Agriculture

Agricultural Entomology

University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Agri.) theses abstracts produced in the

Department of Agricultural Entomology

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1. Bio-Ecology of Spiralling Whitefly *Aleurodicus Dispersus* (Russell) and its Management using Fungal Pathogens on Guava

AISWARIYA. K.K.

ABSTRACT

Studies on the bio-ecology of Spiralling whitefly *Aleurodicus dispersus* (Russell) on guava carried out at Agricultural College, Shimoga during 2004-05 revealed that the egg period ranged from 5.54-10.02 days. The four nymphal instars took 4.74-6.5, 3.56-6.22, 6.02-8.96 and 7.52-10.1 days respectively during different seasons. During the survey, 99 host plants belonging to 38 families were recorded from Shimoga taluka, of which 19 were new records from Karnataka, 11 of which were new host records. A study on natural enemies, revealed seven natural enemies, which included six predators and a parasitoid.

Studies on seasonal incidence indicated that the peak population of spiralling whitefly was associated with rise in temperature and the different stages of whitefly were considerably low during June and first fortnight of July. The total whitefly population showed positive correlation with maximum and minimum temperature, but a negative correlation with relative humidity, rainfall and wind velocity. Further, studies on efficacy of *Fusarium semitectum* Berk. and Ravenel and *Verticillium lecanii* (Zimm.) Viegas were carried out under laboratory conditions. Highest mortality was recorded at concentration of 4.2 x 10^9 spores/ml of *F. semitectum* and 3.6 x10^9 spores/ml of *V. lecanii* with per cent mortality of 75.21, 89.97 (nymphs) and 64.40, 79.90 (adults), respectively. The earlier instars showed higher susceptibility to fungal infection than the later stages. Among 12 treatments evaluated under greenhouse conditions, *F. semitectum* 4.2 x 10^9 + *V. lecanii* 3.6 x 10^9 + 0.06% Triazophos registered highest mortality of 85.80, 86.81 and 83.30 per cent on eggs, nymphs and adults, respectively. Under field conditions, highest mortality was found in *F. semitectum* 6.2 x 10^{15} + *V. lecanii* 4.6 x 10^{14} + Triazophos 0.03%, with 84.44, 1.02 and 79.45 percent mortality in case of eggs, nymphs and adults, respectively. However, Triazophos 40 EC @ 0.06% was highly effective in controlling all the stages of spiralling whitefly.

October 2005

(Dr. M. Manjunatha)
Major Advisor

2. Bio-Ecology and Management of Arecanut Inflorescence Caterpillar, *Batrachedra Arenosella* (Walker) using Entomopathogenic Fungus, *Nomuraea rileyi* (farlow) Samson.

NAVEEN KUMAR. V.

ABSTRACT

The investigations on the Bio-ecology and management of arecanut inflorescence caterpillar were carried out at Department of Agricultural Entomology, College Agriculture, Shimoga, Karnataka. Studies on the seasonal incidence of arecanut inflorescence caterpillar, *Batrachedra arenosella* from July 2003 to June 2004 revealed an incidence ranging from 0.00 to 21.75 larvae / rachis. The highest incidence of 21.75 larvae was observed during July first fortnight, while the lowest incidence of 0.42 mean number of larvae/rachis was observed during February. The simple correlation with the weather parameters and larval population showed weak positive correlation with temperature, where as with relative humidity and rainfall it showed strong positive correlation. The biology of *B. arenosella* was studied in the laboratory during August to October 2004. The total life cycle took an average of 29.0 $\pm$ 2.56 days, where in the egg, larval and pupal period lasted for 3.80 $\pm$ 0.40, 18.2 $\pm$ 1.76, 7.00 $\pm$ 0.40, respectively during August – September, whereas during September – October the life cycle took an average of 32.8 $\pm$ 2.90 days, where in the egg, larval and pupal period lasted for 4.20 $\pm$ 0.74, 20.2 $\pm$ 1.36, 8.40 $\pm$ 0.80, respectively. The pupa measured 3.81 $\pm$ 0.05 mm in length and 0.99 $\pm$ 0.08 mm in width. The adult is small with filiform antenna. The female has a total wingspan of 8.18 $\pm$ 0.04 mm and that of male is 7.86 $\pm$ 0.04 mm.

