

**1. Investigation on Silica in Rice Growing Soils of Tunga Command Area**

**POORNIMA, B.A.**

**ABSTRACT**

An investigation was carried out on the status of available silica and its relationship with properties of soils of Tunga command area. A pot culture experiment was conducted with different kinds and levels of silicon application to know the effect of on growth, yield and nutrient uptake of rice.

The available silica status of soils of Shimoga and Honnali taluks fall under deficiency while soils of Hirekerur taluk fall under sufficiency category indicating the soils of both Shimoga and Honnali taluk belong to class I, which respond profitably for silica application, while soils of Hirekerur taluk belong to class III (non responsive for silica application). Available silica was positively and significantly correlated with clay, pH, CEC and available phosphorus, and negatively correlated with iron oxides and exchange acidity

The study on response of rice to silicon application indicated that the application of silicon at increasing rate significantly influenced the plant growth and yield irrespective of sources *Viz*; sodium silicate or Rice hull ash (RHA). But sodium silicate was superior with respect to yield and nutrient uptake over RHA at the same level of silicon application. Among the treatments T<sub>4</sub> (0.2g of SiO<sub>2</sub> kg<sup>-1</sup> of soil as sodium silicate) recorded highest grain and straw yield followed by T<sub>7</sub> (0.2g of SiO<sub>2</sub> kg<sup>-1</sup> of soil as RHA) of same level of silicon application, over the control.

Slight increase in soil pH, and organic carbon noticed due to silicon application. The available phosphorous, potassium, Ca, Mg and silica were also increased due to increased level of silicon application. RHA treatments were superior in micronutrient uptake compared to sodium silicate. The results of pot culture study revealed that both sodium silicate and RHA applied as a source of silicon was found to have encouraging results on yield and uptake of nutrients by rice.

June.2007

## 2. Seeds and Oil Yield Potential of Chewing Tobacco as Influenced By Graded Levels of NPK and S

**DYAVAPPA.G.K**

### **ABSTRACT**

Research on exploitation of tobacco as a source of edible oil and phytochemicals has attained prominence all over the world in view of the economic potential also due to the growing awareness of health risks associated with tobacco consumption. In the light of this, an investigation was carried out to study the seed and oil yield potential of chewing tobacco as influenced by graded levels of NPK and S. The objective was to assess the influence of graded levels of NPK and S on growth, seed yield, oil content and its quality. A field experiment was conducted at the ZARS, Agricultural College, Navile, Shimoga during kharif 2006. Combination of all three levels of NPK (100, 125 and 150 % NPK) and four levels of S (0.15, 30 and 40 kg/ha) through gypsum were tried.

The results of the work revealed that yield of chewing tobacco significantly increased with increasing levels of sulphur application. The highest seed yield (1226 kg/ha) was recorded in the treatment receiving 30 kg S/ha. Application of sulphur in the form of gypsum significantly influenced the crude oil content in seed. The crude oil content increased from 39.9 per cent at control to 41.1 per cent at 30 kg/ha. The highest crude oil content (41.5%) of chewing tobacco seed was recorded at 125% NPK along with 30 kg S/ha. The crude oil yield ranged from 407 kg/ha at control to 510 kg/ha at 30 kg S/ha. The crude oil yield in seed obtained up to 509 kg/ha indicates that chewing tobacco is comparable to any other oil seed crops under rain fed conditions. There was significant improvement in quality of oil due to sulphur application in terms of peroxide value. The lowest peroxide value (9.4) was recorded in the treatment receiving 45 kg S/ha.

Over all, the seed yield of up to 880 kg/ha could be harvested with chewing tobacco variety A-145. The yield could be further enhanced up to 1200 kg by better nutrient management through application of 30 kg S/ha.

June, 2007

(T.S. Vageesh)  
Major Advisor

### 3. Effect of Different Sources of Zinc on the Behaviour of Zinc in Soil under Maize Crop (*Zea Mays* L.)

**ANIL KUMAR. S**

#### **ABSTRACT**

A field experiment was conducted on a Typic Haplustalf with unndy loam texture to study the effect of different sources of zinc (ZnSO<sub>4</sub>, ZnCb, ZnO, FYM, vermicompost and pressmud compost) on the behaviour of zinc in soil under maize. Results of the experiment indicated that application of different sources of zinc significantly increased the DTPA-Zn in post harvest soil compared to that of absolute control (0.47ppm), and the treatment which received recommended NPK fertilizers alone (0.39ppm). Among the sources of zinc, FYM recorded a maximum of 0.84ppm DTPA-Zn in soil. The DTPA-Zn significantly and positively correlated with pH (0.87\*\*), OC (0.79\*\*) and CEC (0.85\*\*) of the soil.

Addition of above sources of zinc increased the zinc content in all the fractions of zinc except residual zinc fraction, which found to be compared to the absolute control and the treatment that received only NPK fertilizers. Further, all the fractions of zinc correlated with each other indicating existence of dynamic equilibrium between them

Stover and grain yield of maize were also significantly increased due to application of above zinc sources compared to that of absolute control and the treatment which received only NPK fertilizers. However, the treatment, which received zinc through pressmud compost recorded a maximum yield of 5.96 and 6.85 t ha<sup>-1</sup> of stover and grain respectively. Similarly, zinc uptake by maize significantly increased due to applied zinc sources except zinc oxide. Further, path analysis relating to zinc fractions and uptake of zinc by maize indicated that the major fractions through which zinc is made available to maize as water soluble, easily reducible manganese bound and carbonate bound fractions. Zinc present in residual was found to be unavailable to plants because of strong bonding nature.

September, 2007

( H M Chidanadappa)  
Major Advisor

#### 4. Effect of Zinc and Boron on Soil Properties, Yield and Uptake of Nutrients by Groundnut (*Arachis Hypogaea L.*)

**SAYYADSAHED A NADAF**

##### **ABSTRACT**

In order to study the effect of zinc and boron on soil properties, yield and uptake of nutrients by groundnut (*Arachis hypogaea L.*), a field experiment was conducted on a sandy loam soil (Typic Haplustalf) with deficient in available zinc ( $0.46 \text{ mg kg}^{-1}$ ) and boron ( $0.43 \text{ mg kg}^{-1}$ ). Results of the experiment indicated that pod and haulm yield, shelling per cent, kernel yield, oil content and oil yield of groundnut significantly increased over the control due to application of borax @  $5 \text{ kg ha}^{-1}$  and zinc sulphate at three levels ( $5, 10$  and  $20 \text{ kg ha}^{-1}$ ) either alone or in combination with borax. Application of borax had no effect on the content and uptake of zinc by groundnut. But, a significant increase in the content and uptake of boron by haulm and kernels was noticed due to the addition of borax. Similarly, application of zinc sulphate significantly increased the content and uptake of zinc by groundnut.

Increase in the levels of zinc sulphate from  $5$  to  $20 \text{ kg ha}^{-1}$  significantly increased DTPA-Zn status from  $0.57$  to  $0.71 \text{ mg kg}^{-1}$  without any effect on available boron status in soil. Whereas, application of borax significantly increased available boron status in soil ( $0.41 \text{ mg kg}^{-1}$ ). All fractions of zinc except residual fraction significantly increased over control due to the application of zinc sulphate particularly at higher levels ( $10$  and  $20 \text{ kg ha}^{-1}$ ) with or without borax. Further, it was observed that all fractions of zinc correlated with each other indicating existence of dynamic equilibrium between them. A path analysis relating to zinc fractions and uptake of zinc by groundnut indicated that the major fractions of zinc through which zinc is made available to groundnut were water-soluble, sorbed, easily reducible manganese bound and organic bound fractions. Whereas, residual fraction of zinc was found to be unavailable to plants because of its insoluble nature.

Nov, 2007

(H M Chidanadappa)  
Major Advisor

## 5. Dynamics of Phosphorus in Traditional Arecanut Growing Soils of Karnataka

**KAUSHIK BATBYAL**

### **ABSTRACT**

The distribution of different fractions of phosphorus, their contribution to available P pool, as well as phosphorus fixation capacity as influenced by soil physico-chemical properties was studied in the soil profiles from five taluks (viz., Sagar, Thirthally, Koppa, Sringeri and Kundapura ) of traditional arecanut growing areas of Karnataka.

Distribution of P fractions varied greatly with sand, silt, clay, pH, CEC, iron and aluminium oxides and organic carbon content of the soil. Total P content of soils from different taluks ranged from 246 to 679 ppm (average 428 ppm) and decreased down the depth. Total mineral and organic P contents of soils ranged from 138 to 348 ppm (mean 232 ppm) and 46 to 386 ppm (mean 203 ppm), respectively, which on an average accounted for 54 per cent and 47 per cent of total P, respectively. Al-P and Fe-P were the most dominant mineral fractions constituting on an average 23 per cent and 21 per cent of total inorganically bound P, respectively. The relative abundance of different inorganic P fractions followed the order: A1-P (53 ppm)>Fe-P(50 ppm)>Red.-P(44 ppm)> Occl.-P(39 ppm) > Ca-P(27 ppm)>Saloid P(12 ppm).

Available P content of surface soils from different taluks ranged from 6.68 mg kg<sup>-1</sup> (Kundapura Taluk) to 18.58 mg kg<sup>-1</sup> (Sagar Taluk) and that of profile soils ranged from 7.23 mg kg<sup>-1</sup> (Kundapura Taluk) to 15.50 mg kg<sup>-1</sup> (Sagar Taluk) and decreased with depth. Significant and positive correlation of available P with saloid ( r=0.563\*\*), A1-P( r=0.492\*), Ca-P( r=0.448\*) and organic P( r=0.561\*) indicates that these P fractions contribute greatly towards available P pool.

Study on the P fixation capacity revealed that the arecanut growing acid soils of Karnataka have high P fixing capacity with its values ranging from 61.54 mg kg<sup>-1</sup> (Sagar Taluk) to 79.93 mg kg<sup>-1</sup> (Kundapura Taluk) and the P fixation capacity tends to increase down the profile due to decrease in organic carbon content and increase in the content of Fe and Al oxides with increasing depths.

August, 2007

## 6. Evaluation of FCV Tobacco Grown Under Organic, Chemical and Integrated Crop Management Systems.

**INGUDAM BHUPENCHANDRA**

### **ABSTRACT**

Of late, tobacco quality has been deteriorating due to the imbalanced and incessant use of chemical fertilizers, pesticides and other extraneous factors in the sole pursuit of reaping maximum yield. In view of this, organic farming is sometimes restored to in lieu of other crop management systems. The present investigation was carried out to study the yield and leaf quality of FCV tobacco grown under organic, chemical and integrated crop management systems. A field experiment was conducted at ZARS, Navile, Shimoga during the kharif 2007. Three different organic systems involving FYM, pressmud and green leaf manuring were compared with two integrated systems comprising of chemical fertilizers with organics and the recommended package of practices. From the experimental results, it was observed that the cured leaf yield varied significantly, the highest yield ( $1086 \text{ kg ha}^{-1}$ ) being observed with the recommended packages of practices. Being the first year of investigation the productivity levels recorded with all the three organic systems were far below the level recorded by the recommended package of practices. However, among the organic systems studied the nutrients system involving green manuring and crop residues were found to be the best. Similar trend was observed with respect to quality of FCV tobacco in terms of top grade equivalent (TGE). The highest value of TGE ( $625 \text{ kg ha}^{-1}$ ) was observed with the recommended package of practices. The nicotine content of cured leaf both at X and L position was found to vary significantly. The highest nicotine content were recorded in chemical farming with cent per cent fertilizers for cured leaf at X (1.82 %) and L (1.87 %) position.

The highest reducing sugar content in cured leaf at X (18.4 %) and L (17.4 %) position was observed in recommended package of practices with cent per cent chemical fertilizer along with FYM. The highest chloride content were recorded with chemical farming with cent per cent fertilizers for cured leaf both at X (0.41 %) and L (0.34 %) position. There was significant variation in leaf burn. The highest leaf burn was recorded with the recommended packages of practices for both the cured leaf at X (5.1 sees) and L (5.3 sees) position, respectively. There was significant variation in the value of EMC. At X position of cured leaf the highest EMC value (13.5 %) was recorded with cent per cent chemical farming. In case of cured leaf at L position the highest EMC value (15.6 %) was observed in packages of practices with cent per cent fertilizers and FYM manures. Overall, the recommended package of practices gave better yield and improved both the physical and chemical quality constituents in FCV tobacco.

June, 2007

(T S Vageesh)  
Major Advisor

## 7. Effect of Basal and Split Application Potassium Levels on Ihut (*Arachis Hypogaea L.*) Productivity and Status of Potassium in Soil

**RADHIKA K.**

### **ABSTRACT**

A field experiment was conducted at Zonal Agricultural Research Station and College of Agriculture, Navile, Shivamogga during the kharif season of 2008. Different levels of potassium @ 12.5, 18.75, 25 and 31.25 kg K<sub>2</sub>O ha<sup>-1</sup> were tried as basal and also in splits with eight treatments combination along with recommended dose of N, P fertilizers and FYM in a with 3 replications using groundnut (*Arachis hypogaea L.*) as test crop, Results of the experiment indicated that application of potassium @ kg K<sub>2</sub>O ha<sup>-1</sup> in two splits (12.5 kg K<sub>2</sub>O<sup>-1</sup> as basal + 12.5 kg K<sub>2</sub>O ha<sup>-1</sup> at flowering stage) significantly increased pod yield (20.47 q ha<sup>-1</sup>), haulm yield of 32.85 q ha<sup>-1</sup>, kernel yield (14.87 q ha<sup>-1</sup>), crude protein (18.74%) and oil yield (697.99 kg ha<sup>-1</sup>) compared to all other treatments except the treatment (which received 31.25 kg K<sub>2</sub>O ha<sup>-1</sup> in splits. The uptake of nutrients were recorded significantly higher in the treatment which received the potassium level (25 kg K<sub>2</sub>O ha<sup>-1</sup>) in two splits compared to all treatments except the treatment which received the potassium level of 31.25 kg ha<sup>-1</sup> in splits.

An increase in the level of potassium application (12.5 to 31.25 kg ha<sup>-1</sup>) either as basal or in two splits increased the available, water soluble and exchangeable potassium in soil at harvest of the crop. Whereas fixed (Non exchangeable) and lattice potassium decreased with increase in the level of potassium application

June, 2008

(H.M Chidanandappa)  
Major Advisor

**8. Effect of INM Approach on Soil Properties, Yield and Uptake of Nutrient by Rice Crop (*Oryza sativa* L.) in Bhadra Command, Karnataka.**

**SUNITHA, B.P.**

**ABSTRACT**

A field experiment was conducted during the kharief of 2007 at Agricultural research Station, Honnavile, Shivamogga to study the effect of INM approach on soil properties yield and uptake of nutrient by rice crop (*Oryza sativa* L.) in Bhadra command Karnataka. There were eleven treatment combinations comprising of dose of nitrogen applied through urea green leaf manure, FYM with or without Azospirillum. The experiment laid out in randomised complete block design with three replication. Application of 50% nitrogen through urea + 25% nitrogen through GLM+25% nitrogen through FYM + Azospirillum recorded significantly higher CEC value, secondary and micronutrients content in rice soil at tillering, panicle initiation and harvest stages. Whereas pH, EC, and OC status increased in organic alone treated plots.

There was significant increase in the root biomass, thousand grains weight, number of panicle  $m^{-2}$ , grain and straw yield of rice crop in 50% nitrogen through urea + 25% nitrogen through GLM + 25% nitrogen through FYM + Azospirillum plot. However plant height number of tillers per hill higher value was recorded in farmer's practice at all the stages of crop growth. The concentration of major, secondary and micronutrients and uptake of all the nutrients significantly increased in grains and straw with the application of 50% nitrogen through urea+ 25% nitrogen through GLM + 25% nitrogen through FYM + Azospirillum as compared plot to control.

The soil chemical properties like OC, CEC, available N, P, K, exchangeable Ca, Mg, available sulphur, DTPA Zn, Cu, Mn and Fe and uptake of nutrients in gram were positively and significantly correlated with grain yield of rice. In the present investigation net return was maximum by adopting integrated nutrient management practices as to 100 percent nitrogen applied plot and farmer's practice

June, 2008

(H C Prakasha)  
Major Advisor

## 9. Yield and Nutrient Uptake by Maize as Influenced by Graded Levels of Applied Nitrogen Under Varying Soil Nitrogen Status

**KARTHIKA K.S.**

### **ABSTRACT**

A field experiment was conducted in two stages under rain fed conditions at Zonal Agricultural Research Station, Navile, Shivamogga in 2010 to determine the optimum fertilizer dose of nitrogen for maize under varying soil N status. This was done by studying the response of maize in terms of yield and nitrogen uptake to graded levels of applied nitrogen (0, 50,100,150,200 and 250kg ha<sup>-1</sup>) under varying nitrogen fertility strips (very low, low, medium, high and very high). The technique of field experimentation involving creation of wide soil fertility variation in one and the same field was adopted in this study following the STCR approach. The experiment comprised of two stages. A fertility gradient experiment in the pre-kharif season and the main experiment on nitrogen response studies in the kharif season.

