O of 18.94, 18.00 and 20.69 was recorded at N300, P100 and K100 levels respectively.

Among the three nutrients, the requirement of K2O was the highest followed by N and P2O5. The per cent nutrient contribution from soil was higher for P followed by N and K. The per cent contribution of nutrients from fertilizer (Cf) followed the order of K2O>N>P2O5. More contribution for total nutrient uptake was registered with fertilizer source than from the soil source. The per cent contribution of N, P2O5 and K2O from FYM (Cfym) was higher for K2O followed by N and P2O5.

Using the fertilizer prescription equation, nomograms were formulated for desired yield target of bhendi for a range of soil test values under NPK alone and under IPNS for desire yield targets (160, 170 and 180 q ha-1) of bhendi. When NPK + FYM @ 6.25 t ha-1 with 28 per cent moisture and 0.56, 0.32 and 0.48 per cent N, P and K, respectively, there was a saving of 25, 15 and 22 kg of fertilizer N, P2O5 and K2O, respectively. If FYM @ 12.5 t ha-1 was applied with above quality, the saving of fertilizer N, P2O5 and K2O was 51, 29 and 44 kg ha-1, respectively. Critical soil test values for available NPK were low under IPNS treatments (NPK + FYM) as compared to NPK alone.

The bhendi fruit yield was positively correlated with soil nitrogen (r=0.608**, r=0.611**, r=0.734**), soil P (r=0.440*, r=0.586**, r=0.507*), soil K (r=0.436*, r=0.453*, r=0.609**) respectively for NPK alone, NPK + FYM @ 6.25 t ha-1 and NPK + FYM @ 12.5 t ha-1 treatments.

The path analysis revealed that the nutrients except soil P had a direct and positive contribution to the bhendi fruit yield at very high level in the case of N and medium level in the case of K and also the uptake of nutrients positively influenced the yield at very high level.

Application of inorganic fertilizer (NPK) along with FYM @ 12.5 t ha-1 registered higher available nutrient status and positive balance of available nutrients than absolute control, FYM alone, NPK alone and NPK + FYM @ 6.25 t ha-1.

From the findings derived from present investigation, it could be concluded that IPNS treatments are superior over NPK alone treatments in recording higher growth, yield attributes, fruit quality, yield and nutrient uptake by bhendi. The cost of production of bhendi can be reduced by saving fertilizer through IPNS and the IPNS treatments improve the soil fertility which helps to achieve sustained bhendi yield with less environment pollution. Before the adoption of fertilizer prescription equation, the findings can be confirmed by conducting few more verification trials with bhendi on Bahour and allied soil series.

Thus, the practice of fertilizing a crop on the basis of yield targets is precise and eco-friendly that enhances the integrated nutrient management through complementary and synergistic effect of combined use of fertilizer and organic source of nutrient for sustained crop production.