The incidence of different concentrations of *N. rileyi* on mortality of different instars of *B. arenosella* under laboratory conditions from three to five days after spraying indicated the maximum mortality at a concentration 3.2 x 10^9 spores /ml. The mortality on I, II, III, IV and V instar was 93.00, 85,00, 56,00, 49.00 and 44.00 per cent, respectively. The efficacy of the same fungus in combination with chemical and botanicals on *B. arenosella* under field conditions and observations recorded at 15 days after spraying indicated the maximum mortality of 76.56 per cent in 4.1 x 10^{15} spores / ml. + chlorpyriphos followed by 4.1 x 10^{15} spores / ml + malathion with 67.41 per cent, exclusive chlorpyriphos gave 60.83 per cent and least mortality of 3.98 per cent was observed in untreated check.

July, 2005

(B.L.Visweswaragowda)
Major Advisor

3. Evaluation of Fungal Pathogen, *Fusarium Semitectum* (Berk. and Ravenel) against Sugarcane Woolly Aphid, *Ceratovacuna Lanigera* Zehntner (Homoptera: Aphididae)

ASWINI, G. V.

ABSTRACT

Survey for the fungal pathogens on sugarcane woolly aphid in Bhadra command area revealed that woolly aphid was infected with *Fusarium* sp. and *Aspergillus wentii*. Both the fungi isolated proved to be pathogenic to woolly aphid *Ceratovacuna lanigera*, LC_{50} value of the fungal isolates *Fusarium* sp. and *Aspergillus wentii* were at $2.21x10^7$ spores/ml and $6.21x10^7$ spores/ml, respectively, indicating more virulence nature of *Fusarium* sp. than *Aspergillus wentii.* Studies on the effect of temperature and relative humidity on growth of *Fusarium semitectum* revealed that maximum growth of (87.00 mm diameter) occurred at temperature of 35±C and 90% relative humidity. Maximum sporulation (9.1×10^7 spores/ml) was seen with 35°C temperature and 90% RH at 14 days after inoculation followed by temperatures at 30, 25 and 20°C. There was steep fall in growth and sporulation of *F. semitectum* at 40ºC.

Studies on efficacy of *F. semitectum* under laboratory conditions. Highest mortality was recorded at $2.7x10^9$spores/ml of *F. semitectum* with mortality of 87.27 per cent nymphs, 59.32 per cent adults, respectively. The earlier instars were more susceptible to fungal infection than the later stages. Among the eight treatments evaluated under greenhouse conditions, the combination of *F. semitectum* $2.7x10^9$spores/ml and chlorpyriphos (0.02%) registered highest mortalty of 84.12 per cent which was superior next to cholorpyiphos (0.04%). Under field conditions highest mortality was found in combination of *F. semitectum* $3.7x\ 10^{14}$ spores/ml+ chlopyriphos (0.02%) with 75.32 per cent mortality, which was superior next to chlopyriphos (0.04%).

November 2006

(M. Manjunatha)
Major Advisor

4. Studies on Utilization of *Micromus Igorotus* (Banks) (Neuroptera : Hemerobiidae) for Management of Sugarcane Woolly Aphid *Ceratovacuna lanigera* (Zehntner) (Homoptera : Aphididae)

PRAVEEN M.P.

ABSTRACT

Studies on seasonal incidence of *M. igorotus* revealed that incidence ranged from 0.00 (NovII-FebII) to 8.00(SepII) larvae/plant,0.00 (NovI-FebI)to 7.25 (JuneII) larvae/plant and 0.00 (DecI-JanII) to 13.90 (AugII)larvae/plant at ARS, Honnavile, SRDI, Karehalli and ARS, Kattalagere respectively. The biology of *M.igorotus* was studied in the laboratory condition at ARS, Honnavile from August to September, 2006. The total life cycle ranged from 25 to 28 days in case of male and 33-35 days in case of female. The incubation, larva, pupa and adult periods ranged from 3.00 to 4.00, 5.00 to 7.50, 6.00 to 8.00 and 7.00 to 15.00 days respectively. Adult female laid 165-188 eggs. The total feeding potential of *M. igorotus* was 161.76 ? 13.09 aphids.

