

# **Agricultural Entomology**

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

---

**1. Bio-Ecology and Management of Shoot Fly, *Atherigona Pulla* (Wiedemann) (Muscidae: Diptera) in Little Millet and Proso Millet**

**RAVULAPENTA SATHISH**

**ABSTRACT**

Survey for the incidence of shoot fly, *Atherigona pulla* on little millet and proso millet was conducted during 2015-16 in Chitradurga, Davanagere and Haveri districts. The highest per cent deadheart was recorded in Haveri district (15.41 and 22.29 %) whereas, the lowest was recorded in Davanagere district (8.0 and 17.01 %) at 21 and 28 DAE of little millet crop, respectively. However, in proso millet maximum per cent deadheart was recorded in Haveri (14.04 and 21.76 %) whereas, the lowest was in Chitradurga (7.88 and 16.86 %). Effect of date of sowing of little millet and proso millet and biology, screening of genotypes and eco-friendly management against shoot fly in little millet was carried out at the Zonal Agricultural and Horticultural Research Station (ZAHRS), UAHS, Hiriyur during *kharif* and *rabi*, 2015-16. Among different dates of sowings, 1<sup>st</sup> May to 15<sup>th</sup> June sowing was effective in reducing the number of eggs and per cent deadheart. Relative humidity had direct negative correlation with shoot fly incidence. Biological studies of *A. pulla* revealed that, during *kharif* the mean incubation, maggot, pre-pupal and pupal periods were 1.92, 9.16, 1.36 and 8.40 days, respectively, as against 2.12, 12.56, 1.72 and 9.88 days, respectively, in *rabi*.

The longevity of male and female adult was 7.40 and 10.12 days, respectively in *kharif* and 6.96 and 9.32 days in *rabi*. The female laid 22.0 eggs in *kharif* and 15.84 eggs *rabi*. Comparative biology revealed that total life cycle was longer in *rabi* than *kharif*. Among 51 little millet genotypes tested, 34 were tolerant, 16 were moderately tolerant and one genotype showed susceptibility to shoot fly. Among different intercropping systems evaluated, little millet + onion recorded least number of eggs (0.27 and 0.47 eggs/plant) and deadhearts (8.08 and 6.59 %) compared to other intercrops both in *kharif* and *rabi*, respectively. Evaluation of organics, botanicals and insecticides against shoot fly revealed that, seed treatment with imidacloprid @ 5.0 g/kg seed was effective in reducing the oviposition and per cent deadheart by recording highest grain yield (12.01 and 12.07 q/ha), fodder yield (78.99 and 81.54 q/ha) with high B:C ratio (3.28 and 3.43) during *kharif* and *rabi*, respectively.

June, 2016

(M. Manjunatha)  
Major Advisor

# Agronomy

1. Effect of Site Specific Nitrogen Management Approaches in Different Rice Establishment Systems

**BHAVYA, M. R.**

**ABSTRACT**

Field experiment entitled “Effect of site specific nitrogen management approaches in different rice establishment systems” was laid out in split-plot design with three rice establishment systems as main plots [aerobic, system of rice intensification (SRI) and conventional] and four nitrogen management approaches as subplots (soil test crop response-STCR, soil test fertilizer recommendation-STL, leaf colour chart-LCC and recommended dose of fertilizer-RDF) in three replications conducted at College of Agriculture, Navile, Shivamogga, Karnataka during *kharif* 2014 and 2015 in a sandy loam soils of low N status. Among different systems of establishment, SRI recorded significantly higher growth and yield parameters *viz.*, plant height, number of tillers plant<sup>-1</sup>, number of leaves plant<sup>-1</sup>, leaf area and total dry matter accumulation, number of filled grains panicle<sup>-1</sup>, panicle length, panicle weight and test weight.

Thereby achieved significantly higher grain (7767 kg ha<sup>-1</sup>) and straw yield (8878 kg ha<sup>-1</sup>) compared to conventional (7220 and 8106 kg ha<sup>-1</sup>) and aerobic (4975 and 5948 kg ha<sup>-1</sup>) systems. Among different nitrogen management approaches, STCR approach with a target yield of 80 q ha<sup>-1</sup> recorded significantly higher growth and yield components, chlorophyll content and nutrient uptake as compared to RDF, STL and LCC approaches. As a result significantly higher grain and straw yield (7182 and 8313 kg ha<sup>-1</sup>) were realized in STCR approach as compared to RDF (6196 and 6976 kg ha<sup>-1</sup>), STL (6392 and 7588 kg ha<sup>-1</sup>) and LCC approaches (6784 and 7697 kg ha<sup>-1</sup>). Treatment combination of SRI with STCR recorded higher grain and straw yield (8348 and 9479 kg ha<sup>-1</sup>) followed by conventional system with STCR approach (7921 and 8977 kg ha<sup>-1</sup>) and SRI with LCC approach (7914 and 8960 kg ha<sup>-1</sup>). Higher gross returns (Rs. 122201 ha<sup>-1</sup>), net returns (Rs. 86421 ha<sup>-1</sup>) and benefit cost ratio (2.42) was obtained under SRI with STCR approach.

