

# **Agricultural Entomology**

**University of Agricultural and Horticultural Sciences, Shivamogga**  
**Ph.D. theses abstracts produced in Agricultural Entomology**

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**1. Evaluation of Rice Genotypes for Resistance to Lepidopteran Pests**

**ASHRITH K N**

**ABSTRACT**

Investigations were made to evaluate rice genotypes for resistance to lepidopteran pests between 2016 and 2018 at College of Agriculture, University of Agricultural and Horticultural Sciences, Shivamogga. A total of 14 genotypes were screened and classified; among them TKM 6 (3.86%), Kiruvana (4.71%) and Kesari (4.50%) were resistant; KHP 2 (8.19%), JGL 1798 (8.94%), KRH 2 (8.98%), MO4 (8.02%), Jyothi x Kesari (8.35%), Jyothi x Bilya (7.96%), Tunga (14.90%) and Akkalu (15.39%) were moderately resistant for yellow stem borer (YSB) infestation. TKM 6 (4.98%), Jyothi x Kesari (8.24%), Jyothi x Bilya (7.38%), Kiruvana (7.81%), Bilya (9.87%), Kesari (6.48%), KHP 2 (8.24%) and JGL 1798 (9.37%) were resistant to rice leaf folder (RLF). From the morphological basis of resistance, the cultivar with highest number of productive tillers was recorded in TKM 6 (17.69), Kiruvana (17.16), JGL 1798 (16.31) and KHP 2 (16.11) which had significantly negative relationship with YSB damage. Correlation between morphological characters of plant and leaf folder infestation indicated that there was a negatively significant relationship with trichome density ( $r=-0.950^*$ ) and significant positive relationship with leaf width ( $r=0.932^*$ ) at mid point. The highest amount of total sugar was attributed to rice leaf folder and yellow stem borer susceptibility. Phenolic content in the healthy leaves was significantly more when compared to susceptible checks TN-1 (3.56 mg/g) and Jyothi (4.79 mg/g). Potassium and silicon content were significantly high in resistant check TKM 6 (19.94 mg/g) and Kiruvana (17.29 mg/g). Induction of silicon followed by the reaction to YSB and RLF was estimated. The treatment with NPK+FYM+Foliar silicon was most effective treatment as it recorded significantly lowest infestation (3.57 and 1.07%). Application of silicon source significantly increased the rice grain yield. Further in organic amendment treatment plot receiving neem cake recorded lowest per cent leaf (5.96%) and white earhead (3.13%) damage as against the untreated control. The maximum damage by the stem borer was noticed with NPK (12.41%) followed by FYM (12.24%) and vermicompost (10.34%).

July, 2018

(Kalleshwaraswamy, C.M.)  
Major Advisor

# Agronomy

University of Agricultural and Horticultural Sciences, Shivamogga

Ph.D. theses abstracts produced in Agronomy

1. Performance of aerobic rice as influenced by fertigation and irrigation levels in Alfisols of Southern Transitional Zone of Karnataka

YAMUNA, B. G.

ABSTRACT

Two field experiments were conducted at Agronomy Field Unit, College of Agriculture, Shivamogga during *kharif* 2015-16 and 2016-17 & summer 2016 on red sandy clay loam soils to evaluate the performance of aerobic rice as influenced by fertigation and irrigation levels. Experiment on fertilizer levels applied through conventional and fertigation methods was laid out in RCBD with three replications. Daily dripped plots supplied with 25% RDF through soil application + 100% RDF through fertigation recorded significantly higher grain yield per hectare (68.92 q during *kharif* and 71.43 q during summer) and WUE (104.81 and 95.66 kg ha-cm<sup>-1</sup>, respectively during *kharif* and summer) over other treatments in test. However, higher net returns per hectare (₹72,517 and ₹76,420, respectively during *kharif* and summer) and B:C (2.94 and 2.84, respectively during *kharif* and summer) was obtained with soil application of 125% RDF through surface irrigation. Application of RDF through drip fertigation or with different proportions of soil application recorded nearly 40% higher yield compared to soil application of RDF with normal fertilizers. Experiment on scheduling irrigation and fertigation was laid out in RCBD with three replications. Daily drip irrigation at 1.25 PE upto maturity and fertigation with 5 splits of WSF at 20, 35, 50, 65 & 80 DAS recorded significantly higher grain yield (69.80 and 71.46 q ha<sup>-1</sup> during *kharif* and summer, respectively) achieving 55% more over surface irrigation with soil application of 100% RDF. Treatments receiving irrigation @ 1.00 or 1.25 PE daily with 5 or 8 splits of fertigation extended up to 80 days resulted better WUE (ranged from 86.40 to 98.20 and 71.00 to 89.80 kg ha-cm<sup>-1</sup> of water, respectively for *kharif* and summer) and net returns (₹74,983 and ₹79,042 ha<sup>-1</sup>, respectively during *kharif* and summer) than other treatments thereby minimized 35 to 42% of water compared to surface irrigation with soil application of 100% RDF.