The studies on impact of *M. igorotus* on population dynamics of sugarcane woolly aphid indicated that higher sugarcane woolly aphid population was noticed in treatment with heavy infestation of SWA without *M. igorotus* with 106.85 aphids/ 2.5 cm^2 leaf area, whereas least population in treatment with initial infestation of SWA with out M. igorotus and subsequent release of *M. igorotus* with 3.42 aphids/ 2.5 cm^2 leaf area due to predation activity of *M. igorotus*.Studies on standardization of mass production techniques under laboratory conditions revealed that the multivoltine silken thread was superior to other substrates for oviposition. Corrugated paper strips were best suited as pupation substrate compare to other substrates and density of 65-70 first instar larvae in insect rearing box (22cm dia) are the best standardized methods for mass rearing. Above methods are adopted for mass rearing starting with 20 pairs of adults and it yields around 750 pupae in a period of one month.

August, 2007

(B. Shivayogishwara)
Major Advisor

5. Studies on Population Dynamics of Pest Complex of Field Bean (*Lablab Purpureus* L.) with Special Reference to Pod Borers

THEJASWI L.

ABSTRACT

Investigations on the status and management of pod borer complex in field bean were carried out under field conditions during 2005-06 at the College of Agriculture, Shimoga. During the investigation, as many as 22 species of insect pests have been recorded on the crop. The important sucking pests constituted *Riptortus pedestris*, and *Aphis crassivora*. The important pod borers included *Helicoverpa armigera* , *Adisura atkinsoni*, *Cydia ptychora* and *Sphenarches caffer*. The incidence of pod borers was noticed from May II fortnight to February I fortnight. Significant negative correlation was established between pod borers population and minimum temperature. However, the relationship was non-significant with maximum temperature, relative humidity and rainfall. Among the natural enemies of pod borers, the parasitoids *Campoletis chlorideae* and *Bracon* sp. nr. *greeni* (Ashmead) were more predominant.The predators includeslady bird beetles and mirids.

The economic injury level for pod borers was determined as 0.44 larva per plant. An highest yield of 42.50 q per ha pod yield could be obtained from supervisory control (EIL based) plot followed by the treatments which received three sprays of indoxacarb (41.37 q/ha) at 45, 55 and 65 DAS and two sprays of indoxacarb (36.65 q/ha) at 45 and 65 DAS. Among the newer insecticide molecules, spinosad (36.44%) recorded very high larval reduction followed by thiodicarb(36.68%) and lamda cyhalothrin(27.82%) with a pod yield of 44.02 q per ha, 43.88 per ha and 41.08 q per ha, respectively. However, the spinosad application resulted in highest B:C ratio (2.13) followed by thiodicarb (1.98) and lamda cyhalotrin (1.86).

August, 2007

(Mohan I. Naik)
Major Advisor

6. Bio-Ecology and Management of Yellow Stem Borer, *Scirpophaga Incertulas* Walker (Lepidoptera : Pyraustidae) in Aerobic Rice

SHIDDALINGAPPA V. HIUGAR

ABSTRACT

Field experiments were conducted at College of Agriculture, Shimoga during 2005-06 on bio-ecology and management of yellow stem borer (YSB) in aerobic rice. Biology of *S. incertulas* studied revealed that the average incubation, larval, pupal, pre-oviposition, ovipostion, post ovipoaition periods and fecundity were 6.8 ± 0.20, 28.7 ± 1.10, 11.1 ± 0.83 days, 25.6 ± 1.2, 23.0 ± 1.0, 20.3 ± 0.87 hours and 159.3 ± 37.74 eggs/female, respectively from the larva reared on transplanted paddy and 6.5 ± 0.50, 28.4 ± 1.47, 8.6 ± 0.49 days, 25.2 ± 0.83, 22.0 ± 0.71, 20.2 ± 0.52 hours and 152.2 ± 31.58 eggs/female, respectively from the larva reared on aerobic paddy. Per cent dead hearts or white ear heads had significant negative correlation with minimum temperature and afternoon relative humidity during *kharif* and with morning and afternoon relative humidity during *rabi* and significant positive correlation with sunshine hours per day durng *kharif* and with minimum and maximum temperature during *rabi*.

