MANURE/FERTILIZERS

NPARR, 7(1), 2016-74 Integrated use of animal manures along with inorganic fertilizers on soil available major and secondary nutrients in bhendi crop (Abelmoschus esculentus L.)

A field experiment was conducted in Agricultural college and Research Institute, Madurai, Tamil Nadu Agricultural university to evaluate integrated use of animal manures along with inorganic fertilizers on soil available major and secondary nutrients in bhendi crop (Arka anamika) with organic sources like goat manure and pig manure combined with inorganic fertilizers on availability of soil available major and secondary nutrients. There were ten treatment combinations replicated thrice in Randomized block design (RBD) in Maddukkur soil series (Typic Haplustalf). Thus result showed that the combined application of 50 per cent Recommended dose of fertilizers (RDF) + goat manure @ 6.5 t ha⁻¹ at different stages of bhendi viz., vegetative flowering, fruit and post harvesting stages was found superior and increased the soil available nutrients then other treatments, organic carbon (0.653%), available Nitrogen (N), Phosphorus (P) & Potassium (K) (216.1, 12.4 and 252.40 kg ha⁻¹) and Calcium (Ca) & Magnesium (Mg) (0.138 & 0.280%) and lowest value registered in the control plot viz., organic carbon (0.435%), available N, P & K (183.8, 8.5 and 189.40 kg ha⁻¹) and Ca & Mg (0.109 &0.229%) respectively [Dhavappriya, A. and Sanjivkumar, V. (Department of soil science and Agricultural chemistry, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India), Journal of Scientific and Industrial Research, 2015, 74 (12), 690-694].

NPARR, 7(1), 2016-75 Use of different organic fertilizers on soil fertility improvement, growth and head yield parameters of cabbage (Brassica oleracea L.)

Field experiment was carried out in Akure in the rainforest zone of Nigeria to determine the effect of poultry manure, wood ash and rice bran on the soil fertility improvement, growth and head yield of cabbage (Brassica oleracea L.) in 2011 and 2012 cropping seasons. The three organic fertilizer treatments were applied each at 6 t/ha with a reference treatment NPK 15-15-15 applied at 300 kg/ha and a control treatment arranged in a randomized complete block design with three replicates. The results showed significant increases (P < 0.05) in the growth and head yield parameters of cabbage crop under the different organic fertilizers compared to the control treatment. The application of poultry manure resulted in the highest values of cabbage plant height, stem girth, leaf number, leaf area, head weight, head length and head girth followed by NPK 15-15-15, wood ash and rice bran, respectively. Cabbage head weight, head girth, head length, plant height, stem girth, leaf number and leaf area increased by 17, 18, 8,17, 19, 10 and 16 %, respectively, with application of poultry manure compared to NPK fertilizer. Also, these parameters increased by 23, 21, 13 29, 25, 17 and 45 % compared to the wood ash treatment. The highest values of soil pH, Ca and Mg were obtained under wood ash application, while the highest values of soil O.M and moderate values of soil P, K, Ca and Mg were obtained under poultry manure application. Moderate values of soil pH, K, Ca and low % N were also recorded under rice bran treatment. However, the highest K/Ca, K/Mg and P/Mg ratios of 93.1, 74.1 and 572.1, respectively, were obtained under NPK 15-15-15 fertilizer application compared to 2:1 K/Ca, 2:1 K/Mg and 16:1 P/Mg in rice bran treatment. The poultry manure applied at 6 t/ha gave the best results in improving soil fertility, growth and head yield of cabbage, and this was because of its balanced nutrient composition and the least C/N ratio [Ibukunoluwa Moyin-Jesu, E. (Agronomy Department, Federal College of Agriculture, Akure, Ondo, Nigeria), International Journal of Recycling of Organic Waste in Agriculture, 2015, 4 (4), 291-298]
Vermicomposting eliminates the toxicity of Lantana (*Lantana camara*) and turns it into a plant friendly organic fertilizer

In evidently the first study of its kind, vermicompost derived solely from a weed known to possess plant and animal toxicity was used to assess its impact on the germination and early growth of several plant species. No pre-composting or supplementation of animal manure was done to generate the vermicompost in order to ensure that the impact is clearly attributable to the weed. Whereas the weed used in this study, Lantana (*Lantana camara*), is known to possess strong negative allelopathy, besides plant/animal toxicity in other forms, its vermicompost was seen to be a good organic fertilizer as it increased germination success and encouraged growth of all the three botanical species explored by the authors - green gram (*Vigna radiata*), ladies finger (*Abelmoschus esculentus*) and cucumber (*Cucumis sativus*). In terms of several physical, chemical and biochemical attributes that were studied, the vermicompost appeared plant-friendly, giving best results in general when employed at concentrations of 1.5% in soil (w/w). Fourier transform infrared spectrometry revealed that the phenols and the sesquiterpene lactones that are responsible for the allelopathic impact of Lantana were largely destroyed in the course of vermicomposting. There is also an indication that lignin content of Lantana was reduced during its vermicomposting. The findings open up the possibility that the billions of tons of phytomass that is generated annually by Lantana and other invasives can be gainfully utilized in generating organic fertilizer via vermicomposting [Hussain, N.*, Abbasi, T., and Abbasi, S.A. (Centre for Pollution Control and Environmental Engineering, Pondicherry University, Chinakalapet, Puducherry, India), *Journal of Hazardous Materials*, 2015, *298*, 46-57].