May, 2018

(M. Dinesh Kumar)  
Major Advisor

## 2. Studies on integrated nutrient management in paddy-groundnut cropping sequence for Coastal Zone of Karnataka

**NAGARAJ, R.**

### **ABSTRACT**

Field experiments were conducted from 2014 to 2016 at ZAHRS, Brahmavar, Udupi to study the effect of integrated nutrient management in paddy-groundnut and groundnut-paddy cropping sequence. Soil type is sandy loam in texture pH in acidic (4.62 and 4.78), high in organic carbon content (1.38 and 1.32 %), medium in available nitrogen and potassium (348.70 & 362.84 and 106.80 and 113.61 kg ha<sup>-1</sup>, respectively) and high in available phosphorus (59.10 and 56.28 kg ha<sup>-1</sup>) in both the experiments, respectively. The experiment was laid out in RCBD with twelve treatments replicated thrice. The treatments comprised of recommended nutrient practice (POP) and absolute control for comparison along with supplemental addition of 25 and 50 per cent recommended dose of nitrogen through eupatorium, gliricidia, vermicompost, poultry manure and goat manure, respectively.

In paddy-groundnut cropping sequence significantly higher paddy grain yield (5293 kg ha<sup>-1</sup>) was realized with POP + 50 per cent RDN through vermicompost. The residual effect of POP + 50 per cent RDN through poultry manure applied to paddy in kharif on *rabi* groundnut resulted in significantly higher pod and kernel yield (1498 and 1075 kg ha<sup>-1</sup>, respectively) over package of practice. Similarly, in groundnut-paddy cropping sequence with the application of recommended nutrients (POP) + 50 per cent RDN through poultry manure treatment recorded significantly higher pod and kernel yield (2272 and 1665 kg ha<sup>-1</sup>, respectively) in groundnut during *rabi* and paddy grain yield (3623 kg ha<sup>-1</sup>) in subsequent *kharif* paddy crop. Higher net returns and benefit cost ratio (Rs. 1, 05,944 ha<sup>-1</sup> & 2.18 and Rs. 1, 05,024 ha<sup>-1</sup> & 2.09, respectively) in paddy-groundnut and groundnut-paddy sequence were realized with the POP + 50 per cent RDN through poultry manure treatment as compared to package of practice (Rs. 57,573 & 1.58 and 60,304 & 1.64 ha<sup>-1</sup>, respectively).

July, 2018

(M. Hanumanthappa)  
Major Advisor

3. **Agronomic interventions to enhance the productivity of foxtail millet (*Setaria italic L.*) in Southern Transition Zone of Karnataka**

**NANDINI, K. M.**

**ABSTRACT**

Field experiments were conducted at College of Agriculture, UAHS, Shivamogga during the *kharif* seasons of 2016 and 2017 on red sandy clay soil to study the Agronomic interventions to enhance the productivity of foxtail millet (*Setaria italica*L.) in Southern Transition Zone of Karnataka.

The experiment-I was laid out in RCBD with factorial concept involving three dates of sowing *viz.*, June 30<sup>th</sup>, July 30<sup>th</sup> and August 30<sup>th</sup> with three genotypes namely Local, HMT-1 and SIA 2644. Among the different dates of sowing, the crop sown on June 30<sup>th</sup> recorded significantly higher grain yield (2,049 kg ha<sup>-1</sup>), straw yield (4,262 kg ha<sup>-1</sup>) and higher protein and fibre content. Among the genotypes, higher grain yield (1,871 kg ha<sup>-1</sup>), straw yield (3,981 kg ha<sup>-1</sup>) and higher quality parameters also were recorded with SIA 2644.