During *kharif* effect of dates of sowing on infestation by YSB showed that the increase in the incidence of infestation was observed as the dates of transplanting and sowing was delayed. But aerobic paddy had lower infestation. During *rabi* season, in aerobic paddy 30th November sown crop yielded higher with 49.86 q/ha with lower infestation. Similar trend was followed on transplanted paddy but with higher incidence of YSB than on aerobic paddy. Efficacy of new insecticide molecules on YSB infestation in aerobic paddy revealed that among spray formulations beta-cyfluthrin 25 EC @ 12.5 g a.i/ha recorded lower incidence of YSB and gave higher grain yield of 38.67 q/ha and among granular formulations, fipronil 0.3G @ 7.5 g a.i/ha recorded lower incidence of per cent DH or WH and gave highiest grain yield of 42.97 q/ha. The cost benefit ratio was maximum for beta cyfluthrin (1:20.39) and minimum for carbofuran (1:3.12).

Janauary 2007

(Mohan I. Naik)
Major Advisor

7. Utilization of Bioagents in the Management of the Castor Semilooper, *Achaea janata* Linnaeus (Lepidoptera: Noctuidae)

AJITH KUMAR. M. A.

ABSTRACT

Investigations on the status of castor pests, natural enemies of semilooper and management of castor semilooper in castor were carried out under field conditions during 2007-08 at Shikaripur, Honnali and Channagiri taluks and at the College of Agriculture, Shimoga. During the investigation, as many as 16 species of insect pests have been recorded on the crop. The important pests recorded are *Achaea janata* Linn., *Spodoptera litura* F., *Helicoverpa armigera* Hub., *Ergolis merione* Cramer, *Euproctis fraterna* Moore, *Liriomyza trifolii* (Burgess), *Trialeurodes ricini* Misra, *Empoasca flavescens* F.and *Conognethes punctiferalis* (Guenn.). Among the natural enemies of *Achaea janata*, the egg parasitoid, *Trichogramma chilonis* Ishii and a larval parasitoid, *Microplitis maculipennis* Szepligate were more predominant. The incidence of T. chilonis was noticed throughout the crop period along with the pest activity. Parasitisation by T. chilonis showed significant positive correlation with minimum temperature and rainfall. While, larval population exhibited significant positive correlation with parasitisation (%) by M. maculipennis. Per cent parasitisation by M. maculipennis exhibited significant negative and positive correlation with maximum temperature and total rainfall, respectively.

Among different aged eggs, one day old eggs were highly (85.2%) preferred by *T. chilonis.* Among the different larval instars tested, maximum of 72.30 per cent parasitisation was noticed in second instar larvae of *A. janata* by *M. maculipennis*. The total life cycle of *T. chilonis* ranged from 8.62 to 9.04 days on the eggs of *A. janata*. The egg, larval, pupal and adult periods of *M. maculipennis* lasted for 1.70 ± 0.07, 11.64 ± 0.27, 2.22 ± 0.02 and 3.52 ± 0.37 days, respectively.

Among the various IPM modules tried, module-3 (*T. achaea* @ 1.5 lakh per ha @ 30DAS + fenvalerate 20EC @ 45 DAS + *T. achaea* @ 60 DAS) showed superiority in the suppression of the pest, safety to natural enemies, higher yield (15.6 q/ha) and benefit cost ratio (2.08) followed by module-5 (*T. achaea* @ 1.5 lakh per ha @ 30 DAS + profenophos (20EC) @ 45 DAS + Agroneem @ 60 DAS) compared to recommended module-9 (methyl parathion @ 30 DAS + methyl parathion @ 45 DAS + methyl parathion @ 60 DAS) with seed yield of 13.6 q per ha and B:C ratio of 1.70.

June, 2008

(Mohan I. Naik)
Major Advisor

8. Bio-Ecology of Aphid, *Aphis craccivora* Koch and Evaluation of Fungal Pathogen *Fusarium semitectum* Berk and Ravenel against Aphid on Cowpea

ROOPARANI, V.