The varying soil fertility strips were created by applying N levels ranging from 0 to 450kg N ha<sup>-1</sup> and by growing an exhaustive crop of fodder maize. The results of the main experiment indicated the in low and medium level of the N applied (250 kg N ha<sup>-1</sup>) However in the high soil fertility strip we could see a plateau in the response curve beyond 225 kg ha<sup>-1</sup> of applied N. The N applied at levels greater than 200 kg ha<sup>-1</sup> resulted in no additional response in terms of actual grain yield, but increased the grain N content and therefore the protein content of the grain. From the study, it was also inferred that 142 kg ha<sup>-1</sup> is the optimum N take level to produce a maximum grain yield of 6835 kg ha<sup>-1</sup> beyond which there was no response to further increase with increase in the level of the applied N under high soil fertility strip. Optimum N doses were also calculated for maize and it was found to be 250 kg N ha<sup>-1</sup> in the low fertility situations, 240 kg ha<sup>-1</sup> of N fertilizer in medium fertility situations and a dose of 218 kg ha<sup>-1</sup> of fertilizer N in the high fertility soils, under assured rainfall situations.

## 10. Behaviour of Potassium in Soils Under Different Land Use Systems

**KIRAN KUMAR. M**

### **ABSTRACT**

An investigation was carried out to study the Behaviour of potassium in soils under different land use systems, namely, agri system (Rice and Tobacco), horti system (Arecanut), silvi system (Eucalyptus) and current fallow land use system at Zonal Agricultural Research Station, Shimoga. In surface soils of different land use systems the mean water soluble potassium was highest in horti system - Arecanut ( $14.86 \text{ mg kg}^{-1}$ ) and lowest in current fallow land ( $11.94 \text{ mg kg}^{-1}$ ), while mean exchangeable potassium was highest in agri system - Rice ( $137.51 \text{ mg kg}^{-1}$ ) and lowest in current fallow land ( $64.43 \text{ mg kg}^{-1}$ ) and the mean non exchangeable potassium was highest in horti system -Arecanut ( $303.45 \text{ mg kg}^{-1}$ ) and lowest in current fallow land ( $168.10 \text{ mg kg}^{-1}$ ). Similarly, the mean mineral K and total K were highest in agri system - Tobacco (1.36 and 1.39 per cent) and lowest in horti system - Arecanut (0.99 and 1.04 per cent) respectively. The potassium fixation of added K was ranged from 0.22 to 0.76 cmol (p+) kg<sup>-1</sup> under different land use systems, potassium fixation was positively and significantly correlated with clay ( $r = 0.620^{**}$ ).

The water soluble, exchangeable and non exchangeable K content of the profiles under different land use systems were ranged from 6.70 to 17.51, 32.16 to 146.66 and 138.00 to 341.90  $\text{mg kg}^{-1}$  respectively, while, the mineral and total potassium was ranging from 0.81 to 1.92 and 0.86 to 1.97 per cent respectively. Among the forms of potassium, water soluble potassium contributed lowest and mineral potassium contributed highest to the total potassium. Water soluble K was positively correlated with all the forms of K and also with coarse sand, fine sand, silt, EC, OC, CEC while, Exchangeable K was positively and significantly correlated with clay ( $r = 0.401^*$ ), whereas, a significant positive correlation was observed between non exchangeable K and clay ( $r = 0.565^{**}$ ) and CEC ( $r = 0.418^*$ ). 2008

June, 2008

(K. T. Gurumuthy)  
Major Advisor

## **11. Impact of Different Farming Methods on Yield and Nutrient Uptake by Maize (*Zea Mays* L.) and on Soil Properties**

**VIJAYA.N**

### **ABSTRACT**

In order to know the impact of different farming methods viz., zero budget farming (Subash Palekar method), organic farming, inorganic farming, package of practices, zero budget plus inorganic farming methods and control on yield and uptake of nutrient by maize, available nutrient status and biological properties of soil, field and laboratory studies were conducted on sandy loamy soil (Typic Haplustalf), College of Agriculture, Navile, Shivamogga, UAS, Bangalore during the kharif of 2007. Result of the studies indicated that the highest grain ( $12.24 \text{ t ha}^{-1}$ ) and stover  $8.90 \text{ t ha}^{-1}$ ) yield and uptake of nutrients by maize were recorded by package of practices. Whereas, Subash Palekar method registered the lowest grain ( $2.07 \text{ t ha}^{-1}$ ) and stover ( $3.73 \text{ t ha}^{-1}$ ) yield and uptake of nutrients by maize compared to other methods.

The availability of macro and micronutrients in soil increased under the package of practices and organic farming methods, respectively. Similarly, a maximum number of bacteria, fungi and actinomycetes in soil were observed under package of practices and minimum numbers were found under inorganic farming method. Further, the laboratory incubation study indicated that the rate of  $\text{CO}_2$  evolution decreased with time of incubation in zero budget farming (Subash Palekar method) and the treatment which received both Subash Palekar method plus inorganic farming methods. But, it showed an increasing trend up to 54<sup>th</sup> days in package of practices and 48<sup>th</sup> days in case of organic farming method which indicates high biological activity in soil under package of practices and organic farming methods due to more availability of substrates compared to other methods of cultivation.

August, 2008

(H.M Chidanandappa)  
Major Advisor

## 12. Zinc Status and its Distribution in Traditional Arecanut Growing Soils of Karnataka.

**JYOTHI T.V.**

### **ABSTRACT**

An investigation was carried out to study the zinc status in 0-20 cm and 20-40cm depth and vertical distribution of different fractions of zinc in soil profiles of Sagar, Thirthahalli, Koppa and Sringeri and Kundapur taluks of traditional arecanut growing soils of Karnataka. They were sandy loam to sandy clay loam in texture, strong to slightly acidic in reaction (4.62 to 6.23 and 4.69 to 6.23), low in salts, low to medium in CEC, medium to high in organic carbon (5.21 to 27.82 and 4.50 to 29.20 g kg<sup>-1</sup> ) in 0-20 cm and 20-40 cm depth soils respectively.

Available Zn content of different taluks ranged from 0.69 (Kundapur) to 2.24 (Sringeri) mg kg<sup>-1</sup> in 0-20 cm and 0.65 (Sagar and Kundapur) to 2.04 (Sringeri) mg kg<sup>-1</sup> in 20-40 cm depth respectively. In profile soils, it ranged from 0.49 (Sagar) to 1.55 (Sringeri) mg kg<sup>-1</sup> and decreased with depth. Significant and positive correlation of available Zn was established with water soluble plus exchangeable Zn ( $r= 0.83^{**}$ ), organically bound Zn ( $r=0.88^{**}$ ) and manganese oxide bound Zn ( $r=0.62^{**}$ ).

In profile sample study, among the different fractions, residual Zn was the most dominant over the locations (51.19 to 104.71 mg kg<sup>-1</sup>). It was followed by amorphous, and crystalline sesquioxides bound Zn constituting on an average 1 to 7 per cent of the total Zn. It was followed by manganese oxide bound zn and organically bound Zn. Water soluble plus exchangeable Zn was the least (1-2 percent) dominant fraction among all the fractions studied. The relative abundance of different Zn fractions followed the order - residual Zn > amorphous sesquioxides bound Zn > crystalline sesquioxides bound Zn > manganese oxide bound Zn >organically bound Zn > water soluble plus exchangeable Zn.

August, 2009

(Y. Vishwanatha Shetty)  
Major Advisor

### **13. Characterization of Soils Under Different Land Use Systems of Horticultural Research Station (Areca), Sebenakere, Thirthahalli (Tq.), Shivamogga (Dist.)**

**MOHAMED SAQEEBULLA, H.**

#### **ABSTRACT**

An investigation was carried out to characterize the soils under different land use systems of the Horticultural Research Station (Areca), Thirthahalli. The experimental sites were selected based on land use systems namely forest, arecanut, mango, cashew, sapota and paddy land use systems of horticultural research station, Sebinakere, Thirthahalli (Tq.), Shivamogga (Dist.). The present investigation indicated that texture varied from sandy loam to sandy clay loam in texture. The bulk density and particle density were increased with depth, higher BD ( $1.48 \text{ Mg m}^{-3}$ ) and PD ( $2.65 \text{ Mg m}^{-3}$ ) contents were noticed in arecanut and forest systems. The pH was moderately acidic in all soils under investigation. The organic carbon content was ( $193.6 \text{ g kg}^{-1}$ ) observed in forest land use system as compared to other land use systems and was moderate in surface soils and decreased with depth. Calcium carbonate equivalent and free iron oxides were higher (0.48 % and 4.55 %) under forest system and lowest (0.18 % and 2.51 %) under sapota system and it decreased with depth in all the land use systems.

Available nitrogen was varied from 125.54 to 426.50  $\text{kg ha}^{-1}$  under different land use systems, available phosphorus was higher (22.86  $\text{kg ha}^{-1}$ ) in areca systems and lowest (11.83  $\text{kg ha}^{-1}$ ) in sapota system and available potassium was highest (775  $\text{kg ha}^{-1}$ ) in forest land use system. All primary nutrients were decreased with depth. The exchangeable calcium and magnesium were higher (6.10 and 4.50  $\text{cmol (P}^+) \text{ kg}^{-1}$ ) in forest system. Whereas the sulphur status was higher than critical limits in all the land use systems. The DTPA extractable Fe and Zn were higher (61.12 and 1.94  $\text{mg kg}^{-1}$ ) in areca system, highest manganese was noticed in mango-cashew systems, where copper was highest (3.25  $\text{mg kg}^{-1}$ ) in paddy land use system. All the micronutrients were decreasing with depth. The data on the available nitrogen status indicated that 50.00 per cent of the soil samples were low, 32.00 per cent were medium and 18.00 per cent were high. For available phosphorus, 84.00 per cent were low and 16.00 per cent were medium whereas potassium 10.00, 42.00 and 48.00 per cent were low medium and high respectively under different land use systems of Horticultural Research Station, Sebinakere, Thirthahalli.

June, 2009

(K. T. Gurumurthy)  
Major Advisor

## 14. Effect of Zinc Enriched Compost on Soil Properties, Yield and Uptake of Nutrients by Rice (*Oryza sativa* L.)

**VEERANAGAPPA, P.**

### **ABSTRACT**

A field investigation was undertaken during Khari-2008 at College of Agriculture, Navile, Shivamogga to study the effect of zinc enriched compost on soil properties, yield and uptake of nutrients by rice (*Oryza sativa* L.). there were eight treatment combinations comprising of recommended dose of compost, NPK fertilizers, ZnSO<sub>4</sub> and zinc enriched compost in different levels . The experiment was laid out in randomized complete block design and replicated thrice. Application of nutrients as per package of practice and different levels of zinc enriched compost treated plots recorded significantly higher values of primary, secondary and micronutrients in soil at tillering, panicle initiation and at harvest stages. A slight improvement in soil pH, electrical conductivity and organic carbon content noticed higher Values in NPK + zinc enriched levels followed by package of practice.

Significantly higher growth and yield attributes were recorded in package of practice, followed by NPK + Zn-E compost at 15 kg ha<sup>-1</sup> and 10 kg ha<sup>-1</sup>. Grain and straw yields were also superior in the same treatments Compared to other treatments. The concentration and uptake of primary, secondary and micronutrients were significantly increased with the application of nutrients us per package of practice, followed by NPK + Zn-E compost at 15 and 10 kg ha<sup>-1</sup> as compared to rest of the treatments. Soil chemical properties viz., pH, EC, OC, available N, P, K, exchangeable Ca, Mg, available S, DTPA Zn, Cu, Mn and Fe were positively and significantly correlated with the zinc fractions,Uptake of nutrients (N, P, K, Ca, Mg, S, Cu, Zn, Mn and Fe), yield were correlated positively with zinc fractions. Path coefficient analysis indicated that major zinc fractions available to rice are crystalline sesquioxide bound Zn, Res Zn, water soluble plus exchangeable Zn, Organically bound Zn fractions. Net returns were maximum by adopting package of practice followed by NPK + Zn-E compost at 10 kg ha<sup>-1</sup> and 15 kg ha<sup>-1</sup> gave the highest net returns as compared to other treatments

June, 2009

(H. C Prakasha)  
Major Advisor

## 15. Effect of Zinc Enriched Compost and Deferent Levels of Nitrogen on Soil Properties, Yield and Uptake of Nutrients by Rice (*Oryza sativa* L.)

**SATHISHA C.**

### **ABSTRACT**

A field investigation was undertaken during *kharif2009* at College of Agriculture, Navile, Shivamogga to study the effect of zinc enriched compost and different levels of Nitrogen on soil properties, yield and uptake of nutrients by rice (*Oryza sativa* L.). There were nine treatment combinations of different levels of nitrogen along with Zinc sulphate and two levels of zinc enriched compost. The experiment was laid out in randomized complete block design and replicated thrice. Enrichment of compost with zinc and different levels of nitrogen have improved the soil chemical properties, growth yield attributes and yield of rice. Application of zinc sulphate and zinc enriched compost with higher level of nitrogen recorded significantly higher values of available N,P,K,S and DTPA extractable Zn in soil at tillering, panicle initiation and at harvest stages.

Significantly higher growth and yield attributes were recorded in 150% N + Zinc sulphate @ 20kg ha<sup>-1</sup>, followed by 150% N+ Zinc Enriched Compost @ 15 kg ha<sup>-1</sup>. Grain and straw yields were also superior in the same treatments compared to other treatments. It is also observed that the concentration and uptake of (N,P,K,S and Zn) were significantly increased with the application of 150% N + Zinc sulphate @ 20 kg hf<sup>-1</sup>, followed by 150% N + Zinc Enriched Compost @ 15 kg ha<sup>-1</sup>as compared to other treatments. Soil chemical properties (OC, available N,P,K,S and DTPA extractable Zn) were positively and significantly correlated with grain yield of rice. Yield and zinc fractions were correlated positively with significance. Uptake of nutrients (N, P ,K, S and Zn) were also correlated positively and significantly with yield.

Nov, 2010

(H.C. Prakasha)  
Major Advisor

## 16. Dynamics of Phosphorus in Soils Under Different Land Use Systems

**DEEPAK K.T.**

### **ABSTRACT**

An investigation was carried out to study the forms and distribution of phosphorus under different land use systems during 2009-2010 at College of Agriculture, Navile, Shimoga. Five soil profiles under different land use systems *viz.*, agri system -rice, Tobacco, horti system-Arecanut, silvi system -subabul and current fallow and - Control were selected for the study. In each systems of the soil profiles, soil samples were collected depth wise, in addition to profile soil samples, twenty five surface soil samples (Five soil samples in each land use system) at 0-20cm depth were also collected for the characterization of surface soils.

The phosphorus status under different land use systems were ranging from medium to high. The texture of the surface soils were varied from sand to sandy clay. Total P content of soils from different land use systems ranged from 387.25 to 686.36 mg kg<sup>-1</sup> and decreased down with the depth. Total mineral and organic P contents of soils ranged from 175.46 to 362.11 mg kg<sup>-1</sup> and 142.20 to 386.36 mg kg<sup>-1</sup>, respectively. Al-P and Fe-P were the most dominant mineral fractions constituting towards inorganically bound P. The relative abundance of different inorganic P fractions were in the order of: Al-P>Fe-P>Red-P>Occl-P>Ca-P>Saloid-P.

Available P content of surface soils from different land use systems varied from 47.08 (agri system-Tobacco) to 68.69 (agri system-Rice) kg ha<sup>-1</sup> and that of profile soils ranged from 13.29 (current fallow land - Control) to 69.24 (horti system-Arecanut) kg ha<sup>-1</sup> and decreased with depth. Significant and positive correlation was observed with available P with saloid P ( $r=0.455^{**}$ ), Al-P ( $r=0.491^{**}$ ) and Ca-P ( $r=0.448^{**}$ ). The P fixation capacity revealed that the soils under different land use systems have high P fixation capacity with its values ranging from 61.91mg kg<sup>-1</sup> (current fallow land -Control) to 77.60 mg kg<sup>-1</sup> (silvi system - Subabul). Significant and positive correlation of phosphorus fixation capacity was observed with pH ( $r=0.414^{**}$ ), iron ( $r=0.379^{**}$ ), aluminium ( $r=0.576$ ) and sesquioxide ( $r=0.684^{**}$ ) content of the soil.

June, 2010

(K.T. Gurumurthy)  
Major Advisor

## **17. Nitrogen Fractions, Nitrogen Use Efficiency and Productivity of Maize (*Zea Mays L.*) as Influenced by Integrated Nutrient Management Practices.**

**SHILPASHREE V. M.**

### **ABSTRACT**

A field experiment was conducted during kfaarif 2009 on a sandy loam soil belongs to the soil taxonomy of Typic Haplustalf, located at College of Agriculture, Navile, Shimoga to study "The effect of integrated nutrient management practices on nitrogen fractions, nitrogen use efficiency and productivity of maize (*Zea mays L.*)". Two levels of nitrogen applied through organics (FYM and Vermicompost) and inorganics involving nine treatment combinations were tried in a RCBD with three replications. The results of the experiment indicated that significantly higher grain ( $9.50 \text{ t ha}^{-1}$ ) and stover ( $11.00 \text{ t ha}^{-1}$ ) yield and total uptake of N, P and K by maize ( $249.30$ ,  $56.50$  and  $268.00 \text{ kg ha}^{-1}$ , respectively) were recorded by the treatment involving package of practices compared to the treatments which received nitrogen levels in the form of inorganic and organics. However, the integrated treatments did not differ significantly with each other in respect of yield and uptake of NPK by maize.