The experiment-II was laid out in RCBD with factorial concept. The treatments consisted of five different nitrogen levels *viz.*, 0, 50, 100, 125 and 150 % N and three genotypes. 125 % N recorded significantly higher grain yield (2,189 kg ha<sup>-1</sup>), straw yield (4,643 kg ha<sup>-1</sup>), higher protein and fibre content. Concerning genotypes, SIA 2644 recorded significantly higher grain yield (2,246 kg ha<sup>-1</sup>), straw yield (4,823 kg ha<sup>-1</sup>) and higher protein and fibre content.

The experiment-III was laid out in factorial RCBD with twelve treatment combinations comprised of four spacing (30 × 5 cm, 20 × 5 cm, 20 × 10 cm and 10 × 5 cm) and three genotypes. Among spacing significantly higher grain yield (2,227 kg ha<sup>-1</sup>), straw yield (4,349 kg ha<sup>-1</sup>), higher protein and fibre content were recorded in plants grown at 30 x 10 cm. Among the genotypes, higher grain yield (1,941 kg ha<sup>-1</sup>), straw yield (3,919 kg ha<sup>-1</sup>), higher protein and fibre content were recorded with SIA 2644 compared to other genotypes.

September, 2018

(S. Sridhara)  
Major Advisor

#### 4. Standardization of agrotechniques for rainfed hybrid castor (*Ricinus communis* L.) in Central Dry Zone of Karnataka

**UMESHA, C.**

##### **ABSTRACT**

A field experiment was conducted at Zonal Agriculture and Horticultural Research Station (ZAHRS), Hiriyur, which comes under Central Dry Zone of Karnataka, located at 13.95° North latitude, 76.62° East longitude with an altitude of 630 m (2066 feet) above MSL. The soil of the experimental site was clayey soil. Field experiment was laid out in randomized complete block design with factorial concept with 12 and 9 treatment combinations replicated thrice. Results indicated that the castor hybrids DCH-177 recorded significantly higher seed yield (1568 kg ha<sup>-1</sup>) over other hybrids. Among the different fertilizer levels, application of 150 per cent RDF along with DCH-177 resulted in higher seed yield (1693 kg ha<sup>-1</sup>), higher nitrogen, phosphorus and potassium use efficiency (33.50 kg kg<sup>-1</sup>, 33.50 kg kg<sup>-1</sup> and 50.92 kg kg<sup>-1</sup>, respectively). Whereas, application of 125 per cent RDF along with DCH-177 recorded significantly higher net returns (Rs. 24655) and B: C (1.78) as compared to rest of the treatments.

Among the dates of sowing, DCH-177 sown during June second FN recorded significantly higher total dry matter production (146.52 g plant<sup>-1</sup>), total number of spikes (7.06), total number of capsules (97.32) and seed yield (1536 kg ha<sup>-1</sup>) as compared to July second FN. Among the spacings, spacing of 90 x 60 cm recorded significantly higher total nitrogen, phosphorus and potassium uptake (90.66 kg ha<sup>-1</sup>, 11.23 kg ha<sup>-1</sup>, 33.24 kg ha<sup>-1</sup>, respectively) and seed yield (1563 kg ha<sup>-1</sup>) over 120 x 60 cm spacing.

August, 2018

(C. J. Sridhara)  
Major Advisor

## 5. Studies on Fertilizer Management and Planting Geometry in Pigeonpea based Bio - Intensive Cropping System

**MAMATHA SHREE, C. M.**

### **ABSTRACT**

Agronomic investigation was carried out to study the fertilizer management and planting geometry in pigeonpea based bio-intensive cropping system during *Kharif* 2016 and 2017 at College of Agriculture, Shivamogga. Study was carried out to optimize planting geometry and fertilizer dosage for pigeonpea + baby corn inter cropping system and possibility of taking one more crop after baby corn as relay inter crop.