ABSTRACT

Studies on seasonal incidence of cowpea aphid, *Aphis craccivora* Koch were carried out at Agriculture College Shimoga during 2007- 2008. The studies revealed an higher incidence of the aphid during June, October, November, December, February and March and a lower incidence from July to September, January and April. The correlation between the aphid population and weather parameters revealed that, the population of cowpea aphid increases with an increase in temperature. The natural enemies recorded on aphid were coccinellid predators, *Menochilus sexmaculatus* Fab. *and Coccinella transversalis* Fab.

The bio-ecology of cowpea aphid revealed that it had a complex life cycle where in both alate and apterous forms were reproduced by parthenogenetic viviparity without sexual reproduction. Total nymphal duration of the aphid occupied 4.86 ± 0.51 days in the laboratory. Pre-reproduction period was 1.01 ± 0.10 days, reproduction period was 10.31 ± 0.31 days and post-reproduction period was 0.70 ± 0.05 days. Adult longevity took an average of 11.82 ± 0.43 days. Aphids laid an average of 23.37 ± 7.67 nymphs and 16.75 ± 0.91 days to complete its life cycle.

Studies on the efficacy of *F. semitectum* under laboratory conditions indicated the highest mortality at 4.20 x 10^9 spores per ml with a mortality of 89.20 per cent nymphs, 64.66 per cent adults, respectively. The earlier instars were more susceptible to fungal infection than the later stages. Among ten treatments evaluated under green house conditions, the combination of *F. semitectum* 4.20 x 10^9 spores per ml and oxydemeton methyl (0.018%) registered the highest mortality of 85.70 per cent which was superior next to oxydemeton methyl (0.037%). Under field conditions the highest mortality was recorded in combination of *F. semitectum* 4.70 x 10^{14} spores per ml + oxydemeton methyl (0.018 %) with 79.01 per cent mortality, which was superior next to oxydemeton methyl (0.037%).

August 2008 (M. Manjunatha)

. Major Advisor

9. Performance of Inter Specific Bt Cotton Hybrids against Major Insect Pests

MANJUNATHA, R

ABSTRACT

The investigations on interspecific Bt and non-Bt cotton hybrids were under taken at Agriculture Research Station, Honnaville, Shivamogga, during *Kharif* 2008. In the present study it was found that, there was no differential susceptibility between Bt and non-Bt cotton genotypes against sucking pests *viz.*, thrips, aphids, white flies and leaf hopper. Among all the genotypes MRC-7201 Bt and its non-Bt counterpart recorded significantly lower population of sucking pests. However, red cotton bugs and Dusky cotton bugs were comparatively more in Bt cotton than in non-Bt cotton.

The larval population of *Helicoverpa armigera* and *Earias vittella* was almost nil on all the Bt cotton hybrids as against non-Bt cotton hybrids which allowed the larvae to cross the ETL (more than one larvae /plant). Significantly lower per cent of fruiting body damage due to *H. armigera* (1.44-3.67 per cent), *E. vittella* (2.31-5.19 %), rosette flowers (0.01-1.57 per cent) due to pink bollworm was noticed in Bt cotton hybrids. Similarly significantly higher seed cotton yield (16.71-21.16 q/ha) were recorded in Bt cotton hybrids. The seasonal decline in expression of *Cry 1 Ac* differed among Bt cotton genotypes and the expression was variable among plant parts. The highest concentration of *Cry 1 Ac* expression was noticed in leaves (16.34) followed by squares (11.95) and bolls (11.57 µg/g) of JK CH-99 Bt hybrid. The expression in other hybrids (MRC-7201, MRC-6918, Rasi XL-708, NCBH-990 and SP-911) ranged between 5.15-7.30, 2.98-6.58 and 3.78-4.68 µg/g in leaves, squares and bolls respectively.

Economics of Bt cotton hybrids revealed that, although over all cost of cultivation of Bt cotton was more, it recorded higher net returns of Rs. 20920.65 per acre with maximum BC ratio of 3.31 as compared to non-Bt cotton. Adoption level of Bt cotton was highest (91.16 per cent) in Davangere, followed by Chitradurga (87.17 per cent) and Shivamogga (84.59 per cent) districts of Karnataka.

September, 2009

(Pradeep S)
Major Advisor

10. Seasonal Incidences of Cowpea Pests and their Management

NAVEEN.V.