Significantly lower available nitrogen status was recorded in the treatments which received nitrogen only through fertilizers and without any organic matter application ( $196.00$ - $200.50 \text{ kg ha}^{-1}$ ) including absolute control compared to all other treatments ( $238.00$ - $243.60 \text{ kg ha}^{-1}$ ). Except inorganic nitrogen fractions, organic nitrogen fractions were recorded high in integrated treatments compared to the treatment which received nitrogen only in the form of fertilizers. Further, an agronomic nitrogen use efficiency was found highest ( $73.00$ ) in the treatments involving package of practices compared to other treatments. However, nitrogen use efficiency was found to be more at lower level of nitrogen application and also in the integrated treatments compared to the treatments which received only NPK fertilizers.

June, 2010

(H.M. Chidanandappa)  
Major Advisor

## 18. Effect of Different Sources and Levels of Liming Materials on Soil Properties and Yield of Maize (*Zea Mays L.*) in Acid Soil

**RAVI N.C.**

### **ABSTRACT**

Field and laboratory studies on effect of different sources and levels of liming materials were conducted at Zonal Agricultural Research Station, College of Agriculture, Navile, Shimoga during *kharif 2010*. The experimental soil was sandy loam with acidic pH. There were seven treatment combinations laid in four replications. Treatments comprises of three different liming materials viz., lime sludge, agricultural lime and calcium silicate at 45 and 50 per cent calcium saturation levels tested against package of practices (POP). Laboratory incubation studies revealed that among three sources of liming materials, the calcium saturation was earliest (21 days after incubation) in lime sludge treated soil. It was followed by agricultural lime and calcium silicate respectively as they took 30 and 40 days after incubation.

In general improvement in soil pH, OC and CEC was observed with different sources of liming materials. Among the treatments application of POP+ calcium silicate @ 50 per cent calcium saturation recorded significantly higher pH and CEC while POP+ lime sludge @ 45 and 50 per cent calcium saturation and POP+lime sludge @ 45 per cent calcium saturation at different stages of crop growth. Secondary nutrient status of soil was also significantly higher, in treatments POP+ calcium silicate @ 50 per cent calcium saturation and POP+ lime sludge @ 50 per cent calcium saturation. The macronutrients concentration in grain and stover of maize were significantly higher in the treatment POP+ calcium silicate @ 45 per cent calcium saturation followed by POP + lime sludge @ 45 per cent calcium saturation. The treatment supplied with POP+calcium silicate @ 45 per cent calcium saturation recorded significantly highest uptake of macronutrients in grain and stover followed by POP+ lime sludge @ 45 per cent calcium saturation.

As a consequence of above results, application of POP + calcium silicate @ 45 per cent calcium saturation recorded significantly higher growth parameters, yield attributes and maximum grain ( $69.75 \text{ q ha}^{-1}$ ) and stover yield ( $64.15 \text{ q ha}^{-1}$ ) followed by POP+ lime sludge @45 per cent calcium saturation ( $66.73$  and  $53.33 \text{ q ha}^{-1}$  of grain and stover yield respectively). The correlation studies revealed that the sources of liming materials were positively and significantly correlated with soil chemical properties, nutrients uptake and as well yield.

June, 2011

(Y. Vishwanathshetty)  
Major Advisor

## 19. Influence of Nitrogen Levels and Micronutrient Enriched Compost on Soil Properties, Yield and Uptake of Nutirents by Rice (*Oryza Saviva.L.*)

**HARISHA H. S.**

### **ABSTRACT**

A field investigation was undertaken during *kharif 2010* at College of Agriculture, Navile, Shivamogga to study the influence of nitrogen levels and micronutrient enriched compost on soil properties, yield and uptake of nutrients by rice (*Oryza saviva*, L.). There were thirteen treatments combinations, which comprised of two levels of nitrogen along with ZnSO<sub>4</sub> enriched composts. Experiment was laid out in RCBD and replicated thrice. Application of 125kg N+Zn enriched compost @15 kg ha<sup>-1</sup> recorded significantly higher available N,P,K in soil. Higher DTPA extractable zinc was recorded in treatment 100 kg N+Fe enriched compost @15kg ha<sup>-1</sup>. Higher growth and yield attributes were recorded in 125kg N+Zn enriched compost @15 kg ha<sup>-1</sup>, followed by 125 kg N+Zn enriched compost @ 10kg ha<sup>-1</sup>. Grain and straw yields were also recorded superior in the same treatments.

Significantly higher concentration and uptake of nutrients (N, P, K, Zn, Cu, Mn) were recorded in treatment 125kg N+Zn enriched compost @15kg ha<sup>-1</sup> as compared to control. Maximum concentration of Fe was recorded in treatment 125 kg N+ Fe enriched compost @15 kg ha<sup>-1</sup> and maximum uptake of Fe was recorded in treatment 125 kg N+ Zn+Fe enriched compost @ 15kg each ha<sup>-1</sup>. Soil chemical properties (available N,P, K, DTPA extractable Zn, Mn, Cu) were positively and significantly correlated with yield and yield parameters. DTPA extractable Fe was negatively and significantly correlated with yield and yield parameters. Uptake of macro and micronutrients were positive with significantly correlated with grain yield. The treatment 125kg N+Zn enriched compost @ 15kg ha<sup>-1</sup> recorded highest net returns and cost benefit ratio.

Nov, 2011

(H.C. Prakasha)  
Major Advisor

## 20. Maize (*Zea Mays L.*) Productivity and Zinc Status in Soil as Influenced by Different Methods of Zinc Application

**ASHA, L.**

### **ABSTRACT**

A field experiment was conducted on a sandy loam soil (Typic Haplustalf), located at Agricultural College Shivamogga during *Kharif* 2010 in order to know the effect of different methods of zinc application *viz.*, soil application of zinc sulphate @ 10 kg ha<sup>-1</sup>, 0.2% zinc solution as foliar spray at different growth stages (30 and 60 days after sowing), seed priming with 1% zinc solution for 8 hours on yield and nutrients uptake by maize (*Zea mays.L*) and also their effects on available zinc status and distribution of its fractions in soil. Results of the experiment indicated that yield and nutrients uptake by maize significantly increased due to different methods of zinc application compared to that of control. However, the treatment which received zinc through soil (zinc sulphate @ 10 kg ha<sup>-1</sup>) recorded a maximum yield of stover (7.52 t ha<sup>-1</sup>) and grain (6.96 t ha<sup>-1</sup>) and total uptake of zinc (551.92 g ha<sup>-1</sup>) and NPK by maize compared to other treatments.

The DTP A- Zn in post harvest soil significantly increased due to different methods of zinc application except seed priming method over that of control (0.70 mg kg). Among the different methods of zinc application, soil application of zinc sulphate @ 10 kg ha<sup>-1</sup> recorded a maximum of 1.1.6 mg kg<sup>-1</sup> DTPA-Zn in soil due to the direct addition of more quantity of zinc to the soil compared to other treatments. Further, it was noticed that application of zinc through soil significantly increased the water soluble and sorbed zinc fractions in soil compared to that of control and the remaining fractions of zinc *viz.*, easily reducible manganese bound, carbonate bound, organic bound, Fe and Al oxides bound and residual zinc in addition to total zinc, did not influenced by different methods of zinc application.

June, 2011

(H.M. C hidanandappa)  
Major Advisor

## 21. Calcium and Magnesium Dynamics in Nutrient Carriers, Soil and Plant Continuum

**DEEPTHI PATIL**

### **ABSTRACT**

A field experiment was conducted at College of Agriculture, located within the Zonal Agricultural and Horticultural Research Station, Navile, Shimoga, during the kharif, 2012 on soybean crop to study the "Calcium and magnesium dynamics in nutrient carriers, soil and plant continuum". The experiment was laid out in a randomized block design with three replications and 8 treatments combinations, comprising NPK application along with nutrient carriers such as FYM @ 6.25 t ha<sup>-1</sup>, poultry manure @ 3 t ha<sup>-1</sup>, vermicompost @ 3 t ha<sup>-1</sup> with gypsum @ 100 kg ha<sup>-1</sup>.

The application of NPK + poultry manure @ 3 t ha<sup>-1</sup> + gypsum @ 100 kg ha<sup>-1</sup> recorded significantly higher number of pod per plant (96.50 pod per plant), branches per plant (4.81), which was on par with treatment NPK + FYM @ 6.25 t ha<sup>-1</sup>, NPK + FYM @ 6.25 t ha<sup>-1</sup> + gypsum @ 100 kg ha<sup>-1</sup> and NPK + vermicompost @ 3 t ha<sup>-1</sup> + gypsum 100 kg ha<sup>-1</sup>. Highest pod yield, grain yield and haulm yield is recorded in treatment receiving application of NPK + FYM @ 6.25 t ha<sup>-1</sup> + gypsum @ 100 kg ha<sup>-1</sup>.

The concentration of major and secondary nutrients and their uptake by grain and haulm of soybean significantly increased with the application NPK + poultry manure @ 3 t ha<sup>-1</sup> + gypsum @ 100 kg ha<sup>-1</sup> compared to only NPK applied treatment whereas P, Ca, Mg, is higher with application of NPK + poultry manure @ 3 t ha<sup>-1</sup> + gypsum 100 kg ha<sup>-1</sup>. Exchangeable Ca and Mg and major nutrient status in soil is significantly higher in treatment supplied with NPK + poultry manure @ 3 t ha<sup>-1</sup> + gypsum @ 100 kg ha<sup>-1</sup> compared to all other treatments.

June, 2012

(H.M Chidanandappa)

Major Advisor

## 22. Productivity and NPK Use Efficiency in Maize (*Zea Mays L.*) as Influenced by Fertilizer Enrichment of Compost

**SANJAY V.V.**

### **ABSTRACT**

A field experiment was conducted in ZARS, Navile, Shimoga during *kharif* 2011 in order to know the impact of different compost enrichment methods on productivity and NPK use efficiency in maize. The experiment was tried in factorial RED design with factor A at two levels (with and without red earth enrichment) and factor B at five levels (different compost enrichment methods) replicated three times. The different compost enrichment methods adopted were compost enriched with NPK fertilizers, compost enriched with neem oil coated urea (NOCU) + PK fertilizers and compost enriched with neem cake + PK fertilizers compared with only compost and recommended package of practice (POP). The highest grain yield (8626 kg ha<sup>-1</sup>), stover yield (11033 kg ha<sup>-1</sup>) and NPK uptake was recorded by compost + NOCU + PK fertilizers. The grain yield was on par with recommended POP (7924 kg ha<sup>-1</sup>) although 20 kg ha<sup>-1</sup> less N was used through fertilizer. This could be due to steady increase in the supply of nitrogen by NOCU by reducing the leaching and volatilization losses. Only compost recorded lowest grain and stover yield. The highest N, P and K use efficiency of 34.5, 59.9 and 118.1 kg grain per kg of NPK applied, respectively, was recorded in compost + NOCU + PK fertilizers treatment. The crop recovery of applied nitrogen was also highest with compost + NOCU + PK fertilizers (89.9%) indicating the importance of NOCU as slow release source of N. This was followed by compost + neem cake + PK fertilizers enrichment method. Similarly crop recovery of applied phosphorus (35.2%) and potassium (309.4%) was highest with compost + NOCU + PK fertilizers treatments.

Nov, 2012

(T.S.Vageesh)  
Major Advisor

### 23. Effect of Different Sources and Levels of Sulphur on Yield and Uptake of Nutrients by Soybean (*Glycine Max L.*)

**YATHEESH G.**

#### **ABSTRACT**

A field experiment was conducted at Zonal Agricultural Research Station, College of Agriculture, Navile, Shivamogga during *kharif* 2011 to study the effect of different sources and levels of sulphur on yield and uptake of nutrients by soybean. Two sulphur sources with four levels of sulphur *viz.*, 10, 20, 30 and 40 kg ha<sup>-1</sup> as single super phosphate and gypsum were tried in a randomized complete block design with three replications and nine treatments.

Results of the field experiment indicated that the application of 40 kg sulphur ha<sup>-1</sup> as single super phosphate significantly increased the growth parameters and yield attributes. Highest grain (10.20 q ha<sup>-1</sup>) and stover yield (20.55 q ha<sup>-1</sup>) were recorded in the treatment that received 40 kg sulphur ha<sup>-1</sup> as single super phosphate.

The nitrogen, phosphorus, potassium, magnesium and sulphur content in seed, leaf and stem was highest in the treatment that received 40 kg sulphur ha<sup>-1</sup> as single super phosphate. Whereas calcium concentration was highest in the treatment that received 40 kg sulphur ha<sup>-1</sup> as gypsum. Uptake of nitrogen (227.50kg ha<sup>-1</sup>), phosphorus (34.13kg ha<sup>-1</sup>), potassium (118.11kg ha<sup>-1</sup>), calcium (60.59 kg ha<sup>-1</sup>), magnesium (34.74 kg ha<sup>-1</sup>) and sulphur (19.68 kg ha<sup>-1</sup>) was highest in the treatment that received 40 kg sulphur ha<sup>-1</sup> as single super phosphate. Quality parameters like crude protein content (35.42%), crude protein yield (360.26 kg ha<sup>-1</sup>), oil content (19.07%) and oil yield (194.51kg ha<sup>-1</sup>) and also highest net return (16819.00 Rs/ha) was recorded in the treatment.

June, 2012

(K.T. Gurumurthy)  
Major Advisor

## 24. Effect of Different Sources and Levels of Sulphur on Productivity and Quality of Maize (*Zea Mays L.*)

**ABHIRAM G.J.**

### **ABSTRACT**

A field experiment on effect of different sources and levels of sulphur was conducted at Zonal Agricultural Research Station and College of Agriculture, Navile, Shimoga during kharif 2011. The soil in the experimental site was sandy loam with acidic pH. There were ten treatment combinations and three replications laid with randomized completely block design. Treatments comprises of three different sulphur sources *viz.*, elemental sulphur, ammonium sulphate and gypsum at 10,20 and 30 kg sulphur ha<sup>-1</sup> tested against control (no sulphur).

Results of the field experiment indicated that among the treatments, application of sulphur at 30 kg ha<sup>-1</sup> as ammonium sulphate recorded significantly higher growth parameters. Highest grain (74.80 q ha<sup>-1</sup>) and stover yield (86.91 q ha<sup>-1</sup>) were recorded in the treatment receiving sulphur at 30 kg ha<sup>-1</sup> as ammonium sulphate followed by sulphur at 30 kg ha<sup>-1</sup> as gypsum. The correlation studies revealed that the sources of sulphur were positively and significantly correlated with soil chemical properties, nutrients uptake and yield.

Primary nutrient status of soil was significantly highest with the application of sulphur at 30 kg ha<sup>-1</sup> as ammonium sulphate at different stages of crop growth. Exchangeable calcium and magnesium status of soil was significantly highest in treatment, sulphur at 30kg ha<sup>-1</sup> as ammonium sulphate. The primary nutrient concentration in grain and stover of maize were significantly higher in the treatment sulphur at 30 kg ha<sup>-1</sup> as ammonium sulphate followed by sulphur at 30kg ha<sup>-1</sup> as gypsum. The calcium and magnesium concentration in grain and stover of maize were significantly higher in the treatment sulphur at 30 kg ha<sup>-1</sup> as gypsum followed by sulphur at 30 kg ha<sup>-1</sup> as ammonium sulphate. The sulphur concentration in grain and stover of maize were significantly higher in the treatment, sulphur at 30 kg ha<sup>-1</sup> sulphate recorded significantly highest uptake of primary nutrients in grain and stover followed by sulphur at 30 kg ha<sup>-1</sup> as gypsum. The crude protein content and oil content of maize was higher in the treatment sulphur at 30kg ha<sup>-1</sup> as ammonium sulphate. The ratios of N:S and P:S decreases with increasing levels of sulphur. The highest net return was recorded in the treatment receiving sulphur at 30 kg ha<sup>-1</sup> as ammonium sulphate.

June, 2012

(Y. Vishwanath Shetty)  
Major Advisor

## 25. Micronutrients Status in Soils of Krishnarajpet Taluk, Mandya District, Karnataka

**BHAVITH N.C.**

### **ABSTRACT**

A study was conducted at Agricultural College, Shimoga in order to characterize the soils coming under Krishnarajpet taluk of Mandya district with respect to available micronutrients status. After selecting four to five villages from each hobli of the taluk. Five surface soil samples were collected from each village and were analyzed for physico-chemical properties and micronutrients status.

Results indicated that the clay content in these soils varied from 3.80 to 28.70 percent and 62 percent of the soils had a sandy loam texture. The soils were acidic to alkaline in nature (4.01 to 8.47), organic carbon status ranged from low to medium and CEC (3.12 to 14.80 cmol (p+)kg<sup>-1</sup>) and CaCO<sub>3</sub> equivalent was found to be low.