To meet the set objectives, two field experiment consisted of 12 and 11 treatments respectively were laid out in RCBD replicated thrice. It was found that pigeonpea (60-120-60 × 30 cm) + baby corn (30 × 30 cm) receiving respective RDF separately by component crops on population basis recorded maximum pigeonpea equivalent yield (4767 kg ha<sup>-1</sup>), net returns (Rs.1,91,943), B:C (3.28) and monetary advantage (Rs.1,05,207) with 64 per cent land saving. The next best treatment was pigeonpea (60-120-60 × 30 cm) + baby corn (60 × 20 cm) in which the component crops received their respective RDF separately on population basis. In the relay intercropping study, higher pigeonpea equivalent yield (4327 kg ha<sup>-1</sup>) was realized with pigeonpea (60-120-60 × 15cm) + baby corn (30 × 30 cm) *fb* vegetable field bean. This was 98 per cent and 8 per cent higher over sole pigeonpea and pigeonpea + baby corn in terms of main crop equivalent yield. Thus, it can be concluded that growing pigeonpea in paired row system with a crop geometry of 60-120-60 × 15 cm and two rows of baby corn in between paired row and taking vegetable field bean or vegetable cowpea after the harvest of baby corn, resulted not only higher monetary benefits and land advantages but also exploits residual moisture and nutrients with surplus green fodder yield of 20 t ha<sup>-1</sup>.

December, 2018

(G.K. Girijesh)  
Major Advisor



**Genetics  
and Plant  
Breeding**

**University of Agricultural and Horticultural Sciences, Shivamogga**  
**Ph.D. theses abstracts produced in Genetics and Plant Breeding**

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**1. Marker Assisted Characterization and Exploitation for Salinity Tolerance in Landraces of Rice (*Oryza sativa* L.)**

**RAGHAVENDRA P**

**ABSTRACT**

The present study composed of 177 rice landraces and six checks. Screening under saline field condition based on salt injury score revealed that, 20 landraces were tolerant and 39 landraces were highly susceptible. The selected 144 landraces were evaluated in augmented design for yield and related traits during *Kharif* 2016 and 2017. The pooled Analysis of variance revealed that significant difference present among the landraces for the studied characters. High heritability coupled with high genetic advance over mean were recorded for SPAD reading (97.62 and 72.80) and total tillers (80.44 and 53.23). Trait association studies indicated that, yield had positive and highly significant association with panicle weight (0.497) followed by total tillers (0.456) whereas, the association of grain yield was significant and positive with CHOS (0.1962). The nutrient composition analysis of grains revealed that the average grain protein content and CHOs was increased in saline condition. The physiological characters studied showed that, chlorophyll content (0.205) is positively correlated whereas,  $\text{Na}^+/\text{K}^+$  ratio (- 0.170) is negatively correlated with salinity tolerance in landraces. The screening of 24 selected landraces using petridishes and PVC pipes in saline solution of 0, 100 and 200 mM indicated that gradual decrease in germination percentage and seedling vigour traits with increase in salinity. However, the percent reduction over control was less in tolerant lines. Validation of 22 *Saltol* locus linked SSR markers revealed that RM140, RM1287 and RM3412 were found best markers in classifying landraces for salinity tolerance. Based on morphological, physiological and molecular confirmation ‘Doddabaikalu’, ‘Kalaadikonda’, ‘Gajagunda’ and ‘Anekombinabattha’ were identified as superior donor for salinity tolerance. Among saline tolerant landraces two restorers were identified and 13 maintainers were identified these could be further developed in to new male sterile lines so that saline tolerant rice hybrids could be developed.