ABSTRACT

Investigations on seasonal incidence of cowpea pests and their management in cowpea were carried out under field conditions during 2008-09 at the College of Agriculture, Shimoga. During the investigation, 20 species of insect pests have been recorded on the crop. The important constituted *Aphis crassivora* Kochamong sucking prests and among borers *Maruca testulalis* Geyer and *Cydia ptychora* Meyrick. The incidence of *Aphis crassivora* was noticed throughout the year. The incidence of pod borers was noticed from May II fortnight to March I fortnight. Studies on the bioecology of *Maruca testulalis* revealed the total developmental period of 22.36 ± 1.45 days with a fecundity ranging from 90-201 eggs per female.Studies on the bioecology of cowpea aphid revealed that it had a complex life cycle, wherein both alate and apterous forms were reproduced by parthenogenetic viviparity. Aphids laid on an average of 24.02 ± 7.55 nymphs and took 16.99 ± 0.91 days to complete its life cycle.

An highest yield of 13.02 q per ha grain yield was obtained from supervisory control (EIL based) plot followed by the treatments which received three sprays of spinosad (12.10 q/ha) at 45, 55 and 65 DAS and two sprays of spinosad (9.88 q/ha) at 45 and 55 DAS. Among the newer insecticide molecule combinations, the combination sequence of clothianidin, NSKE and spinosad which were sprayed at different crop growth stages resulted in the high aphid population reduction (47.55%) and high larval population reduction (48.58%). The next to follow was the sequence of thiamethoxam, NSKE and spinosad which resulted in per cent aphid population reduction of 46.20 and per cent larval population reduction of 47.80. However, sequence of clothianidin, NSKE and spinosad resulted in highest B:C ratioof 1.65 followed by spray sequence of thiamethoxam, NSKE and spinosad with B:C ratio of 1.51.

September 2009

(Mohan I. Naik)
Major Advisor

11. Bio Ecology and Management of Sucking Pests in Bt Cotton

NAGARAJA, D. N

ABSTRACT

Studies on seasonal incidence of sucking pests of Bt cotton were carried out at Agriculture College Shimoga during 2008-09. The studies revealed higher incidence of aphids (48.11 per three leaves) during second fortnight of May and zero incidence in Second fortnight of July and first fortnight of August. The higher incidence of leafhopper (19.20) during May second fortnight and zero incidence in August. Higher incidence of whitefly (29.50) during second fortnight of April and zero in July, August and September months. Where as, the higher incidence of thrips population (26.81) was noticed during April second fortnight and zero incidence in July, August, September and October months. The incidence of all these sucking pests were correlated positively with maximum temperature. The peak population red cotton bug (0.80/ Plant) and ducky cotton bug (8.60/boll) was noticed during second fortnight of November (150 DAS) and second fortnight of December (190 DAS), respectively. The most commonly recorded natural enemies on sucking pests were coccinellids, spiders and chrysopa were positively correlated with increasing pest population.

The life cycle of cotton aphid revealed that the average total nymphal period was 5.24±0.74 days. The aphid was found to reproduce parthinogenitically viviparous. The pre-reproductive, reproductive and post- reproductive periods were found to be 0.88±0.24, 10.33±1.25 and 4.10±0.51 days, respectively. The number of young ones produced by an adult aphid was 11.10±3.47.

The average incubation period and the total nymphal period ofleafhopper was 6.53±0.58 and 11.68±3.74 days, respectively. The pre-oviposition, oviposition and post-oviposition periods were found to be 3.30±0.35, 9.53±1.11 and 3.80±0.63 days, respectively. The fecundity of leafhopper varied with a mean of 20.33±2.65 eggs per female. The longevity of adult leafhopper was 16.38±1.83 and 15.90±1.58 for female and male respectively.

Among the treatments one day after spraying Fenpropathrin showed superior efficacy in bringing down all the sucking pest population followed by Dimethoate, Imidacloprid and Acetamiprid. Dimethoate and Imidacloprid were most effective against aphid and Dimethoate alone was most effective on leafhopper, whitefly and thrips at three days after spraying. The similar trend was maintained even at seven days after treatment also.

July, 2009

(B. K., Shivanna)
Major Advisor

12. Effect of Organic Manures on Incidence of Pests of Pigeon Pea and their Natural Enemies

BOMMESHA, B.