DTPA - extractable copper (0.382 to 4.634 mg Kg<sup>-1</sup>) was found to be sufficient in these soils. DTPA- extractable zinc was in the range of 0.66 to 0.85 mg Kg<sup>-1</sup> and 85 percent of the soils recorded the available zinc status below 0.60 mg kg<sup>-1</sup> (deficient). In respect of available boron status, all soils recorded the values in deficient range (0.007 to 0.166 mg Kg<sup>-1</sup>). Available Fe and Mn status were in the range of 1.40 to 87.51 mg Kg<sup>-1</sup> and 0.124 to 28.44 mg Kg<sup>-1</sup>, respectively. Only about 5 and 8 percent of the soils were deficient in iron and manganese, respectively. Further, it was observed that available copper and zinc showed a positive and significant correlation with organic carbon and clay contents in soils. But a poor correlation was observed between the soil properties (pH, OC, Clay and CaCO<sub>3</sub>) and available Mn, Fe and boron status in soils.

June, 2013

(H. M. Chidanandappa)  
Major Advisor

## 26. Study of Micronutrients Status in Soils of Sagar Taluk, Shimoga District

**SAVITHA. M. S.**

### **ABSTRACT**

To assess the micronutrients status of soils of Sagar taluk, Shimoga district a study was undertaken during 2012-13, in which 120 surface soil samples (0-15cm) were collected and analyzed for various physic-chemical parameters and available micronutrients. The texture of the surface soil varied from loamy sand to sandy clay loam. The soils were found to be acidic in reaction where as the EC was found normal range. The organic carbon content of the soils were low to high (2.77-27.81g kg<sup>-1</sup>). The CEC of soils were varied from 11.21 to 16.81 cmol(p+)kg<sup>-1</sup>. Sesquioxide of soils varied from 13.00 to 22. 28 percent.

The result of investigation indicated that, most of surface soils were found to be low to high in available nitrogen. Available phosphorus were found to be low to medium and available potassium were found to be medium to high. The available iron, manganese, copper, zinc and boron were found to be 30.43 to 96.15 mg kg<sup>-1</sup>, 30.84 to 150.09 mg kg<sup>-1</sup>, 1.24 mg kg<sup>-1</sup>, 0.24 to 1.24 mg kg<sup>-1</sup> 0.10 to 0.72 mg kg<sup>-1</sup> respectively. Available iron, copper and manganese was found sufficient in all soil samples while zinc was sufficient in 31 percent and deficient in 69 percent samples and available boron was found sufficient in 19 percent and deficient in 81 percent soil samples. All available micronutrients (Fe, Mn, Cu, Zn and B) significant positive correlation with organic carbon and available boron was significant positive correlation with clay, CEC and C<sub>a</sub>CO<sub>3</sub>.

June, 2013

(K.T. Gurumurthy)  
Major Advisor

## 27. Effect of Different Organic Manures on the Release Pattern of Nitrogen and Productivity of Maize (*Zea Mays* L.)

VIRENDRA SINGH TAN WAR

### ABSTRACT

Field and laboratory studies on effect of different organic manures on the release pattern of nitrogen and productivity of maize were conducted at Zonal Agricultural Research Station, Navile, Shimoga during *Kharif* 2012. The experimental soil was sandy loam. There were nine treatment combinations laid in three replications. Treatments comprise of three types of manures viz., FYM, Vermicompost and Poultry manure with fertilizers and Neem coated urea.

Laboratory incubation studies revealed that among different treatment,  $\text{NH}_4^+$ -N was significantly increased (30 days after incubation) in 100% RD N+ 2 times of N- equivalent of RD-FYM through Poultry manure treated soil. In case of  $\text{NO}_3^-$  - N highest value was recorded in 100% RD-N (no organic manure). As number of incubation days increased, release pattern increased up to 6- days there after it was decreased due to volatilization loss.

The highest grain and stover yield were recorded by 100% RD-N through Neem coated urea (4ml neem oil/100g urea). This could be due to steady increase in the supply of nitrogen by Neem oil coated urea. The macronutrients concentration and uptake in grain and stover of maize were significantly higher in the treatment 100% RD-N through Neem coated urea (4ml neem oil/100g urea) over the others treatments. The highest available N in soil was recorded in 100% RD-N through Neem coated urea (4ml neem oil /100g urea) treatment at 60 days after sowing and harvest. The correlation study revealed that the grain and stover yield were positively correlated with available nitrogen in soil.

June, 2013

(Y. Vishwanathshetty)  
Major Advisor

## 28. Effect of Fym Levels with or without Fertilizers on Zinc and Copper Dynamics in Soil Under Ragi (*Eleusine Coracana L.*) Crop

**MAHASWETA CHAKRABORTY**

### **ABSTRACT**

Field and laboratory studies were conducted at College of Agriculture, Navile, Shimoga during *kharif*, 2013, in order to know the effect of FYM levels with or without fertilizer on soil properties, available zinc and copper status in soil and productivity of ragi. Results of the experiments indicated that application of FYM @ 22.5 t ha<sup>-1</sup> with or without fertilizers, significantly increased soil pH, organic carbon, DTPA-Zn (0.97 mg kg<sup>-1</sup>) and DTPA-Cu (0.9 mg kg<sup>-1</sup>) and zinc and copper content in all fractions (water soluble, sorbed, easily reducible manganese bound, carbonate bound and organic bound) except Fe and Al bound residual fractions in soil compared to the control in soil after harvest of the ragi. Further, all fractions except residual fraction had a positive and significant correlation with each other indicating the existence of a dynamic equilibrium among themselves. The maximum CO<sub>2</sub> evolution rate throughout the incubation period was recorded in the treatment that received FYM @ 22.5 t ha<sup>-1</sup> and minimum was recorded in the treatment that received only recommended dose of fertilizers (RDF).

Similarly, the treatment receiving FYM @ 22.5 t ha<sup>-1</sup> + RDF was found to be significantly superior in respect of grain (30.28 q ha<sup>-1</sup>) and straw yield (18.90 q ha<sup>-1</sup>), content and uptake of zinc and copper by grain and straw of ragi. Hence, application of FYM at higher level with or without fertilizers can be thought of as an approach towards bio fortification of zinc in plant and plant products to overcome zinc malnutrition in human beings.

June, 2013

(H. M. Chidanandappa)  
Major Advisor

## 29. Studies on Fe and Zn Nutrition for Improving Productivity and Seed Quality of Groundnut in Light Textured Red Soils

**SACHIN A.S.**

### **ABSTRACT**

A field investigation was undertaken during *kharif*, 2009 at ZARS, Navile, Shimoga to study the effect of Fe and Zn nutrition for improving productivity and seed quality of groundnut in light textured red soils. There were nine treatments of Fe and Zn application both as soil and foliar application along with recommended dose of NPK fertilizers. The experiment was laid out in randomized complete block design and replicated thrice. Although the pod yield of groundnut improved significantly when both iron and zinc were applied, there was no significant improvement in pod yield when iron or zinc were applied individually. Highest productivity level of 1685 kg ha<sup>-1</sup> of pod yield was obtained when FeSO<sub>4</sub> + ZnSO<sub>4</sub> were applied to soil @ 10 kg ha<sup>-1</sup> each along with FYM as compared to 1140 kg ha<sup>-1</sup> recorded at control. There was a significant increase in the shelling percentage of groundnut also from 66.3 percent at control to 72.0 percent when FeSO<sub>4</sub>+ ZnSO<sub>4</sub> were applied to soil @ 10 kg ha<sup>-1</sup> each along with FYM. Similarly, seed quality parameters like seedling length and seedling vigour index also increased significantly. Seedling vigour index was higher when FeSO<sub>4</sub> were applied to soil @ 10 kg ha<sup>-1</sup> each along with FYM. There was a significant increase in available Fe and Zn content in soil particularly when FeSO<sub>4</sub>+ZnSO<sub>4</sub> were applied to soil at 10kg ha<sup>-1</sup> each along with FYM. Highest Fe levels of 11.87, 13.45 and 11.33 mg kg<sup>-1</sup> were recorded at 30, 60 days and after harvest respectively with this treatment. The available Zn content at 30, 60 days after sowing and after harvest were positively and significantly correlated with pod yield. However available Fe was significantly correlated with pod yield only at 60 days after sowing. It can be concluded from the present investigation that application of FeSO<sub>4</sub> and ZnSO<sub>4</sub> significantly influences the growth, pod yield, seed quality of groundnut in light textured red soils.

June, 2014

(T.S. Vageesh)  
Major Advisor

### **30. Studies on Fertilizer use Efficiency in Ragi (*Elusine corcana L.*) under Rainfed Condition**

**SARASWATHI**

#### **ABSTRACT**

A field experiment was conducted on alfisols during 2013 of Zonal Agricultural and Horticultural Research station, college of Agricultural, Navile, shimoga. To study the fertilizer use efficiency in ragi (*Elusine coracona L.*) under rainfed condition. A total of nine treatments were tried in a Randomized Complete Block Design (RCBD) with three replication. The treatments comprise of RDF + compost 10 t ha<sup>-1</sup>, RDF + 50 % NK + compost 10 t ha<sup>-1</sup>, STCR based NPK + compost 10 t ha<sup>-1</sup>, STL based NPK + compost 10 t ha<sup>-1</sup> RDF through enriched compost, RDF + 50% NK through enriched compost, STCR based through enriched compost, STL based through enriched compost, with a control.

The results revealed that application of STCR based NPK and compost 10 t ha<sup>-1</sup> for targeted yield 40 q ha<sup>-1</sup> recorded a highest grain yield (3238.00 kg ha<sup>-1</sup>) and straw yield (8926.00 kg ha<sup>-1</sup>). The per cent deviation for targeted yield of 40 q ha<sup>-1</sup> (19.05%).

Similarly higher uptake was recorded in STCR based NPK + compost 10 t ha<sup>-1</sup> both in grain and straw. However, the NUE and AUE was highest in STCR based NPK and compost 10 t ha<sup>-1</sup> for targeted yield 40 q ha<sup>-1</sup>. The highest physiological use efficiency was recorded in control plot (no fertilizer).

The highest partial factor productivity was recorded in STCR based NPK + compost 10 t ha<sup>-1</sup>. However the available NPK and exchangeable Ca, Mg and available sulphur were highest in STCR based NPK + compost 10 t ha<sup>-1</sup>. The STCR approach was better for achieving the higher yield and higher nutrient use efficiency.

June, 2014

(Y. VishwanathShetty)  
Major Advisor

### **31. Effect of Phosphorus Levels with or without PSB Seed Treatment on Dynamics of P in Soil and Productivity of Groundnut (*Arachis Hypogaea* L.)**

**ANJALI, M.C.**

#### **ABSTRACT**

A field experiment was conducted on a sandy loam soil at UAHS, Shimoga during kharif of 2013 to know the effect of phosphorus levels with or without PSB seed treatment on dynamics of P in soil and productivity of groundnut. The levels of phosphorus @ 0, 25, 37.5 and 50 kg P<sub>2</sub>O<sub>5</sub> as DAP per ha-4 with or without PSB seed treatment were tried in a randomized complete block design (RCBD) with three replications and eight treatments.

Results of the field experiment indicated that application of 50 kg PaOs ha<sup>-1</sup> with PSB seed treatment significantly increased the growth, yield and yield attributes of groundnut. Highest pod yield of groundnut (24.29 q ha<sup>-1</sup>) was noticed in with 50 kg P<sub>2</sub>O<sub>5</sub> ha:1 with PSB seed treatment. The nutrient content and uptake by groundnut like N, P, K, Ca, Mg and S were highest in the treatment that received 50 kg PaOs ha<sup>-1</sup> with PSB seed treatment.

Higher values of saloid - P, Ca - P and available P status in soil were recorded with 50 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-4</sup> with PSB seed treatment at different crop growth stages. Higher values of Al - P, Fe - P, reductant - P, occluded - P, organic - P and total - P fractions were recorded in treatments involving 1° levels without PSB seed treatment compared to only P levels with PSB seed treatment. Treatment 50 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> recorded higher Al-P, Fe - P reductant - P, occluded - P, organic - P and total - P values.

June, 2014

(B.C. Dhananjaya)  
Major Advisor

## 32. Studies on Effect of Different Sources of Nitrogen on Nitrogen Dynamics in Soil under Aerobic Rice (*Oryza Sativa* L.) Cultivation

**KOWSALYA.P**

### **ABSTRACT**

A field experiment was conducted during *khariet* 2014 on a sandy clay loam soil belongs to the soil taxonomy of Typic Haplustalf, located at Agricultural and Horticultural Research station (AHRS), Kathalgera , Channagiri taluk, Davangere district to study the effect of different sources of nitrogen on nitrogen dynamics in soil under aerobic rice cultivation (*Oryza sativa* L.). Five sources of nitrogen applied through organics (FYM, Poultry manure, vermicompost, sunhemp, eupatorium) and inorganics involving eight treatment combinations were tried in a RCBD with three replications. Among the treatments, significantly higher grain and straw yields were obtained with the application of 50 per cent recommended N + 50 per cent N through FYM (44.73 q ha<sup>-1</sup> and 53.73 q ha<sup>-1</sup> respectively). The total uptake of N, P and K significantly increased with application of different sources of nitrogen.

Available nitrogen recorded was high in the treatment with 50 per cent recommended N + 50 per cent N through FYM (332.3 kg ha<sup>-1</sup>) as compared to control (205.6 kg ha<sup>-1</sup>). Inorganic nitrogen fractions, total nitrogen, nitrogen use efficiency were recorded high in treatments which received combine application of organic and inorganic sources of nitrogen compared to the treatments which received only NPK fertilizers. The higher B: cost ratio recorded in treatment which received combine application of 50 per cent recommended N + 50 per cent recommended N through FYM compare to other treatments. It can be concluded that combine application of organic and inorganic was better than the application of inorganic fertilizers alone.

June, 2014

(K.T.Gurumurthy)  
Major Advisor

### 33. Studies on Tobacco Stem Based Composts and their Evaluation as Soil Amendments

**PREETHA, S.**

#### **ABSTRACT**

A study on tobacco stem based composts was conducted in ZAHRS, Navile, Shimoga in 2013. The experiment on standardization of composting technique in tobacco stem waste was tried in factorial CRD design with factor A at four levels [green leaves (pongamia), poultry manure, pressmud and no green waste] and factor B at two levels (with and without lime) replicated three times. Consortium of four decomposing fungal cultures, urea and zinc sulphate was common to all the treatments. The second experiment, a laboratory incubation study was conducted to know rate of ammonification and nitrification in soils amended with varying levels of composts. Two best composts selected from study-I based on physical qualities like texture, colour and odour were used with and without calcium ammonium nitrate (CAN). Green leaves based compost @ 25 % showed higher microbial activity (79.10 mg 100g<sup>-1</sup> compost) than no green waste (74.15 mg 100g<sup>-1</sup> compost). Total carbon content was much lower in poultry manure (19.77%) and press mud (19.42%) based composts compared to that of no green waste (24.00%) with lime application.

The highest reduction in cellulose, hemicellulose and lignin content was recorded with poultry manure based compost @ 25% (10.66, 11.96 and 14.45% respectively), due to narrow C:N ratio of poultry manure. Poultry manure based compost (PMC) and green leaves based compost (GLMC) were found to be best two composts from the first experimentation. Further, application of two best composts to soil increased maximum water holding capacity of soil from 20.13 per cent at control i.e. no compost to 23.16 and 22.47 per cent in PMC and undecomposed tobacco stem (UTS) @ 25 t ha<sup>-1</sup> with CAN respectively. An increase of 21.16 per cent in organic carbon was recorded in PMC over control. The NH<sup>4</sup>-N levels increased up to 15 days and then after it decreased. (NO<sub>2</sub>+NC)-N levels recorded in soils amended with tobacco stem based composts indicate that there was a significant influence of PMC, GLMC and UTS on rate of nitrification. Thus, use of tobacco stem as GLMC and PMC, improved the soil properties related to crop production.

June, 2014

(T S Vageesh)  
Major Advisor

### **34. Impact of Organic Farming Practices on Micronutrient Status and Biological Properties of Soils**

**DENILA. D**

#### **ABSTRACT**

An investigation was under taken at College of Agricultural, Shivamogga during the period of 2013-15 in order to study the impact of organic farming practices on micronutrients status and biological properties of soils. Surface soil samples were collected from selected organic and conventional farms covering paddy and arecanut crops of seven taluks in Shivamogga district. The collected soil samples were processed and analyzed for chemical properties, available micronutrients status and biological properties. The results of the investigation indicated that soils coming under organic farming practices of paddy and arecanut covers, recorded higher range in pH, organic carbon and CEC compared to the soils managed with conventional farming practices.

Organically managed soils of both paddy and arecanut covers recorded higher values in DTPA extractable copper (2.33 and 4.17 mg kg<sup>-1</sup>), iron (77.33 and 44.81 mg kg<sup>-1</sup>) and manganese (22.92 and 22.91 mg kg<sup>-1</sup>) compared to the soils managed with conventional farming practices and were found to be sufficient with respect to the above nutrients availability. But, 14 and 67 per cent of soils coming under conventional farms of paddy and arecanut covers recorded zinc and boron deficiencies, respectively compared to the soils managed with organic farming practices where no deficiency of zinc and boron was observed.

Further, it was observed that total microbial counts (bacteria, fungi and actinomycetes), enzyme activity *viz.*, dehydrogenase, acid phosphatase and urease, free living N-fixing bacteria recorded at higher level in soils managed with organic farming practices of both paddy and arecanut land use cover. But, phosphorus solubilizing bacteria were not detected in soils coming under both conventional and organic farming practices probably because of acidic pH of the soils.