The results of field study conducted at RVSKVV, KVK Rajgarh - Biaora (M.P.), India during rabi 2011-2012 to evaluated the performance of marigold var. Pusa Narangi Gainda to various manures and fertilizers levels on growth and flower yield reveal that maximum plant height, girth of stem, number of branches/plant, plant height number of flowers/plant, circulation of flower length, weight of flower, flowers yield/plant, flower yield/ha, gross return, net return and B:C ratio were recorded with recommended dose of 120:80:40 kg NPK/ha alongwith border strip method of irrigation, which significantly superior over control, but statically on a par and closely followed by vermicompost @ 5t/ha and poultry manure @ 3.16 q/hactare, which gave 19.84, 14.57, 30.49, 12.86, 35.01, 27.06, 32.18, 77.94, 78.07, 78.07, 125.68, 61.41 and 104.96% higher growth characters, yield attributing characters, flower yield, gross return, net return, B:C ratio and IBCR ratio respectively than control plot [Singh, L., Gurjar, P.K.S., Barholia, A.K., Haldar, A. and Shrivastava, A. (College of Agriculture, R.V.S.K.V.V., Race Course Road, Gwalior-(Madhya Pradesh), India), *Plant Archives*, 2015, *15* (2), 779-783].

**Soil and plant nutrient status as influenced by organic farming in long pepper**

Long pepper (*Piper longum* L.) spikes and roots forms one of the important constituents in the treatment of various human ailments under ayurveda, siddha and unani medicine systems of India. An experiment was conducted in this crop to study the effect of various combinations of organic manures and bio-fertilizers on crop growth, nutrition and soil fertility status including microbial population after harvesting of the crop. Varied levels of farm yard manure (FYM - 30 and 40 t ha$^{-1}$), vermicompost (VC - 1 and 2 t ha$^{-1}$), neem cake (NC - 1 and 2 t ha$^{-1}$) and bio-fertilizers
Azospirillum, phosphate solubilizing bacteria and vesicular arbuscular mycorrhizae each at 10 kg ha$^{-1}$ were tried in sixteen different combinations. After three years of experimentation the impact of organic farming on soil and plant nutrient status has been analyzed. The results revealed that the application of organic manures has a significant impact on plant and soil nutrient status after three years of cropping. The highest tissue nutrient content and nutrient uptake were recorded in the treatment FYM 40 t + VC 2.0 t + NC 2.0 t + BF 10 kg ha$^{-1}$ where the organic manures and bio-fertilizers were applied at highest level. The same treatment has also increased the organic carbon, available NPK and microbial population in the soil after three years of cropping. All these parameters were lowest in treatment FYM 30 t + VC 1.0 t + NC 1.0 t ha$^{-1}$ where manures were applied in lowest quantity without bio-fertilizers. Hence, we conclude that the long pepper is an organic matter loving crop and application of higher levels of organic manures improved both plant and soil nutrient status [Smitha, G.R*, Umesh, K., Sreeramu, B.S. (Division of Horticulture, Gandhi Krishi Vigyana Kendra University of Agricultural Sciences, Bengaluru, Karnataka, India), *Journal of Medicinal and Aromatic Plants*, 2015, 6 (1), 21-28].

NPARR, 7(1), 2016-79 Earthworm and soil fertility under water and fertilizer managements in a greenhouse vegetable field

A field experiment was conducted to investigate soil earthworm density and soil basic fertility changes and their relationship under different water (irrigation) and fertilizer (manure fertilization) managements in greenhouse organic vegetable system to provide scientific basis for reasonable irrigation and fertilization on greenhouse organic vegetable. Soil moisture, porosity, the contents of soil organic carbon, total nitrogen, available phosphorus and available potassium were significantly increased by 4%–27%, 6%–9%, 19%–27%, 19%–26%, 141%–230% and 74%–91% respectively with the increasing organic manure fertilization. Under the same irrigation, earthworm density was significantly increased by 43%–110% in the manure treatments compared with no manure treatment. There were extremely significant positive correlations between earthworm density and soil productivity, soil porosity, the contents of soil organic carbon, total nitrogen and available phosphorus. The data indicate that soil earthworm can be a bio-indicator to assess soil fertility in greenhouse vegetable fields, and can play important ecological functions. Considering soil fertility and productivity, decrement-irrigation plus conventional-manure application is the best management for sustainable organic vegetable production [Zheng, T.*, Ji-Guang, L.I., Hui, L.I., Ning, Y.U., Zhong-Fang, L.I., Xiao-Xiang, C. and Chun-Ian, C. (College of Chemistry and Bioengineering, Hezhou University, Hezhou, Guangxi, China), *Chinese Journal of Ecology*, 2015, 34 (8), 2210-2214].