July, 2018

(Dushyanthakumar, B. M)  
Major Advisor

## 2. Genetic and Molecular Analysis of Leaf Blast Resistance in Rice (*Oryza sativa* L.)

**SHESHAIAH**

### **ABSTRACT**

Rice is one of the world's major staple food crop but its production is severely affected by blast. The present study evaluated 35 rice germplasm lines for leaf blast resistance at AHRS, Ponnampet during *Kharif 2014*. Germplasm lines, Tadukan and Tetep showed highly resistant reaction, KPR-1, KPR-2, Kiruwana and IR-64 recorded resistant reaction and whereas, CO-39, HR-12, Jaya, Intan, Ambemori, Bheemasali, Chittiga and FR-13A showed high susceptibility to leaf blast. The analysis of variance showed significant differences among the germplasm lines and Kiruwana has recorded highest yield per plant under blast hot spot condition. Grain yield per plant recorded highest GCV and PCV and most of the traits recorded high heritability coupled with high GAM. Mahalanobis  $D^2$  statistics grouped total germplasm into six clusters and maximum number of germplasm observed in cluster-I. Among studied characters leaf blast and grain length major contributing traits to the total divergence. Based on leaf blast screening, *per se* performance and diversity studies, Kiruwana was chosen as a donor parent to the most popular blast susceptible cultivar, Jyothi. The  $F_1$ 's developed and true  $F_1$  identified at both phenotypic and molecular level. The  $F_2$  population showed positively and negatively skewed platykurtic distribution for studied traits. High heritability coupled with high GAM observed for days to flowering, days to maturity, plant height, number of tillers and productive tillers per plant. The selfed  $F_2$ 's were advanced to  $F_3$  and were scored for leaf blast reaction. Among 226  $F_3$  families, 178 showed resistant and 48 showed susceptible reactions and fit to the expected ratio of 3:1. The marker RM 1337 showed goodness of fit to the expected ratio of 1:2:1 and significantly associated with phenotypic evaluation. The present investigation revealed that germplasm used in the study are diverse and leaf blast resistance in Kiruwana is governed by single dominant gene and RM 1337 has associated with that gene [*Pi-20(t)*].

August, 2018

(Dushyanthakumar, B. M)  
Major Advisor

### 3. Genetic Basis of Fruit Biochemical, Morpho-Physiological and Yield Traits Governing Shelf Life in Tomato (*Solanum lycopersicum* L.)

**PAVAN M P**

#### **ABSTRACT**

An investigation was undertaken with objectives to estimate variability in tomato germplasm lines and F<sub>2</sub> segregating individuals, heterosis and combining ability and to study nature of gene action through generation mean analysis for extended shelf life at the University of Agricultural and Horticultural Sciences, Navile, Shivamogga, during summer and *Kharif* 2016, summer and *Kharif* 2017 and summer 2018. Thirty tomato germplasm lines grouped into seven clusters. Number of clusters contributed most to total diversity. ANOVA revealed significant differences among germplasm lines. Mean for studied traits lower in summer than in *Kharif* indicating influence of environment. Close correspondence between PCV and GCV noticed for most characters. High broad sense heritability and GAM recorded for most characters indicated role of additive gene effects. The high shelf life tomato germplasm lines had slow respiration rate leads to slow water loss and weight loss. Higher shelf life in Red ball, P-4, TLB-133 and L-00191 is due to cumulative effect of higher fruit firmness, pericarp thickness, calcium and fruit epicuticular wax content. The hybrids IIHR 2349 × Arka Vikas and IIHR 2349 × Arka Saurabh recorded significantly higher yield potential and standard heterosis for shelf life. Shelf life had significant and positive correlation with fruit firmness, pericarp thickness and titratable acidity. The F<sub>2</sub> mean is lower than F<sub>1</sub> mean indicating role of dominance gene action. The mean of B<sub>1</sub> and B<sub>2</sub> was very close towards P<sub>1</sub> and P<sub>2</sub> respectively. The inadequacy of additive-dominance model indicates significance of the joint-scaling test. Focus should be on improving individual characters separately based on nature of gene action. One or two cycles of biparental mating followed by recurrent selection are advisable with dissipating dominance and enhancing frequency of genes. One has to practice selection of desirable genotypes in advanced segregating generations by evaluating a large number of families. Both additive and dominance with a predominance of dominance effects of genes are important in inheritance of shelf life.

September, 2018

(Gangaprasad, S)  
Major Advisor

# **Plant Pathology**

University of Agricultural and Horticultural Sciences, Shivamogga

Ph.D. theses abstracts produced in Plant Pathology

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1. Epidemiology and management of chrysanthemum leaf blight incited by *Alternaria* spp.

DIVYAJYOTHI, U.