June, 2015

(H.M Chidanandappa)  
Major Advisor

### **35. Soil Properties as Influenced by Organic Farming Practices in Shivamogga District, Karnataka**

**BHARATH Y PATEEL**

#### **ABSTRACT**

A study was conducted in the UAHS, Shivamogga to know the effect of organic farming practices on soil physico-chemical properties and NPK fractions in Paddy and Arecanut growing soils of Shivamogga district. The 84 surface soil samples were collected from all taluks of Shivamogga district where farmers are practicing organic farming for more than five years and the soil samples from neighboring conventional farms under the same crop were also collected to compare the changes in soil properties.

Practicing of organic farming reduced the bulk density of soil but increased the maximum water holding capacity. The soil pH was slightly increased in soils under organic farming. But there was no appreciable change in soil texture and EC of the soils. The soils under organic farms recorded higher SOC, CEC, higher amount of available N,P,K,S and exchangeable Ca and Mg than the soil under conventional farming in both Paddy and Arecanut growing farms.

Organic farming increased the total N and available N in soil. The contents of inorganic N fractions of soil viz.,  $\text{NH}_4^+$ -N and  $\text{NO}_3^-$ -N as well as organic fractions viz., hydrolysable-N, hexamine-N, amino acid-N and total hydrolysable-N recorded higher in organically managed soils. Among them amino acid N was dominant fraction contributing to total N. All phosphorus fractions recorded higher in organically managed soils compared to inorganic farming soils. Al-P, Fe-P and Org-P were the major contributor to total P and recorded higher in organic farming soils in both Paddy and Arecanut growing soils compared to inorganically managed farms. The soils under organic farming recorded higher soil K fractions than the soils under conventional farming. Higher water soluble K, exchangeable K, lattice K was recorded in soils of organic farming over soils of conventional farming, but non exchangeable soil K content was found higher in inorganic farming farms.

July, 2015

(Ganapathi)  
Major Advisor

### **36. Effect of Soil Salinity on Performance of Different Rice Varieties**

**NANDA G. S**

**ABSTRACT**

An experiment was conducted in ZAHRS, Navile, Shivamogga during 2012 in order to know the effect of soil salinity on performance of different rice varieties. The experiment was tried in factorial CRD design with factor one consisting of four salt tolerant rice varieties and one ruling check and factor two consisting of two amendments and control. The different varieties used were BPT 5204 (check), CSR 22, GNV-05-01, IR 30864 and Vikas. The amendments used were gypsum and sulfur compared with control replicated three times. The highest grain yield (18.9 and 18.7 g hill<sup>-1</sup>), straw yield (35.8 and 39.2 g hill<sup>-1</sup>) and NPK uptake was recorded by the varieties GNV-05-01 and CSR 22. Among the amendments, gypsum recorded highest grain and straw yield (21.6 and 40 g hill<sup>-1</sup>, respectively) followed by sulfur (19.1 and 39.2 g hill<sup>-1</sup>, respectively). This could be due to better growth with gypsum provided by favorable soil condition for crop growth. Control recorded lowest grain and straw yield. K : Na ratio in both grain and straw was highest with variety CSR 22 (245.8 and 16.7, respectively). The higher K : Na ratio in grain and straw was recorded in gypsum and sulfur applied soil (223.5, 120.5 in grain and 20.8, 9.9 in straw, respectively). Application of gypsum significantly decreased pH, EC, exchangeable sodium and ESP of soil at different growth stages of rice over control. The per cent decrease in ESP over control was 60.9 and 43.4 with gypsum and sulfur respectively, indicating the importance of gypsum in reducing the sodicity hazard of soil. The K : Na ratio in the shoot was significantly and positively correlated with the grain and straw yield ( $r= 0.615^*$  and  $0.652^{**}$ , respectively).

July, 2015

(T. S. Vageesh)  
Major Advisor

### 37. Distribution of Carbon Pools in Soils under Different Land Use Cover in Bhadravathi Taluk of Shivamogga District, Karnataka

**RUDRESH M D**

#### **ABSTRACT**

A study was conducted at UAHS, Shivamogga to know the distribution of carbon pools in soils under different land use cover in Bhadravathi taluk of Shivamogga district, Karnataka. Soil samples were collected from major land use cover *viz.*, paddy, maize, sugarcane, arecanut, banana and forest cover. The results revealed that pH of different land use cover ranged from 4.72-6.82, BD ranged from 1.24-1.35 Mg m<sup>-3</sup>, CEC ranged from 3.51-5.73 c mol (p<sup>+</sup>) kg<sup>-1</sup> and per cent CaCO<sub>3</sub> ranged from 0.80-3.77 per cent.

Carbon fractions *viz.*, potassium dichromate oxidizable organic carbon ranged from 3.91-10.66 g kg<sup>-1</sup>, potassium permanganate oxidizable organic carbon from 228.98-1328.63 mg kg<sup>-1</sup>, cold water extractable carbon from 218.02-339.00 mg kg<sup>-1</sup>, total carbon from 14.56-25.68 g kg<sup>-1</sup>, total organic carbon from 14.40-25.51 g kg<sup>-1</sup> and total inorganic carbon ranged from 0.147-0.303 g kg<sup>-1</sup> under different land use cover.

Among different land use cover E<sub>4</sub>/E<sub>6</sub> values were lower than 5. Soils under paddy (4.68), arecanut (4.50) and forest (4.44) recorded higher humic acid and arecanut (4.34), maize (4.09) and sugarcane (3.98) soils recorded higher fulvic acid.

Microbial biomass carbon, microbial biomass nitrogen and microbial biomass phosphorus under different land use cover ranged from 221.66-432.33 mg kg<sup>-1</sup>, 21.14-40.15 mg kg<sup>-1</sup> and 9.61-19.26 mg kg<sup>-1</sup>, respectively. The correlation between PDOC with PPOC (r=0.287<sup>\*</sup>), TC (r=0.830<sup>\*\*</sup>), TOC (r=0.831<sup>\*\*</sup>), MBC (r=0.386<sup>\*\*</sup>) was positive and significant. PPOC showed positive and significant correlation with TC (r=0.437<sup>\*\*</sup>), TIC (r=0.353<sup>\*\*</sup>) and TOC (r=0.432<sup>\*\*</sup>). MBC showed positive and significant correlation with MBP (r=0.557<sup>\*\*</sup>) and MBN (r=0.518<sup>\*\*</sup>). TOC and TIC showed positive and significant correlation with MBC (r=0.348<sup>\*\*</sup>) and TOC (r=0.338<sup>\*\*</sup>), respectively.

July, 2015

(B. C. Dhananjaya)  
Major Advisor

### **38. Status of Potassium in Soils under Paddy Land use Cover of Udupi District, Karnataka**

**LEELAVATI, C. CHANNAGOUDRA**

#### **ABSTRACT**

An investigation was carried out at College of Agriculture, Shivamogga during the year 2014-16 in order to know the status of potassium in soils under paddy cover of Udupi district, Karnataka. For the study, 165 surface samples were collected from soils under paddy cover of three taluks (Udupi, Kundapura and Karkala) consisting of nine hoblies of Udupi district. After processing, samples were analysed for K-fractions, K-fixation capacity and Quantity-Intensity relationship. Results of the study indicated that, more than 80 per cent of the soils had pH in the range of extremely acidic to strongly acidic with organic carbon status ranged from low to high status (0.60 to 25.30 g kg<sup>-1</sup>). The available K status was found to be in the range from low to high status (26.34 to 659.90 kg ha<sup>-1</sup>) and only 05.45 per cent of the samples had high available K status.

Water soluble, exchangeable, fixed and mineral K in soils varied from 1.00 to 79.60, 0.90 to 144.50, 0.90 to 222.95 and 1240.00 to 69918 mg K kg<sup>-1</sup>. Total potassium was recorded in the range of 1310 to 70,000 mg K kg<sup>-1</sup> and appeared to be low. The contribution of different forms of K to the total K was found in the order of water soluble < exchangeable < fixed < mineral K. Further, a positive and significant relationship was observed between water soluble, exchangeable, fixed K indicates that there exists a dynamic equilibrium between above fractions in soils.

Potassium fixing capacity of the soils ranged from 0.12 to 0.29 cmol (p+) kg<sup>-1</sup> revealing soils had low K fixing capacity. Soils had very low (14.39, 07.00, 09.00 cmol (p+) kg<sup>-1</sup>) potential buffering capacity (PBC<sup>K</sup>) and also had low labile and specific K due to low clay content and also dominance of kaolinite clay mineral. This indicates that soils had a low K supplying power and need frequent and multiple applications of K- fertilizer for sustainable production.

June, 2016

(H.M. Chidanandappa)  
Major Advisor

### **39. Soil Resource Characterization and Mapping of Nicchapura-2 Micro-Watershed of Harappanahalli Taluk, Davanagere District.**

**KRISHNA, N. R.**

#### **ABSTRACT**

The study was conducted during 2015-16 to know the soil fertility status of Nicchapura-2 micro-watershed in Harappanahalli taluk, Davanagere district which is 120 km away from UAHS, Shivamogga. Under this study six pedons were selected based on soil heterogeneity in micro-watershed area and soil samples were collected from different horizons and analyzed for physico-chemical properties. The results on soil texture indicated that varied from sandy clay to sandy clay loam and bulk density ranged from 1.31 to 1.43 Mg m<sup>-3</sup>. The results revealed that the pH and OC was decreased with depth, available N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, exchangeable Ca, Mg and available sulphur ranged from 96 to 262 kg ha<sup>-1</sup>, 11 to 46 kg ha<sup>-1</sup>, 101 to 396 kg ha<sup>-1</sup>, 12.1 to 23.5 cmol(p<sup>+</sup>)kg<sup>-1</sup>, 1.60 to 10.3 coml(p<sup>+</sup>)kg<sup>-1</sup> and 1.03 to 8.21 mg kg<sup>-1</sup>, respectively. Available nitrogen, phosphorus and sulphur are decreased with depth. However, potassium, exchangeable Ca, Mg increased with depth.

One hundred and three surface grid soil samples were collected and analyzed for their fertility status. The value of pH, EC, and OC ranged from 6.2 to 8.7, 0.11 to 0.84 dS m<sup>-1</sup> and 3.1 to 5.6 g kg<sup>-1</sup>, respectively. The available N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, exchangeable Ca, Mg and available sulphur were ranged from 135 to 236 kg ha<sup>-1</sup>, 10 to 34 kg ha<sup>-1</sup>, 130 to 415 kg ha<sup>-1</sup>, 8.1 to 38.1 cmol(p<sup>+</sup>)kg<sup>-1</sup>, 6.3 to 26.2 cmol(p<sup>+</sup>)kg<sup>-1</sup> and 6.3 to 12.1 mg kg<sup>-1</sup>, respectively. Available micronutrients viz., iron, manganese, zinc and copper were ranged from 0.58 to 5.92 mg kg<sup>-1</sup>, 0.60 to 10.3 mg kg<sup>-1</sup>, 0.01 to 0.41 mg kg<sup>-1</sup> and 0.06 to 4.81 mg kg<sup>-1</sup> respectively. Available zinc and iron are found to be deficient, whereas, copper and manganese found sufficient in these soils of micro watershed. The fertility status of soils under micro watershed area collected grid wise and were mapped by GIS technique.

August, 2016

(Parashuram Chandravamshi)  
Major Advisor

#### **40. Impact of Landuse Systems on Nutrient Status and Carbon Distribution in Soils of Thirthahalli Taluk, Shivamogga District**

**ASHA SUBHASH SHETTAR**

##### **ABSTRACT**

An investigation was carried out during 2015-16 to study the impact of landuse systems on nutrient status and carbon distribution in soils of Thirthahalli taluk, Shivamogga district. The landuse systems studied included forest, arecanut, coconut, paddy, fallow. The present investigation indicated that texture varied from sandy loam to sandy clay loam. The highest ( $1.44 \text{ mg m}^{-3}$ ) mean BD was observed under paddy land use and highest mean moisture (35.91%) content was observed under forest land use system. The pH was acidic in all the soils under investigation. The highest mean organic carbon content ( $19.23 \text{ g kg}^{-1}$ ) was noticed in forest as compared to other land use systems. Calcium carbonate equivalent was higher (0.36%) in forest land use system.

Available mean nitrogen ( $372.7 \text{ kg ha}^{-1}$ ) and phosphorus ( $28.27 \text{ kg ha}^{-1}$ ) was highest in forest, and lower in paddy land use system, mean available potassium varied from 115.3 to  $382.2 \text{ kg ha}^{-1}$  under different land use systems. The primary nutrients decreased with depth, the mean exchangeable calcium and magnesium were higher ( $6.04$  and  $2.52 \text{ cmol (p+) kg}^{-1}$  respectively) in forest land use system. The mean available sulphur was higher ( $25.1 \text{ mg kg}^{-1}$ ) in forest as compared to other land use systems.

Highest mean Potassium permanganate oxidizable carbon content was noticed in forest ( $1182.7 \text{ mg Kg}^{-1}$ ) and lower in paddy land use systems. Highest mean cold water extractable ( $43.3 \text{ mg Kg}^{-1}$ ) and microbial biomass carbon ( $437.7 \text{ mg kg}^{-1}$ ) were observed in forest land use systems and decreased with depth. The highest mean soil organic carbon stock was recorded in forest ( $37.89 \text{ t C ha}^{-1}$ ) land use at surface depth. The humic acid and fulvic acid ratios were higher in forest land as compared to other land use systems.

July, 2016

(K.T. Gurumurthy)  
Major Advisor

## 41. Effect of Phosphorus Levels through Integrated Nutrient Management (INM) Packages on Productivity of Groundnut (*Arachis hypogaea* L.) and Status of Phosphorus in Soil

**BADKA AMRUTH**

### **ABSTRACT**

A field experiment was conducted at College of Agriculture, Shivamogga during *kharif* of 2015 in order to know the effect of phosphorus levels through integrated nutrient management (INM) packages on productivity of groundnut (*Arachis hypogaea* L.) and status of phosphorus in soil. The three levels of phosphorus *viz.*, 20, 30 and 50 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> as DAP were tried in a Randomized Complete Block Design (RCBD) with three replications and nine treatments. Results of the field experiment indicated that application of 75 % of 30 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> through CF + 25 % through FYM + Phosphorus Solubilising Bacteria (PSB) significantly increased the growth, yield and yield attributes and quality parameters of groundnut. Higher pod yield of groundnut (19.79 q ha<sup>-1</sup>) was recorded due to treatment of 75 % of 30 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> through CF + 25 % through FYM + PSB.

The content and uptake of N, P, K, Ca, Mg and S by groundnut plant parts *viz.*, haulm, shell and kernel were highest in the treatment that received 75 % of 30 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> through CF + 25 % through FYM + PSB. The available phosphorus status in soil decreased as the crop maturity and lower status was recorded at harvest. However, the treatment T<sub>9</sub> supplied with high dose of P *i.e.* 75 % of 50 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> through CF + 25 % through FYM + PSB was recorded higher available P compared to other treatments. Higher values of Saloid-P, Al-P, Fe-P, Reductant Soluble -P, Occl-P and Total-P fractions were recorded except Organic-P in treatment T<sub>7</sub> supplied with 50 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>. Higher B: C ratio of 1: 2.82 was recorded in treatment T<sub>6</sub> supplied with 75 % of 30 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> through CF + 25 % through FYM + PSB.

August, 2016

(G. N. Thippeshappa)  
Major Advisor

## 42. Distribution of Secondary Nutrients Under Different Land Use in Hebburu Micro-Watershed of Ajjampura Sub-Watershed, Tarikere Taluk, Chikkamagaluru District

**CHAITRA, B. K.**

### **ABSTRACT**

The study was conducted at UAHS, Shivamogga to know the distribution of secondary nutrients under different land use in Hebburu micro-watershed. Under different land use 158 soil samples were collected grid-wise viz., coconut, arecanut, onion, chilli, ragi, oilseed/pulse, uncultivable land and other horticultural land use were analysed for their fertility status. The texture of soils varied from sandy loam to sandy clay loam in texture. Results revealed that bulk density and particle density ranged from 1.09 to 1.88 and 1.80 to 2.87 Mg m<sup>-3</sup>, respectively. The values of pH, electrical conductivity, organic carbon, cation exchange capacity, calcium carbonate equivalent and per cent base saturation ranged from 4.15 to 9.37, 0.01 to 3.07 dS m<sup>-1</sup>, 0.60 to 9.60 g kg<sup>-1</sup>, 0.20 to 128.60 g kg<sup>-1</sup>, 6.31 to 135.80 cmol (p<sup>+</sup>) kg<sup>-1</sup> and 31.57 to 99.35 per cent, respectively.

The distribution of secondary nutrients viz., exchangeable Ca, exchangeable Mg and available S values in soils ranged from 1.70 to 52.25 and 0.30 to 26.80 cmol (p<sup>+</sup>) kg<sup>-1</sup> and 0.26 to 9.51 mg kg<sup>-1</sup>, respectively. Secondary nutrients showed positive and significant correlation with pH, clay, CEC and negative and significant correlation with BD. The secondary nutrients status in soils collected grid-wise were mapped by GIS technique.

Twenty five soil samples collected from six pedons under different land use were analysed for different fractions of secondary nutrients. The exchangeable and total Ca increased with depth while water soluble Ca decreased with depth. The fractions of magnesium did not follow any trend with depth. The S fractions varied with a decreasing trend with depth of the profiles. Ca and Mg fractions showed positive and significant correlation with clay, pH, CEC and CaCO<sub>3</sub> and sulphur fractions showed positive and significant correlation with clay, PD, pH, OC and CEC.