## 2. Optimization of Sowing Dates and Nutrient Management Practices to Enhance the Yield and Quality of Guar Genotypes

**PAVITHRA, A.H.**

### **ABSTRACT**

Field experiments were conducted at College of Agriculture, UAHS Navile, Shivamogga during the *khari*(seasons of 2014 and 2015 on red sandy clay soil to study the optimization of sowing dates and nutrient management practices to enhance yield and quality of guar genotypes.

The experiment-I was laid out in RCBD with factorial concept involving three dates of sowing viz., 15 August, 30 August and 15 September with three varieties namely RGC-1003, RGC-936 and HG-365. Among the different dates of sowing, the crop was sown on 15 August recorded significantly higher grain yield (445.06 kg ha<sup>-1</sup>), protein content (33.36%), protein yield (148.65 kg ha<sup>-1</sup>), gum content (32.11 %), gum yield (154.84 kg ha<sup>-1</sup>) and endosperm content (32.82 %). Among the genotypes, higher grain yield (416.57 kg ha<sup>-1</sup>), stover yield (982.51 kg ha<sup>-1</sup>), protein yield (134.18 kg ha<sup>-1</sup>), gum content (33.03%), Gum yield (138.78 kg ha<sup>-1</sup>) and endosperm content (30.56 %) were recorded with RGC-1003.

The experiment-II was laid out in RCBD with factorial concept. The treatments consisted of three different fertilizer levels viz, 30:60:30, 20:40:20 and 10:20: 10 kg N:P205:K20 ha<sup>-1</sup> recorded significantly higher grain yield (434.59 kg ha<sup>-1</sup>), protein yield (142.43 kg ha<sup>-1</sup>), gum yield (136.11 kg ha<sup>-1</sup>). With respect to genotypes, RGC-1003 recorded significantly higher grain yield (460.87 kg ha<sup>-1</sup>), protein content (33.48 %), protein yield (154.33 kg ha<sup>-1</sup>), gum content (32.61%) and gum yield (147.53 kg ha<sup>-1</sup>).

The experiment-III was laid out in RCBD with nine treatments replicated thrice. Among the nine different foliar application of nutrients, application of DAP @ 2% at 25 and 45 DAS significantly recorded higher grain yield (612.35 kg ha<sup>-1</sup>), protein content (33.46%), protein yield (204.92 kg ha<sup>-1</sup>), gum content (32.86 %), gum yield (204.92 kg ha<sup>-1</sup>) and endosperm content (35.74 %).

August, 2016

(S. Sridhara)  
Major Advisor

### 3. Studies on Nutrient Management Strategies for Enhancing Productivity and Economics of Maize (*Zea Mays L.*) Cultivation

ULLASA, M. Y.

#### ABSTRACT

Two experiments were conducted during *kharif* seasons of 2014 and 2015 in sandy loam soils of Zonal Agricultural and Horticultural Research Station, Navile Shivamogga to study the nutrient management strategies for enhancing productivity and economics of maize. First experiment was laid out in split plot design with three fertilizer levels (100, 80 and 60 % RDF) as main plot and eight foliar fertilization schedules (application of one per cent 19:19:19 at different growth stages) as sub plots. In second field experiment different potassium management practices were tested in randomised block design. Among fertilizer levels, higher grain yield (7007 kg ha<sup>-1</sup>), net returns (₹ 56637 ha<sup>-1</sup>) and benefit cost ratio (2.56) were recorded with 100 % RDF (150: 75: 40 kg N: P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O ha<sup>-1</sup>). Among foliar treatments, application of one per cent 19:19:19 at 20, 40 and 60 DAS recorded higher grain yield (7087 kg ha<sup>-1</sup>), net returns (₹ 57658 ha<sup>-1</sup>) and benefit cost ratio (2.60) over other schedules.

Interactive effects revealed that, 100 per cent RDF + foliar fertilization at 20, 40 and 60 DAS recorded higher grain yield (7530 kg ha<sup>-1</sup>) and net returns (₹ 61708 ha<sup>-1</sup>). It is possible to save 20 % RDF with foliar fertilization as highest B: C ratio was achieved with 80 RDF+ foliar fertilization at three stages. Among different potassium management practices, application of 60 kg K<sub>2</sub>O ha<sup>-1</sup> in two equal splits (Basal +30 DAS) + foliar fertilization of 1 % potassium sulphate at 60 DAS recorded higher yield (7693 kg ha<sup>-1</sup>), and net returns (₹ 64,897 ha<sup>-1</sup>), while highest benefit cost ratio (2.77) was achieved in 40 kg K<sub>2</sub>O ha<sup>-1</sup> applied in two equal splits + foliar fertilization of potassium sulphate at 60 DAS. Foliar application of 19:19:19 at 20, 40 and 60 DAS along with RDF, and split application of potassium not only found productive for rainfed maize but also economical.