ABSTRACT

Chrysanthemum leaf blight is one of the important disease caused by *Alternaria* spp. and is a serious threat to successful cultivation of chrysanthemum. During 2016-17, the disease was severe in all the surveyed districts and average disease severity ranged from 39.42 to 80.64 per cent. The maximum mean Percent Disease Index (PDI) was observed in Tumkur district (74.70) followed by Davangere (57.93), Chitradurga (47.57) and least was noticed in Shivamogga (43.86). On the basis of morphological and molecular studies, the pathogen was identified as *Alternaria* spp. the pathogen grouped into eight isolates viz., SSA, SBA, DHA, DJA, TTA, TSA, CCA and CHA isolates. The conidia of different isolates varied in septation, with 1 to 2 vertical and 4 to 7 horizontal septa. The width of the conidia varied from 5.46 to 9.29  $\mu\text{m}$ . The cultural characters of the *Alternaria* spp. were studied on different media where the growth was fast in potato dextrose agar medium and slow growth in the V<sub>8</sub> juice agar. The pathogen produced maximum growth at 25-30°C temperature. The weather studies revealed that PDI was progressing at linear rate throughout the plant growth and it was negative correlation with minimum temperature and evening relative humidity and positive correlation to maximum temperature and rainfall. In aerobiological study, the spore load was maximum during August and October months, and in different date of planting the maximum PDI was observed in 25<sup>th</sup> July planted crops. PCR sequencing results revealed that out of eight tested isolates, seven isolates (SBA, SSA, DJA, DHA, TSA, CCA and CHA) belonged to *A. alternata* and one isolates (TTA), belonged to *A. tenuissimum*. *In-vitro* evaluation of fungicides reveals that, tebuconazole, trifloxystrobin+tebuconazole, and propiconazole, showed cent per cent inhibition at all the concentrations (0.05%, 0.1% and 0.2%). In field evaluation, tebuconazole @ 0.1% recorded least PDI with high yield (8.78 t/ha) was recorded. Among seventeen genotypes evaluated, Vasanthika was found resistant.

July, 2018

(Suresh D. Ekabote)  
Major Advisor

**Soil Science**

**and**

**Agricultural**

**Chemistry**

**University of Agricultural and Horticultural Sciences, Shivamogga**

**Ph.D. theses abstracts produced in**

**Soil Science and Agricultural Chemistry**

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1. **Studies on characterization of soil resources and zinc nutrition of finger millet in Lingalapura sub-watershed, Chikkamagaluru District, Karnataka**

**SARASWATHI**

**ABSTRACT**

A study was undertaken to characterize soil resources and zinc nutrition of finger millet in Lingalapura sub-watershed, Chikkamagaluru district, Karnataka. Twenty soil profiles and concurrently two hundred surface (0-15) and subsurface samples (15-30 cm) were drawn from the farmers' fields in different land use systems viz., arecanut, coconut, maize, ragi and natural vegetation in different micro-watersheds to study the morphological, physico-chemical properties of soil and their distribution of zinc fractions in relationship with soil properties. The soils were shallow to deep in red soil areas while moderately deep to deep in areas dominated by black soils. The soil structure was crumbly to sub-angular in surface and sub-angular in sub surface horizons. The soil reaction (pH) in the red soil varied from slightly acidic to alkaline, whereas the pH of the black soil ranged from neutral to alkaline in nature. The zinc status in study area ranges from sufficiency to deficiency while iron, copper and manganese content were sufficient in all micro-watershed. The order of magnitude of different zinc fractions was water-soluble + exchangeable zinc < organically bound zinc < content < manganese oxide bound zinc < amorphous sesquioxide bound zinc < crystalline sesquioxide bound < residual zinc. A field experiment was carried out to study the response of finger millet to nanozinc oxide formulation in the micro-watersheds. Significantly higher grain (9.60 g pot<sup>-1</sup>) and straw yield (15.87 g pot<sup>-1</sup>) was recorded in the treatment (T<sub>7</sub>) which receives foliar spray nanozinc oxide @ 500 ppm recorded compared to control. The highest zinc uptake in grain and straw (0.34 and 0.49 mg plant<sup>-1</sup>) in T<sub>7</sub> and lowest was recorded in absolute control (0.22 and 0.29 mg plant<sup>-1</sup>). The available zinc content in the soil was higher (0.60 mg kg<sup>-1</sup>) in T<sub>7</sub> with the application of nanozinc oxide particles @ 500 ppm respectively.