July, 2016

(B. C. Dhananjaya)  
Major Advisor

### **43. Nitrogen Fractionation in Soils under Different Horticultural Land Use Systems in Hiriyur Taluk, Chitradurga District.**

**PURNANANDA CHIKKOPPAD**

#### **ABSTRACT**

The study was conducted to know the distribution of nitrogen fractions under different horticultural land use systems in Hiriyur Taluk, Chitradurga district during 2015-16. Six horticultural land use systems *viz*, coconut, arecanut, pomegranate, banana, onion and chilli were identified. The soils analyzed for Physico-chemical properties and nitrogen fractions. 120 composite samples include 60 surface and 60 sub-surface samples. Soils were clay to sandy clay loam in texture in selected land use systems and clay content higher in sub-surface than the surface soils. The bulk density was medium to high and increased with increasing the depth. Soils were slightly alkaline to alkaline in reaction.

Electrical conductivity and organic carbon were medium to high. Major portion of study area was low to medium in available nitrogen and low to medium in available phosphorus and potassium. Nitrogen fractions content were directly related with the organic carbon of the soils. Inorganic nitrogen fractions like nitrate and ammonical nitrogen showed decreasing trend with increasing the depth. Organic nitrogen fractions showed the irregular distribution with the depth it may be due to slow mineralization in the sub-surface soils as compared to surface soils. Total hydrolysable nitrogen was dominant fraction and nitrate nitrogen was the least fraction. The dynamics status of nitrogen fractions is related to organic carbon content. So frequent N fertilization with small amount but multiple times so that nitrogen concentration in soil solution may be maintained at a higher and more stable value for sustainable production of horticultural crops.

October, 2016

(L. B. Ashok)  
Major Advisor

#### 44. Effect of Subsurface Fertigation on Fertility Status of Soil Under Sugarcane Crop Cover

**SUPRIYA, U. L.**

##### **ABSTRACT**

An experiment was conducted on “Effect of subsurface fertigation on fertility status of soil under sugarcane crop cover” in selected villages of Davangere district, Karnataka during 2015 at College of Agriculture, Navile, University of Agricultural and Horticultural Sciences, Shivamogga. The ninety soil samples were collected from 0-15, 15-30, 30-45, 45-60 and 60-75 cm soil depth from six sub-surface sugarcane fertigated field ( $\geq 2$  years) of Arsapura and Yellebethuru villages of Davangere district. The collected soil samples were analysed for selected physical and chemical properties by adopting standard methods to know the depth wise distribution of sugarcane farms subjected to subsurface fertigation. The soil pH decreases with depth and were neutral to alkali in nature. The EC of the soil is  $\leq 1 \text{ dSm}^{-1}$  and showed decreases with depth and depth wise decrease in trend of soil organic carbon was observed in all farms. The available and total nitrogen, phosphorus and potassium showed decreasing trend with depth under subsurface fertigated farms. The exchangeable calcium, magnesium and available sulphur increases with depth and higher at 45-60 cm and 60-75 cm and lower at 0-15 cm depth in farms studied. The water soluble potassium was higher at 0-15 cm and lower at 60-75 cm depth indicating decreasing trend with increasing depth in fertigated farms. The  $\text{NO}_3\text{-N}$  content varied with depth and was higher at 45-60 cm and lower at 0-15 cm depth. The  $\text{NH}_4\text{-N}$  varied with depth, but higher at 0-15 cm and lower at 45-60 cm and 60-75 cm depth in subsurface fertigated farms.

July, 2016

(Ganapathi)  
Major Advisor

#### **45. Characterization of Soils under Different Land Use Systems of Koranahalli Micro Watershed Area of Tarikere Taluk, Chikkamagalore District.**

**VIDYASHREE, M. S.**

##### **ABSTRACT**

An investigation was carried out to characterize the soils under different land use systems of Koranahalli micro watershed area of Tarikere taluk, Chikkamagalore district during the year 2015-16 at Department of Soil Science and Agricultural Chemistry, College of Agriculture, UAHS, Shivamogga. The study areas were selected based on land use systems namely ragi, maize, arecanut and barren land use systems.

The texture of surface soils of ragi, maize and barren land use systems varied from sandy loam to sandy clay loam. The soil reaction (pH) was moderately acidic to neutral in all the land use systems except the arecanut land use system which showed slightly saline in nature with clayey texture. The organic carbon content was recorded medium to high status in all the land use systems of surface soils and decreased with depth of profile.

The surface soils recorded low to medium in available N, medium to high in available P in all the land use systems. The available K content of surface soils of ragi, maize and barren land use systems were showed low to high, whereas the arecanut land use system registered low to medium available K content. The status of NPK was decreased with depth of profile.

The exchangeable Ca and Mg status of surface soils of all the land use systems were sufficient range but, the available S were found to be low to medium in maize, barren and arecanut land use systems whereas the ragi land use system showed medium to high S status and these nutrients did not follow a definite trend throughout the profile depth in their distribution. The DTPA extractable iron, zinc, manganese and copper content of soil were found sufficient in all the land use systems. However, the available boron content was found low in all the land use systems of surface soils.

June, 2016

(G. N. Thippeshappa)  
Major Advisor

## 46. Effect of Long Term Integrated Nutrient Management on Soil Properties and Distribution of NPK Fractions of Soil under rice (*Oryza sativa* L.) -MAIZE (*Zea mays* L.) Cropping System

**SACHIN KM**

### **ABSTRACT**

A field experiment was conducted during *kharif* 2014 on a sandy clay loam soil belongs to the soil Taxonomy of *TypicHaplustalf*, located at AHRS, Kathalagere, Davanagere district, to study the effect of long term integrated nutrient management on soil properties and distribution of NPK fractions of soil under rice-maize cropping system. The different sources and levels of nutrients are applied through organics (FYM, paddy straw and glyricidia) and inorganics involving twelve treatment combinations were tried in a Randomized Complete Block Design with four replications using rice as test crop.

The results of the experiment indicated that combined application of fertilizers and organic materials viz., FYM, paddy straw and glyricidia reduced the bulk density and significantly increased the maximum water holding capacity, soil pH, electrical conductivity and organic carbon of soil. Significantly, higher concentration of available nitrogen, phosphorous, potassium, exchangeable calcium, magnesium, available sulphur and DTPA extractable micronutrients were recorded in the integrated treatments as compared to only fertilizer treated plots and absolute control.

Further, the contents of inorganic and organic fractions of nitrogen, phosphorous and potassium were recorded high in integrated treatments as compared to fertilizer treated plots and absolute control. The higher grain (6873.59 kg ha<sup>-1</sup>) and straw (10775.59 kg ha<sup>-1</sup>) yield and total uptake of N, P and K by rice were recorded by the treatment which received 75 per cent recommended N along with 25 per cent N through paddy straw. The lowest grain (3556.54 kg ha<sup>-1</sup>) and straw (5025.59 kg ha<sup>-1</sup>) yield were recorded in absolute control. It can be concluded that combined application of organic and inorganic sources of nutrients was better than the application of inorganic fertilizers alone and absolute control. Among the plots treated with different organics paddy straw was superior over FYM and glyricidia.

February, 2017

(Dr. Parashuramchandravanshi)  
Major Advisor

## **47. Studies on Status and Distribution of Potassium in Soils under Arecanut Gardens of Bhadra Command Area of Davanagere District**

**AMRUTHESH, P.**

### **ABSTRACT**

An investigation was carried out at College of Agriculture, Shivamogga during the year 2016-17 in order to know the status of potassium in soils under arecanut gardens of Davanagere district, Karnataka. For the study, 200 surface and subsurface samples were collected from soils under arecanut garden of four taluk (Channagiri, Honnalli, Harihara and Davanagere) of Davanagere district. After processing, samples were analyzed for physical and chemical properties and potassium fractions. Results of the study indicated that, the soils had pH in the range of slightly acidic to neutral with organic carbon status ranged from medium to high status (5.47 to 10.02 g kg<sup>-1</sup>). In surface and subsurface soils of different taluks, the mean water soluble potassium was highest in Channagiri taluk (18.93 mg kg<sup>-1</sup>) and lowest in Davanagere taluk (10.22 mg kg<sup>-1</sup>), while the mean exchangeable potassium was highest in Channagiri taluk (127.89 mg kg<sup>-1</sup>) and lowest in Davanagere taluk (64.39 mg kg<sup>-1</sup>) and the mean non-exchangeable potassium was highest in Channagiri taluk (289.11 mg kg<sup>-1</sup>) and lowest in Davanagere taluk (137.93 mg kg<sup>-1</sup>). Similarly, the mean lattice and total potassium was highest in Channagiri taluk (3103.17 and 3539.10 mg kg<sup>-1</sup>) and lowest in Davanagere taluk (2077.11 and 2289.65 mg kg<sup>-1</sup>).

Depth wise distribution of different potassium fractions in the profiles noticed that the available, water soluble and exchangeable potassium content found highest in surface layer and decreased with depth, whereas non-exchangeable, lattice and total potassium increased with depth under arecanut garden soils of Davanagere District, Karnataka.

August, 2017

(Parashuram Chandravamshi)  
Major Advisor

## 48. Status and Behaviour of Copper in Soils under Arecanut Cover in Malnad Region of Shivamogga District

**ANUSHA, H. R.**

### **ABSTRACT**

An investigation was carried out at College of Agriculture, Shivamogga during 2015-17 to know the status and behaviour of copper in soils under arecanut cover in malnad region of Shivamogga district. Surface and subsurface samples were collected from soils under arecanut cover in four taluks of Shivamogga district and were analysed for available Cu, Cu-fractions and adsorption, desorption behaviour of Copper in soils. Results of the study indicated that pH, organic carbon and available copper was in the range of 3.49-6.53, and 3.89-6.99, 3.00- 28.40 g kg<sup>-1</sup> and 1.50-28.40 g kg<sup>-1</sup> and 0.50 to 62.00 mg kg<sup>-1</sup> and 0.52 to 25.10 mg kg<sup>-1</sup> in surface and subsurface layers, respectively.

Forms of copper such as water soluble, sorbed, easily reducible manganese bound, calcium carbonate bound, organic bound, Fe and Al oxide bound and residual copper were found in the range of 0.04 to 0.89, 0.23 to 17.80, 0.39 to 5.93, 0 to 2.26, 0.20 to 2.80, 0.68 to 5.78 and 25.85 to 365.05 mg kg<sup>-1</sup> in surface and 0.02 to 1.33, 1.22 to 8.22, 0.02 to 5.26, 1.08 to 3.12, 0.20 to 2.24, 0.68 to 6.20 and 14.40 to 229.29 mg kg<sup>-1</sup> in subsurface layers respectively. Total Cu in the range of 27.50 to 397.50 and 18.50 to 250.00 mg kg<sup>-1</sup> in surface and subsurface layer, respectively.

Adsorption of copper in soils followed both Freundlich and Langmuir's adsorption isotherms. Quantity of adsorption ranged from 39.90 to 322.00 µg g<sup>-1</sup>. Desorption of copper in soils was followed the Langmuir isotherm model with a % desorption ranged from 5.97 to 22.93.

July, 2017

(H. M. Chidanandappa)

Major Advisor

## **49. A Study of Carbon Sequestration Potential of Arecanut based Cropping Systems of Coastal and Hilly zones of Karnataka.**

**APURVA, V.**

### **ABSTRACT**

An investigation was undertaken at, Department of Soil Science and Agricultural Chemistry, College of Agriculture, UAHS, Shivamogga to know Carbon Sequestration potential of areca nut based cropping systems of coastal and hilly zones of Karnataka. The study area covered the soils of Mangalore and Udupi district of coastal (zone-10) and Chikkamagalur, Kodugu and Shivamogga district of hilly (zone-9). Representative soil samples were collected from 0-30 cm, 30-90 cm and 60-90 cm depth from areca nut Sole, arecanut + banana, arecanut+cocoa, arecanut+pepper, arecanut+mixed, arecanut+coffee and areca nut +orange from 2 location. The results revealed that soil pH were acidic to neutral with normal EC and Sandy loam to sandy clay loam in texture. The SOC contents were medium to high ranged and decreases with depth. Among the cropping systems studied, arecanut+mixed recorded higher mean potassium permanganate oxidizable organic carbon ( $1387.33 \text{ mg kg}^{-1}$ ), cold water extractable carbon ( $409.06 \text{ mg kg}^{-1}$ ), total carbon ( $29.39 \text{ g kg}^{-1}$ ), total organic carbon ( $18.70 \text{ g kg}^{-1}$ ), total inorganic carbon ( $0.2136 \text{ g kg}^{-1}$ ) and soil microbial biomass carbon ( $370.33 \text{ mg kg}^{-1}$ ) fractions as compared to other cropping systems and decreases with lower depth. Among different areca nut based cropping system  $E_4/E_6$  values were higher in areca nut +mixed (1.166). Carbon fractions were higher in 0-30cm soil depth and decreases in lower depth of areca nut based cropping systems. Humic acid was higher in areca nut +mixed (5.35) and fulvic acid was higher in arecanut+ coffee (5.01). Correlation study showed that the various carbon fractions were positively and significantly correlated amongst themselves and with pH, clay and  $\text{CaCO}_3$  (%) content of the soils.

July, 2017

(Ganapathi)  
Major Advisor

## 50. Phosphorus Transformation and Productivity of Rainfed Maize under Phosphorus Rich Acid Soils

LAVANYA BAI, T.

### ABSTRACT

A field experiment was carried out at Zonal Agricultural and Horticultural Research Station (ZAHRS), Navile, Shivamogga during *kharif* 2016 to study the response of maize to different phosphorus (P) levels with and without seed treatment. Different levels of P @ 0, 30, 45, 60 and 75 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> with or without PSB (*Bacillus megatherium*. L) seed treatment were tried in a randomized complete block design with three replications and eleven treatments. The results of the experiment indicated that seed treatment with PSB and higher levels of P application significantly increased the growth, yield and yield attributes of maize. The nutrient content and uptake of N, P and K by maize is also increased with 75 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> with PSB seed treatment compared to other treatments. The same treatment at different growth stages recorded higher values of saloid-P, Ca-P and available P status. Higher values of Al-P, Fe-P, reductant-P, occluded-P, organic-P and total-P fractions were recorded in treatments involving P levels without PSB seed treatments. Treatment receiving 75 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> without PSB seed treatment recorded higher values of Al-P, Fe-P, reductant-P, occluded-P, organic-P and total-P. The occurrence of P fractions were in the order of total P > organic P > reductant soluble P > Fe-P > Al- P > occluded P > saloid P > Ca-P. Positive response for soil microbial biomass P, acid phosphatase and dehydrogenase enzyme activity has noticed with application of higher P levels and PSB seed treatment wherein highest values were recorded in the treatment 75 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> with PSB seed treatment at different crop growth stages. All the P fractions except organic P significantly and positively were correlated with yield attributes, soil properties and P uptake by grain, stover and total uptake at harvest of maize. The highest B:C of 2.43 was found with application of recommended NPK + PSB seed treatment. Hence, application of recommended dose of NPK along with PSB can be used for profitable maize cultivation under high phosphorous rich acid soils.

July, 2017

(B. C. Dhananjaya)  
Major Advisor

## 51. Forms and Status of Potassium in Soils of Vanivilas Command Area, Hiriyr Taluk, Chitradurga District

**RAMYA KRISHNA, K.**

### **ABSTRACT**

An investigation was carried out during 2016-17 to study the forms and status of potassium in soils of Vanivilas command area, Hiriyr taluk, Chitradurga district. The texture was varied from sandy loam to sandy clay loam, while the soil reaction was alkaline with high EC values indicating salt accumulation at the surface. The organic carbon contents were low to medium and found higher in surface than subsurface soils. The calcium and magnesium values were higher in subsurface than surface soils. The CEC values ranged between 30.22 to 33.07  $\text{cmol (p}^+)\text{kg}^{-1}$  at the surface and increased with depth. The ESP values were higher in surface than subsurface soils. The available nitrogen content and available  $\text{P}_2\text{O}_5$  content was low to medium and the available  $\text{K}_2\text{O}$  was varied from 385.86 to 489.05  $\text{kg ha}^{-1}$  in surface and decreased with depth. The available S content was high and varied from 40.38 to 46.14  $\text{mg kg}^{-1}$  in surface soils. Available potassium, water soluble and exchangeable potassium content of the surface soils was ranged from 101.60 to 230.65  $\text{mg kg}^{-1}$ , 4.75 to 28.95  $\text{mg kg}^{-1}$ , and 99.30 to 222.05  $\text{mg kg}^{-1}$ , respectively and decreased in subsurface soils, while non-exchangeable, lattice and total forms of potassium was ranged from 107.40 to 363.20  $\text{mg kg}^{-1}$ , 4790.36 to 9722.37 and 5302 to 10365  $\text{mg kg}^{-1}$ , respectively for surface soil and was found higher in subsurface than surface soils. Among the different forms water soluble potassium contributed lowest and mineral potassium contributed highest to the total potassium. Correlation study showed that the various forms of K were positively and significantly correlated with CEC, clay and silt content of the soils and negatively correlated with sand content of the soils studied. The potassium fixation capacity showed positive and significant correlation with clay ( $r=0.479^*$ ) and CEC ( $r=0.528^{**}$ ).