June, 2016

(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**

---

**1. Genetic Variability and Stability Analysis for Yield and its Attributing Traits in Guar  
(*Cymopsis tetragonoloba* L. Taub)**

**NIRANJANA KUMARA B**

**ABSTRACT**

The present investigation was carried out in *Kharif* 2014 (E1), Summer 2014(E2) and Summer 2015 in Department of Genetics and Plant Breeding, College Of Agriculture, UAHS, Shivamogga. Experiment was composed of 85 genotypes replicated thrice in RCBD. Observations were recorded on ten quantitative traits. All the traits had shown variability in terms of Phenotypic Variance, Genotypic Variance, Phenotypic Coefficient of Variation, and Genotypic Coefficient of Variation across the season, all the ten traits had shown the high Heritability coupled with high Genetic advance in both the environments. Ten clusters were formed from eighty-five genotypes shown maximum genetic diversity among the genotypes, grain yield per plant (37.90%) was contributed more per cent contribution towards divergence.

Twenty two genotypes were found stable performance across the environments tested by using Eberhart and Russel model. The genotypes namely IC-311393, IC-421816, IC-373427 and IC-415151 were identified as potential they possess higher level of gum, crude protein and crude fat. However, the trait narrow leaf type with pubescence leaf surface is a characteristic of gum yielding genotypes. Seven traits were studied about variability among root parameters, root length and root volumes are significantly correlated to seed yield. IC-311403, IC-311432, IC-311449, IC-324023 and IC-325800 were shown resistant to powdery mildew.

July-2016

(Gangaprasad S)  
Major Advisor



# Plant Pathology

University of Agricultural and Horticultural Sciences, Shivamogga

Ph.D. theses abstracts produced in Plant Pathology

1. Investigations on Wilt Complex of Banana Cv. Ney Poovan (AB) caused by *Fusarium oxysporum* f. sp. *cubense* (E.F. Smith) Snyder and Hansen and *Radopholus similis* (COBB and Thorne)

**MURALI, R.**

**ABSTRACT**

Banana (*Musa* spp.) is one of the major fruit crop grown throughout the humid tropics and subtropics. Wilt complex caused by *Fusarium oxysporum* f. sp. *cubense* (Foc) and *Radopholus similis* is most destructive disease on many cultivars of banana. Survey in southern Karnataka during 2015 revealed that, highest wilt incidence was recorded in Shivamogga (27.63 %) district whereas, the least incidence of 15.75 per cent was recorded in Chitradurga district.

Among the different solid and liquid media were tested against Foc, Richard's medium supported maximum growth of fungus (89.55 mm and 336.42 mg) whereas, least growth was recorded in host extract medium (21.82 mm and 70.87 mg). The nutritional studies of Foc revealed that, maximum dry mycelia weight of fungus was recorded in Sucrose as carbon source (404.28 mg) followed by nitrogen source as potassium nitrate (440.50 mg), sulphur source magnesium sulphate (401.37 mg) respectively. In interaction studies, maximum reduction in plant height, pseudostem girth, root length, fresh shoot and root weight was noticed in simultaneous inoculation of *R. similis* and Foc over control. Molecular characterization of Foc revealed that, RFLP analysis of PCR product obtained from amplification with TEF-1F and TEF-1R primers with restriction endonuclease enzymes viz., *TaqI*, *AluI* and *MspI* showed high degree of genetic similarity among 24 Foc isolates studied, indicating close relationship between the Foc isolates.

Sequencing analysis of PCR products revealed that Foc as race 2. *In vitro* evaluation of eight plant extracts against Foc revealed that, higher per cent inhibition was recorded by Neem @ 20 per cent (80.73 %). Among eight bioagents, *Trichoderma viride* (76.66 %) (Shivamogga isolate) was significantly found effective in inhibiting the mycelial growth of Foc. *In vitro* screening of fungicides against Foc revealed that, Captan at 100 ppm Propiconazole and combi products, Carbendazim + Iprodione (100 %) was found effective in inhibiting the mycelia growth of Foc @ all concentrations. Integrated management of wilt complex was conducted in the farmers orchard during 2015 revealed that, the combined soil application of Neem cake (250 gm/pl), 25gms of each *T. viride*, *P. fluorescens*, *P. lilacinus* along with FYM, Carbofuran (20 gm/pl) + stem injection of Carbendazim @ 2 percent (at 5, 7, 9 months) recorded the maximum plant height with reduced the *R. similis* population, less wilt incidence (11.12 %), maximum bunch weight (16.80 kg) and yield (26.33 t/ha) respectively.

June, 2016

(H. Narayanaswamy)  
Major Advisor