June, 2018

(Y. Vishwanatha Shetty)  
Major Advisor



## 2. Dynamics of boron in soils under paddy land cover of Bhadra command, Karnataka

**PRASHANTH, K. M.**

### **ABSTRACT**

An investigation was carried out in order to study the dynamics of boron in soils under paddy land cover of Bhadra command in Karnataka. Collected soil samples were characterized for chemical properties, available boron status, fractionation and adsorption behavior of boron. Field experiments were also conducted at AHRS, Bhavikere and Kathalagere to study the response of paddy for different levels of boron application.

Results of the study indicated that the pH of soils of Bhadra command varied from 5.02 to 8.62 with 37.5 per cent of soils were found to be acidic and remaining samples were in the range of neutral to alkaline. Organic carbon status of these soils was in the range of 3.60 to 13.50 g kg<sup>-1</sup>. Only 16.90 per cent samples analysed were recorded low organic carbon status and remaining samples were in the range of medium (22.50 %) and high (60.60 %) organic carbon status.

Hot water extractable boron status in soils varied from 0.26 to 0.94 mg kg<sup>-1</sup> and it was noticed that 38.12 per cent of the soils were recorded deficient and remaining 61.88 per cent of soils were recorded sufficient in status of boron.

The fractions of boron in soils reveal their relative dominance in order of RES-B > Org-B > Ox-B > Sp-B > Rs-B. Boron adsorption ranged from 7.76 to 165.46 µg g<sup>-1</sup> as the boron concentration increased from 1.0 to 20.0 µg ml<sup>-1</sup> in the equilibrium solution. Order of adsorption was found as follows; Silty clay loam > Sandy clay loam > Loamy sand > Sandy clay > Sandy loam soils.

Application of borax @ 8 kg ha<sup>-1</sup> significantly increased grain and straw yield of paddy but application of borax @ 20 kg ha<sup>-1</sup> increases uptake of boron in grain and straw and available boron in soils at both the locations.

July, 2018

(H. M. Chidanandappa)  
Major Advisor

### 3. Soil Resource Characterization, Classification and Productivity Assessment of Sigehadlu Micro Watershed of Chikkamagalur District

**RAJASHEKHAR L**

#### **ABSTRACT**

An investigation was carried out to soil resource characterization, classification and productivity assessments of Sigehadlu micro watershed of Chikkamagalur district during the year 2017-18 at Department of Soil Science and Agricultural Chemistry, College of Agriculture, OUAHS, Shivamogga.

Gridwise surface soil samples were collected at 250m X 250 m interval and soil fertility status maps were prepared. The soils were slightly acidic to moderately alkaline in pH. The soil OC and available N were low to medium where as P, K and S medium to high. The exchangeable calcium, magnesium and micronutrients like iron, copper, manganese were sufficient, while zinc was 84.15 per cent of area was sufficient and 16 percent of area deficient.

Ten soil profiles were studied based on soil heterogeneity. Soil structure of pedons varied from sub-angular to angular blocky and soil texture varied from sandy loam to clay. The soil OC, available N, P, K, and S were decreased with increasing depth. Based on morphological, physical and chemical properties these soils were grouped into *Alfisols*, *Inceptisols* and *Vertisols*. Land capability classification showed that majority of soils belong to class III and IV with limitations of erosion and texture. Land suitability evaluation for sorghum, maize, ragi, groundnut, sunflower, mango, coconut, arecanut, guava was moderately to marginally suitable, sapota were highly to moderately suitable. In general organic and inorganic nitrogen fractions under different land use systems were found to be highest in horti system-arecanut followed by coconut land use and lowest was observed current fallow land use system. The results of the field experiment indicated that treatment which received nitrogen in integrated form of fertilizers and organics significantly higher grain yield (65.21 q ha<sup>-1</sup>) and stover yield (84.30q ha<sup>-1</sup>) of maize. Significantly higher nitrogen use efficiency was also observed in the treatment which received nitrogen in integrated form.

December, 2018

(K.T Gurumurthy)  
Major Advisor