July, 2017

(Gurumurthy, K. T.)  
Major Advisor

## 52. Characterisation of Salt Affected Soils of Vani Vilas Command Area Hiriyur Taluk, Chitradurga District

**SHIVA KUMAR, S.**

### **ABSTRACT**

The present investigation was carried out on “Characterisation of salt affected soils of Vani Vilas command area Hiriyur taluk, Chitradurga district”. Hundred soil samples from 0-15 cm depth were collected from ten identified villages of Vani Vilas command area. Samples were analysed for various physical, chemical properties. The mean values of the properties were used to study the variability and understand the relations. Most of samples were texturally classified under sandy clay loam and sandy loam. Bulk density, per cent pore space values ranged between 1.38 to 1.60 Mg m<sup>-3</sup> and 39.85 to 48.51 respectively. The soils were found to be moderate to strongly alkaline in reaction (pHs 8.31 to 8.88), salt content was (ECe 1.76 to 3.38 d Sm<sup>-1</sup>) and low to medium in organic carbon content, available nitrogen and available phosphorus and high in available potassium and available sulphur. Exchangeable calcium and magnesium were above critical limit with high cation exchange capacity (16.12 to 26.15 cmol (p<sup>+</sup>) kg<sup>-1</sup>) and Exchangeable sodium percentage and sodium adsorption ratio ranged between 9.13 to 25.79 per cent and 6.66 to 12.83 me L<sup>-1</sup>. The DTPA extractable micronutrient cations manganese, copper and iron were found above critical limit, soils were deficit in zinc (76%). Soil pH had a significant and positive correlation with exchangeable Na, ESP and SAR values and gypsum requirement. Gypsum requirement depends on chemical properties, ESP found to be correlated with gypsum requirement thus regression equation developed from the relation is useful for the farmers, scientists and agriculture agencies for calculating the quantity of gypsum required to reclaim the salt affected lands of these regions on large scale basis and to take up measures for improving in the soil health.

July, 2017

(Sarvajna B. Salimath)  
Major Advisor

### **53. Effect of Foliar Application of Different Sources of Calcium on Growth, Yield Quality and Nutrient Content and Uptake by Tomato under Poly house Condition**

**TEJASHVINI, A**

#### **ABSTRACT**

Poly house experiment was carried out at Zonal Agricultural and Horticultural Research Station (ZAHRS), Navile, Shivamogga during *kharif* 2016 to study the response of tomato fruit to different sources and levels of calcium. Three sources of calcium ( $\text{CaCl}_2$ ,  $\text{CaNO}_3$  & CAN) with three levels each (0.2, 0.5 and 0.8%) were applied as foliar spray in CRD with three replications and ten treatments. The results of experiment indicated that foliar spray of calcium through different sources increased the growth, yield, and quality of tomato significantly over the control (water spray). Among the different sources studied, the treatment receiving 0.5 per cent CAN as foliar spray was recorded highest plant height (149.21 cm), number of branches (24.47), stem diameter (5.47 cm) and yield parameter like fruit diameter (4.72 cm), number of fruits per plant (58.67) fruit yield ( $91.98 \text{ t ha}^{-1}$ ) and higher fruit weight (111.89 g) and quality parameters like lycopene content ( $79.66 \text{ mg kg}^{-1}$  of tissue), fruit firmness ( $0.33 \text{ kg cm}^{-2}$ ), Ascorbic acid ( $132.32 \text{ mg } 100\text{g}^{-1}$ ), total soluble solids ( $5.00^\circ\text{Brix}$ ) and titrable acidity (0.23 %) compared to  $\text{CaCl}_2$  and  $\text{CaNO}_3$ . The Highest Ca content and uptake by tomato leaves was recorded at flowering (1.55 % &  $424.94 \text{ kg ha}^{-1}$ ) and fruiting (1.57 % &  $430.81 \text{ kg ha}^{-1}$ ) stages respectively. Similarly the Ca content and uptake (0.84 %,  $77.26 \text{ kg ha}^{-1}$ ) by tomato fruits was recorded highest due to foliar spray of 0.5 per cent CAN compared to control and the next best source for foliar spray found to be  $\text{CaCl}_2$  @ 0.8 per cent.

June, 2017

(G. N. Thippeshappa)  
Major Advisor

## 54. Effect of Levels of Fertigation on Growth and Yield of Tomato under Polyhouse Condition

**ANANDA SAJJAN**

### **ABSTRACT**

The polyhouse experiment was carried out at College of Horticulture, Hiriyr during *Kharif* season 2017, to study the effect of levels of fertigation on growth and yield of tomato. The results of experiment indicated that soil application of 100:100:100 kg NPK per acre increased the growth, yield and quality of tomato significantly over other fertigation treatments. Among the fertigation treatments, as fertigation dose increased, yield also increased. The treatment that received soil application of 100:100:100 kg NPK per acre recorded significantly higher plant height (242.67 cm), number of branches (11.60 plant<sup>-1</sup>), number of leaves (626.16 plant<sup>-1</sup>), leaf area (67.07 dm<sup>2</sup> plant<sup>-1</sup>), yield parameters *viz.*, number of fruits per plant (30.18 plant<sup>-1</sup>), fruit weight (65.13 g), fruit yield (1.62 t ac<sup>-1</sup>), quality parameters *viz.*, shelf life (9.38 days), total soluble solids (3.4 °Brix), Lycopene content (56.60 mg 100g<sup>-1</sup>) and ascorbic acid (123.37 mg 100g<sup>-1</sup>) was significantly higher in treatment received 100:100:100 kg NPK per acre. Among the fertigation treatments, treatment that received soil application of 40:40:40 kg NPK per acre + 4 kg 19:19:19 per acre through fertigation recorded significantly higher growth, yield and quality parameters. Significantly maximum nitrogen (79.90 kg ac<sup>-1</sup>), phosphorus (24.48 kg ac<sup>-1</sup>) and potassium (163.26 kg ac<sup>-1</sup>) uptake by tomato (fruit + plant) registered in treatment received soil application of 100:100:100 kg NPK per acre. Similarly, soil application 100:100:100 kg NPK per acre recorded higher available nitrogen (138.34 kg ac<sup>-1</sup>), available phosphorus (39.82 kg ac<sup>-1</sup>) and available potassium (155.74 kg ac<sup>-1</sup>) after harvest of the crop. The economic benefits of 100:100:100 kg NPK per acre through soil application resulted in maximum benefit cost ratio (2.12) and value cost ratio (49.15).

August, 2018

(L. B. Ashok)  
Major Advisor

## 55. Soil Characterization of Hebbalagere Micro Watershed of Channagiri Taluk in Davanagere District of Karnataka

**HARSHITHA S**

### **ABSTRACT**

An investigation was carried out to characterize the soils of Hebbalagere microwatershed of Channagiri taluk in Davanagere district of Karnataka during the year 2017-18 at Department of Soil Science and Agricultural Chemistry, College of Agriculture, UAHS, Shivamogga.

Gridwise surface soil samples were collected at 320m X 320m interval and soil fertility status maps were prepared. The surface soil texture of the Hebbalagere micro watershed area was predominantly with sandy clay and clay. The soils were slightly acidic to strongly alkaline with non-saline in nature and soil organic carbon was low to high. The micro-watershed showed low to medium in available N status, medium to high in available  $P_2O_5$ , available  $K_2O$  and available sulphur status. The exchangeable calcium, magnesium and DTPA extractable iron, copper, manganese were sufficient in the entire micro-watershed area while the DTPA extractable zinc was both deficient and sufficient. Available boron content ranged from low to high in the study area.

Eleven soil profiles were studied based on soil heterogeneity of studied area. Soil structure of pedons varied from sub-angular blocky to angular blocky. The available N,  $P_2O_5$ ,  $K_2O$ , sulphur and boron, exchangeable Ca and Mg and DTPA extractable Fe, Cu, Mn and Zn decreased with depth in the majority of the pedons while in some pedons it followed the indefinite trend. The pedons 1, 2, 3, 4, 5, 6, 8 and 11 were classified under order Alfisols, the soils of pedon 7 and 9 were grouped under order Inceptisols and Pedon 10 was classified as order Vertisols. Sorghum, sunflower and mulberry were highly to moderately suitable; maize and arecanut were marginally suitable; ragi, red gram, chilli, soybean, banana, mango and guava were moderately to marginally suitable; field bean was moderately suitable; cotton and coconut were marginally to not suitable in the Hebbalagere micro watershed.

July, 2018

(Ganapathi)  
Major Advisor

## 56. Assessment of Carbon Sequestration Potential in Different Land use Systems of Virajpet Taluk, Kodagu District.

**PRADEEPA, K. L.**

### **ABSTRACT**

A study was conducted at UAHS, Shivamogga to know the carbon sequestration potential of soils under different land use systems in Virajpet taluk, Kodagu district, Karnataka. The representative soil samples were collected from major land use systems *viz.*, sacred groves, coffee based agroforestry-indigenous, coffee based agroforestry-exotic and paddy land use system from 0-15 cm, 15-30 cm, 30-60 and 60-90 cm soil depths.

The present investigation indicated that, texture varied from loamy sand to clay loam. The pH was acidic in all the soils under investigation and electrical conductivity was normal with respect to salt accumulation. The CEC of soil ranged from 14.43 to 29.95 cmol (p+) kg<sup>-1</sup>. The highest mean value of BD was observed under paddy land use system (1.30 Mg m<sup>-3</sup>). The highest mean value of available nitrogen (343.64 kg ha<sup>-1</sup>) was observed in coffee based agroforestry-indigenous and highest mean value of available phosphorous (57.32 kg ha<sup>-1</sup>) and sulphur (45.09 mg kg<sup>-1</sup>) was observed in sacred groves.

Among different land use systems, the higher mean value of PDOC(13.56 g kg<sup>-1</sup>), PPOC (1026.26 mg kg<sup>-1</sup>), CWEC(548.75 mg kg<sup>-1</sup>), SMBC(626.78 mg kg<sup>-1</sup>), TOC (31.93 g kg<sup>-1</sup>), TC (52 g kg<sup>-1</sup>) and TIC (0.58 g kg<sup>-1</sup>) content was observed in sacred groves and decreases with increasing soil depth. The E<sub>4</sub>/E<sub>6</sub> value was lower than 6 in all the studied land use systems. The soils under sacred groves has recorded the highest mean value of Humic acid and Fulvic acid (4.50 and 5.51). The highest mean value of carbon sequestration potential was observed in sacred groves (325.25 t ha<sup>-1</sup>) followed by coffee based agroforestry-indigenous (239.40 t ha<sup>-1</sup>) and lowest mean value of carbon sequestration potential was observed in paddy land use system (162.96 t ha<sup>-1</sup>).

August, 2018

(Ravikumar, D)  
Major Advisor

## 57. Forms and Distribution of Zinc in Soils under Paddy Cover in Bhadra Command of Karnataka

**RANJITHA, P.**

### **ABSTRACT**

A study was carried out in the department of soil science and agricultural chemistry, college of agriculture, Shivamogga to know the “Forms and distribution of zinc in soils under paddy cover in Bhadra command of Karnataka” during 2016-18. 145 surface soil samples (0-15 cm) were collected from soils of Bhadra command and analysed for chemical properties, available zinc status and distribution of zinc fractions in soils and their relationship with other soil properties were also worked out.

The results indicated that, soil pH ranged from 5.02 to 8.63 (39.31% soil samples recorded acidic pH). Organic carbon ranged from 3.54 to 13.20 g kg<sup>-1</sup> (57.24% samples recorded high). Per cent CaCO<sub>3</sub> ranged from 0.35 to 5.89.

The DTPA extractable zinc in these soils ranged from 0.10 to 2.41 mg kg<sup>-1</sup>. Considering 0.60 mg kg<sup>-1</sup> as the critical limit of DTPA zinc in soils, 70.34 and 29.66% were found to be sufficient and deficient in DTPA extractable zinc, respectively. The distribution of soil zinc fractions to total zinc followed order as water-soluble < carbonate bound < organic bound < Sorbed < easily reducible manganese bound < Fe and Al oxide bound < residual zinc. Among the zinc fractions, the residual fraction was found to be a dominant fraction and the water soluble fraction was found to be the least fraction. Total zinc was found to be in the range of 391 to 477 mg kg<sup>-1</sup>.

Correlation studies showed that, available zinc positively related with organic carbon ( $r = 0.116$ ), clay content ( $r = 0.343^*$ ) and CEC ( $r = 0.204$ ). Further, positive correlations among the zinc fractions and total zinc except for Fe and Al oxide bound Zn indicated that zinc fractions are in dynamic equilibrium with each other.

July, 2018

(H. M. Chidanandappa)  
Major Advisor

## 58. Effect of P Levels and P Solubilizers on P Status in Soil and Productivity of Paddy

**SHOBHA TALAWAR**

### **ABSTRACT**

A field experiment was conducted at AHRS, Bavikere, UAHS, Shivamogga on sandy loam soil during *Kharif* 2017 to know the effect of P levels and P solubilizers on P status in soil and productivity of paddy. The levels of phosphorus at 0, 50, 75 and 100%  $P_2O_5$  Kg per ha with and without P solubilizer seedling treatment were tried in Randomized Complete Block Design (RCBD) with twelve treatments and three replications.

Results of the field experiment indicated that application of recommended NPK with PSF seedling treatment significantly increased the growth and yield of paddy. Highest grain yield of paddy was noticed with recommended NPK with PSF seedling treatment ( $56.90 \text{ q ha}^{-1}$ ). The nutrient content and uptake of NPK by paddy was highest in the treatment that received recommended NPK with PSF seedling treatment.

Higher values of soil P and Ca-P and available P status in soil were recorded with recommended NPK with PSF seedling treatment at different crop growth stages. Higher values of Al-P, Fe-P, red-P, occl-P, organic-P and total-P fractions were recorded in treatments involving only P levels without P solubilizers seedling treatment compared to the application of P levels with P solubilizers seedling treatment. Application of recommended NPK recorded higher values of Al-P, Fe-P, red-P, occl-P, organic-P and total-P fractions. All the fractions except organic P significantly and positively correlated with yield attributes, straw yield, grain yield and P uptake by paddy.

August, 2018

(B. C. Dhananjaya)  
Major Advisor

## 59. Characterization of Soils and Water in Lakya Sub Watershed of Dasarahalli-I Micro Watershed in Chikmagalur Taluk

**SUSHMITHA, C.V.**

### **ABSTRACT**

An investigation was carried out to characterize soils and water in Lakya sub watershed of Dasarahalli-I microwatershed in Chikmagalur taluk during the year 2017-18 in the Department of Soil Science and Agricultural Chemistry, College of Agriculture, UAHS, Shivamogga.

Grid wise surface soil samples were collected at 320 m X 320 m interval and soil fertility status maps were prepared. The surface soil texture of the Dasarahalli-I micro watershed area was predominantly with sandy clay loam and clay. The soils were strongly acidic to slightly alkaline (5.02-7.80) with non-saline in nature and soil organic carbon was low to medium (3.30-7.50 g kg<sup>-1</sup>). The micro-watershed showed low to medium (188.16-376.32 kg ha<sup>-1</sup>) in available nitrogen status, medium in available P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O and medium to high in available sulphur status. The exchangeable calcium, magnesium and micro nutrients were sufficient in the entire micro-watershed area while the zinc was deficient in 0.38 per cent of the area and sufficient in 6.61 per cent of the study area. Available boron content was deficient in study area.

Eight soil profiles were studied based on soil heterogeneity of studied area. Soil structure of pedons was sub-angular blocky. In general available N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, sulphur and boron, exchangeable Ca and Mg and micro nutrients decreased with increasing depth. Sorghum and sunflower were highly to marginally suitable; groundnut, ragi, bengal gram, tur, guava, coconut, mango and arecanut were moderately to marginally suitable in Dasarahalli-I micro watershed.

Total of 14 ground water samples were collected from running tube wells in the study area in before and after rainy season. All the analyzed chemical parameters were found to be highest in case of samples collected in before rainy season as compared to after rainy season and quality parameters like pH, EC, SAR, RSC *etc.* , were within the permissible limits.

July, 2018

(K. T. Gurumurthy)  
Major Advisor

## 60. Effect of Calcium Enriched FYM through Eggshell on Soil Properties and Yield of Brinjal

**SUSHMITHA, N. SWAMY**

### **ABSTRACT**

An enrichment and field experiment was conducted at ZAHRS, Navile, Shivamogga during the year 2017 to know the “Effect of Calcium enriched FYM through eggshell on soil properties and yield of Brinjal”. The FYM was enriched with Eggshell powder (ESP) @10kg/t and Lime @5kg/t as calcium sources with and without microbial consortia for 45 days. The Ca enriched FYM was applied to field with brinjal as test crop. The experiment was laid out in a Randomized Complete Block Design with thirteen treatments replicated thrice. The FYM enriched with eggshell powder @10kg/ton + Microbial Consortia (MC) for 40 days recorded high nitrogen (0.85%), phosphorus (0.36%), potassium (0.58%) and Calcium (0.69%) content compared to FYM with package of practices.

The highest mean plant height, number of branches per plant and stem diameter were recorded due to application of Ca enriched FYM through eggshell powder @10kg/t + MC enriched for 45 days compared to control (FYM only). The soil application of Ca enriched FYM through (45 days) eggshell powder @10kg/t + MC was recorded maximum number of fruits (44.6) per plant, fruit girth (5.26 cm) and fruit weight (58.9g) followed by Ca enriched FYM through (45 days) eggshell powder @10kg/t without MC and lime enrichment. Whereas application of FYM with package of practices was recorded lower number of fruits (32.00) per plant and fruit girth and fruit weight. The soil application of Ca enriched FYM through (45 days) eggshell powder @10kg/t + MC recorded highest fruit yield per plant (0.91 kg plant<sup>-1</sup>) and fruit yield per hectare (25.32 kg ha<sup>-1</sup>), to the extent of 20.62 per cent increase in yield compared to FYM enriched with lime and with FYM with package of practices.

Significantly higher exchangeable calcium content in soil was recorded after harvest due to application of Ca enriched FYM through (45 days) eggshell powder @10kg/t + MC whereas the lower exchangeable calcium status in soil was recorded in the treatment supplied with FYM only in all the growth stages and harvest stage.

July, 2018

(G. N. Thippeshappa)  
Major Advisor

## **61. Effect of Levels and Split Application of Potassium on Productivity of Paddy and Status of Potassium in Alluvial Soil of Coastal Region of Karnataka**

**YASHAWANTHKUMAR, S. M.**

### **ABSTRACT**

A field experiment was conducted during *Kharif*, 2017 at Zonal Agricultural and Horticultural Research Station, Brahmavar, UAHS, Shivamogga to know the effect of levels and split application of potassium on productivity of paddy and status of potassium in alluvial soil of coastal region of Karnataka. The experiment was laid out in randomised complete block design with ten treatments and replicated four times. Among different levels and split application of potassium, the treatment received potassium @ 75 kg K<sub>2</sub>O ha<sup>-1</sup> with three equal split doses recorded higher plant height (115.05 cm), number of tillers per m<sup>2</sup> area (482.25), panicle length (23.05 cm), test weight (25.34 g), filled grains per panicle (108.98), grain and straw yield (7733 and 8815 kg ha<sup>-1</sup>, respectively) and lowest growth and yield parameters was observed in treatment without application of potassium.

The higher uptake of potassium (168.79 kg ha<sup>-1</sup>) was recorded in treatment, which received potassium level (75 kg K<sub>2</sub>O ha<sup>-1</sup>) in three equal splits compared to all other treatments.

An increase in the level of potassium application (45 to 75 kg ha<sup>-1</sup>) either as basal or in splits, increased the water soluble and non-exchangeable potassium in soil after harvest of crop and lattice potassium decreased with increase in level of potassium application.

August, 2018

(Jayaprakash, S. M.)  
Major Advisor

## **62. Effect of Biochar on Soil Physical Properties, Carbon Pools and Productivity of Maize (Zea mays L.)**

**(SHILPA, P. V.)**

### **ABSTRACT**

A field experiment was conducted at Agricultural and Horticultural Research Station, Bavikere, UAHS, Shivamogga during the year 2018, to know the “Effect of biochar on soil physical properties, carbon pools and productivity of maize (Zea mays L.)”. Two levels of cob rind biochar combination with and without three levels of FYM was applied to field. The experiment was laid out in a Randomized Complete Block Design with nine treatments and replicated thrice. The result revealed that application of higher level of biochar 4 t ha<sup>-1</sup> + 100 per cent RD-FYM + RDF, significantly increased the water holding capacity (37.41%) and porosity (32.93%) of soil compared to control treatment received RDF + RD- FYM.

Increase in soil pH and electrical conductivity was observed with the application of biochar at 4 t ha<sup>-1</sup> + 50 per cent FYM + RDF. But soil application of biochar at 4 t ha<sup>-1</sup> + 100 per cent FYM + RDF recorded significantly higher soil carbon pools like PDOC (10.89 g kg<sup>-1</sup>), PPOC (494.01 mg kg<sup>-1</sup>), MBC (365.77 mg kg<sup>-1</sup>), CWEC (160.64 mg kg<sup>-1</sup>), TOC (11.17 g kg<sup>-1</sup>), TIC (0.82g kg<sup>-1</sup>) and TC (11.99 g kg<sup>-1</sup>), soil available nutrients like nitrogen (316.10 kg ha<sup>-1</sup>), phosphorus (55.18kg ha<sup>-1</sup>) and potassium(253.33kg ha<sup>-1</sup>), growth and yield parameters like plant height (182.20 cm), number of leaves (13.56), total dry matter production (295.00 g), grain yield (86.40 q ha<sup>-1</sup>), stover yield (104.20 q ha<sup>-1</sup>) and nutrient concentration like nitrogen (1.65 and 1.00 %), phosphorus (0.29 and 0.22 %) and potassium(0.49 and 1.07 %) in grain and stover of maize was observed.

July, 2019

(G. N.Thippeshappa)

### **63. Performance of French bean (*Phaseolus vulgaris* L.) as Influenced by Organic Nutrient Management under Rainfed Condition**

**(GOWTHAMCHAND, N.J.)**

#### **ABSTRACT**

A field experiment was conducted during kharif 2018-19 at Organic Farming Research Centre, Zonal Agricultural and Horticultural Research Station, UAHS, Shivamogga to study the performance of French bean (*Phaseolus vulgaris* L.) as influenced by organic nutrient management under rainfed condition. The experiment was laid out in Randomized Complete Block Design in ten treatments with three replications. In this investigation, the results revealed that application of Beejamrutha (seed treatment) + Jeevamrutha (soil application @ 500 l ha<sup>-1</sup>) + 100 % RDN through vermicompost + Foliar spray of Panchagavya @ 3% recorded higher green pod (16.43 t ha<sup>-1</sup>) and haulm yield (2.82 t ha<sup>-1</sup>) and on par with application of Beejamrutha (seed treatment) + Jeevamrutha (soil application @ 500 l ha<sup>-1</sup>) + 50 % RDN through FYM + 50 % RDN through FYM + Foliar spray of Panchagavya @ 3% (15.81 and 2.75 t ha<sup>-1</sup>) and Beejamrutha (seed treatment) + Jeevamrutha (soil application @ 500 l ha<sup>-1</sup>) + 100 % RDN through vermicompost + Foliar spray of Panchagavya @ 3% (15.42 and 2.60 t ha<sup>-1</sup>). Lower green pod (8.07 t ha<sup>-1</sup>) and haulm yield (1.76 t ha<sup>-1</sup>) was recorded in the treatment which received only Beejamrutha (seed treatment) + Jeevamrutha (soil application @ 500 l ha<sup>-1</sup>). These treatments also showed similar trend with respect to growth and yield parameters and also nutrient content and NPK uptake by plants. There was significant improvement in soil available nutrient status, dehydrogenase, phosphatase and urease activities at different growth stages of crop. Higher B:C ratio (4.19) was recorded with application of Beejamrutha (seed treatment) + Jeevamrutha (soil application @ 500 l ha<sup>-1</sup>) + 100 % RDN through FYM + Foliar spray of Panchagavya @ 3% and lower B:C ratio (3.36) was observed in the treatment which received only Beejamrutha (seed treatment) + Jeevamrutha (soil application @ 500 l ha<sup>-1</sup>).

August, 2019

(Ganapathi)  
Major Advisor

## 64. Dynamics of Potassium in Soil under Ragi (*Eleusine coracana* L.) Crop as Influenced by Levels and Split Application of Potassium

(KAVYASHREE, A.N)

### ABSTRACT

A field experiment was conducted at Agricultural and Horticultural Research Station, Bavikere, UAHS, Shivamogga during the kharif season of 2018 to know the dynamics of potassium in soil under ragi crop as influenced by levels and split application of potassium. The experiment was laid out in randomized complete block design with nine treatments and replicated thrice. Different levels of potassium @ 18.75, 25, 31.25 and 37.5 kg K<sub>2</sub>O ha<sup>-1</sup> were tried as basal and also in splits. Among the different levels and split application of potassium, the treatment received potassium @ 31.75 kg K<sub>2</sub>O ha<sup>-1</sup> in two splits (15.87 kg K<sub>2</sub>O ha<sup>-1</sup> as basal+ 15.87 kg K<sub>2</sub>O ha<sup>-1</sup> at critical stage) significantly increased the plant height (110.30 cm), number of leaves per plant (32), number of tillers per hill (5.20), finger length (7.24 cm), test weight (3.32 g), straw yield (5851.05 kg ha<sup>-1</sup>) and grain yield (2596.67kg ha<sup>-1</sup> ) compared to all other treatments except the treatments which received 37.50 kg K<sub>2</sub>O ha<sup>-1</sup> in two splits and lowest growth and yield parameters was observed in treatment without application of potassium.

The uptake of nutrients (N, P, K, Ca, Mg and S) were recorded significantly higher in the treatment which received the potassium level (31.75 kg K<sub>2</sub>O ha<sup>-1</sup>) in two splits compared to all other treatments except the treatment which received the potassium level of 37.50 kg K<sub>2</sub>O ha<sup>-1</sup>.

An increase in the level of potassium application (18.75 to 37.50 kg K<sub>2</sub>O ha<sup>-1</sup>) either as basal or in splits increases the available potassium , water soluble potassium, exchangeable potassium, non- exchangeable potassium and total potassium in soil at harvest of crop. Whereas lattice potassium was decreased with increasing the potassium level of potassium application.

August, 2019

(Chidanandappa, H. M )

Major Advisor

## **65. Influence of Level of Areca Husk Biochar on Carbon Fractions and Growth and Yield of Field Bean (*Dolichus lablab* L.)**

**(MADHUPRIYA, K.)**

### **ABSTRACT**

A field experiment was conducted at Agricultural and Horticultural Research Station (AHRS), Bhavikere, Karnataka, during Rabi 2018 to study the response of field bean (Hebbalavare - 4) towards different levels of areca husk biochar with FYM. Levels of biochar @ 5, 7.5 and 10 t ha<sup>-1</sup> in combination with 100 percent (15 t ha<sup>-1</sup>) and 75 percent (11.25 t ha<sup>-1</sup>) recommended FYM were tried in a randomized complete block design with three replications and nine treatments. Results of the experiment revealed that application of high level of biochar @ 10 t ha<sup>-1</sup> with 15 t ha<sup>-1</sup> FYM significantly increased the growth, yield and yield attributes of field bean. Higher values of nutrient content and uptake by field bean were recorded in the same treatment. The bulk density decreased and maximum water holding capacity, primary nutrients, secondary nutrients and DTPA extractable micronutrients status of soil were increased due to application of biochar at 10 t ha<sup>-1</sup> with 100 percent recommended FYM. Similar trend was also observed for total carbon, total organic carbon and total inorganic carbon fractions of soil during the different growth stages of field bean. Positive response for soil enzyme activities such as dehydrogenase, acid phosphatase and urease activity at different growth stages of field bean was noticed with high rate of biochar application and highest values were recorded with treatment receiving biochar @ 10 t ha<sup>-1</sup> in combination with FYM @ 15 t ha<sup>-1</sup>.

August, 2019

(B. C. Dhananjaya)

Major Advisor

**66. Assessment of Soil Organic Carbon Fractions in Soils under Different Land Use Systems of Somawarpettaluk, Kodagu district.**

**(SEEMA ANANTARAJJUN.)**

**ABSTRACT**

A study was conducted at UAHS, Shivamogga to know the carbon sequestration of soils under different land use systems in Somawarpet taluk, Kodagu district, Karnataka. The one hundred representative soil samples were collected from different land use systems viz., natural forest, sacred groves, coffee based agroforestry-indigenous, coffee based agroforestry-exotic and paddy land use systems at 0-20, 20-40, 40-60 and 60-80 cm soil depths. The present investigation revealed that, texture of the soil is loam to clay loam. The pH was acidic in all the land use systems and electrical conductivity was normal. The highest BD was observed under paddy land use system. The highest mean value of available nitrogen was observed in coffee based agroforestry-indigenous and highest mean value of available phosphorous and available sulphur was observed in natural forest.

Among the different land use systems, the higher mean value of PDOC (18.06 g kg<sup>-1</sup>), PPOC (292.41 mg kg<sup>-1</sup>), CWEC (313.98 mg kg<sup>-1</sup>), SMBC (411.46 mg kg<sup>-1</sup>), TOC (35.05 g kg<sup>-1</sup>), and TC (35.43 g kg<sup>-1</sup>) contents were observed in natural forest and decreases with increasing soil depth. The E4/E6 value was lower than 6 in all the studied land use systems. The soils under natural forest system has recorded the highest mean value of Humic acid (4.87) and Fulvic acid (5.48). The highest mean value of carbon sequestration was observed in natural forest (4140.23 t ha<sup>-1</sup>), followed by sacred groves (3995.12 t ha<sup>-1</sup>) and lowest mean value of carbon sequestration was observed in paddy land use system (2171.45 t ha<sup>-1</sup>).

August, 2019

(Ravikumar, D.)

Major Advisor

## **67. Characterisation of Soils and Leaf Composition of Healthy and Crown Choking (Hidimundige) Affected Arecanut Gardens in Chitradurga district, Karnataka**

**(SUJAINA, M.)**

### **ABSTRACT**

An investigation on “Characterisation of soils and leaf composition of healthy and crown choking (Hidimundige) affected arecanut gardens in Chitradurga district, Karnataka” was under taken at College of Agriculture, Shivamogga during 2018-2019 to delineate the causes for hidimundige syndrome in arecanut. Soil samples from two depths 0 to 30 cm and 30 to 60 cm were collected at 60 cm away from the trunk of arecanut from both healthy and affected gardens of Holalkere, Hiriyur, Chitradurga and Hosadurga taluks. The collected soil samples were analysed for various physical and chemical properties and also for macro and micro nutrients. Similarly, leaf tissues from corresponding healthy and affected garden were also collected from 4th and 6th leaf of the arecanut trees and subjected to analysis for macro and micro nutrients. The results of the investigation indicated that soils coming under affected gardens showed the high mean clay content than healthy gardens. There was a significant increase in bulk density of affected gardens compared to healthy gardens in Holalkere (from 1.63-1.84 Mg m<sup>-3</sup>) and Hosadurga (from 1.84-1.96 Mg m<sup>-3</sup>) taluk at lower depth. The drainable porosity decreased significantly in affected gardens compared to healthy gardens of Holalkere (from 33.54-25.69 %) and Hosadurga (from 25.79-21.23 %) taluk at lower depth. In all taluks, majority of the soils from both healthy and affected arecanut gardens were neutral to alkaline in reaction. There was no significant difference between the electrical conductivity and organic carbon content of healthy and affected gardens of Chitradurga district. The study showed that availability of N, P, K, S, Fe, Mn, Cu and B and also the content of exchangeable Ca and Mg was quite heterogeneous in both healthy and affected gardens. Whereas, available zinc status in the soil showed significant decrease in affected gardens compared to healthy gardens of Hiriyur, Chitradurga and Holalkere taluks. Among the leaf tissue nutrients, concentration of zinc decreased significantly in affected gardens compared to healthy gardens which were less than the normal level.

August, 2019

(Sarvajna B. Salimath)

Major Advisor

## 68. Effect of Hydrogel on Soil Properties in Groundnut (*Arachis hypogaea* L.) under Central Dry Zone of Karnataka

(VIVEK, M. S.)

### ABSTRACT

A field experiment entitled 'Effect of hydrogel on soil properties in groundnut (*Arachis hypogaea* L.) under central dry zone of Karnataka' was conducted during *Kharif* 2018 under rainfed condition at Zonal Agricultural and Horticultural Research Station, Babbur farm, Hiriyr. The experiment was laid out in a Randomized Complete Block Design with ten treatments replicated thrice, the treatments comprised of various levels of hydrogel applied at 1.0, 2.0, 3.0 and 4.0 kg ha<sup>-1</sup> along with recommended dose of fertilizers and FYM at 10 t ha<sup>-1</sup>. Among the different levels of hydrogel application, treatment that received hydrogel at 4 kg ha<sup>-1</sup> along with RDF and FYM at 10 t ha<sup>-1</sup> was recorded significantly higher growth, biochemical and yield parameters such as plant height (38.74 cm), total chlorophyll content (1.345 mg g<sup>-1</sup> fresh weight), chlorophyll stability index (81.37 %), number of pods (25 plant<sup>-1</sup>), pod yield (1470 kg ha<sup>-1</sup>) and haulm yield (3114 kg ha<sup>-1</sup>).

Soil physical, chemical and biological properties such as MWHC (25.12 %), FC (15.46 %), AWC (13.32 %), moisture content (9.92 %), OC content (4.91 g kg<sup>-1</sup>), available nutrients such as N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O and S (283.05, 46.97, 367 kg ha<sup>-1</sup> and 11.84 mg kg<sup>-1</sup>, respectively), exchangeable Ca and Mg (5.97 and 2.86 kg ha<sup>-1</sup>), microbial population viz., bacteria, fungi and actinomycetes and soil enzymatic activity viz., dehydrogenase, urease and alkaline phosphatase were recorded significantly higher in treatment with application of hydrogel at 4 kg ha<sup>-1</sup> along with RDF and FYM at 10 t ha<sup>-1</sup> when compared to control.

August, 2019

(Parashuram Chandravamshi)

Major Advisor