ABSTRACT

A field investigation on "Effect of organic manures on incidence of pests of pigeon pea and their natural enemies" was carried out at College of Agriculture, Shimoga during *kharif* 2009. In the present study the lowest population of leaf hopper (0.11 hopper/three trifoliate/pl) and leaf roller (0.55 larvae/pl) were recorded in NC and PM+NC (Poultry manure+Neem cake) applied plots respectively. The lowest population of spotted pod borer, plume moth, gram pod borer were recorded (0.39, 0.99, 0.45 larvae/pl, respectively) in NC applied plots, while blue butter fly was low (0.19 larvae/pl) in standard check. Similarly, significantly lowest blister beetle (0.20 adults/pl) and pod fly (0.50 maggots/10 pods) were recorded in NC, while pod bugs (0.32 adults/pl) in PM applied plots. Significantly higher numbers of coccinellids (0.42 grubs and adults/pl) and spiders (0.52 spiders/pl) were recorded in untreated check.

The application of NC has resulted lower chlorophyll (1.8291, 1903 mg/g), reducing sugars (1.20, 1.71%) and total sugar (1.77, 2.35%) and highest phenol content (4.49, 5.21 mg/g) in leaves at 45 and 75 days after sowing. While, PM+NC (10.46, 11.27%) plot had lower protein. Whereas, in green pods application of NC had highest phenol (7.97 mg/g), lowest protein, reducing and total sugars of 21.60, 1.42, and 3.42 per cent, respectively. The correlation was positively significant between spotted pod borer (r=0.60*), gram pod borer (0.63*), blue butter fly (0.63*) with protein and spotted pod borer (0.63*) and gram pod borer (0.59*) with reducing sugars and spotted pod borer (r=- 0.73**), blue butter fly (-0.67*), gram pod borer (-0.77**), plume moth (-0.68*) tur pod fly (-0.68*) had significantly negative relationship with phenol. Among organics FYM+VC (Farm yard manure+Vermicompost) had highest net returns (Rs.12448 per ha) with ICBR of 2.85, followed by VC (Rs.11302 per ha) with ICBR of 2.26.

July, 2010

(Mohan I. Naik)
Major Advisor

13. Biology and Management of Pulse Beetles, *Callosobruchus maculatus* (Fab.) and *C. analis* (Fab.)

RAMAMURTHY, B.N.

ABSTRACT

Investigations on the biology and management of pulse beetles, *Callosobruchus maculatus* (Fab.)and *C. analis* (Fab.) were carried out under laboratory conditions in the Department of Agricultural Entomology, Shimoga during 2009-2010. On cowpea, the incubation period, pupal period and total developmental period were 5 ± 0.24, 9.90 ± 0.94 and 27 ±2.79 days, respectively for *C. maculatus.* While the corresponding figures for *C. analis* were 6 ±0.62, 9.0 ±1.02 and 30±2.65 days. Similarly on green gram, the figures for *C. maculatus* were 4 ±0.59, 10.55±0.76 and 29 ±1.48 and for *C. analis* it was 5±0.36, 8.80±1.42 and 30±1.55 days. The size and life span of female is comparatively more than male in both the species of pulse beetle. Sizes of male and female *C. maculatus* were bigger than C. *analis*.

Among the tested pulses, field bean (GL-66) and red gram (BRG-1) were least preferred for both the species. Cowpea and green gram were most preferred hosts for *C. maculatus* and *C. analis*, respectively. Among the cowpea varieties, CP-17 and IT-38956 were least preferred for oviposition in both the species. Prolonged developmental period, least per cent adult survival and grain weight loss were observed in these varieties. On the contrary C-152 and local variety of cowpea were highly preferred for both the species.

Among the indigenous materials [sand layer (2" over the grains), neem seed powder (5 %) and asafeotida powder (0.2%)] and plant oils [neem oil (1%) and ground nut oil (1%)] gave better protection upto three months for both the species of pulse beetles on cowpea. Red earth coating (5%), rice hull ash (5%), wood ash (5%), sunflower oil (1 %) and neem leaf dust (5%) recorded the highest population build up, per cent grain damage and per cent weight loss. Neem oil showed cent per cent adult mortality at 2 DAT when compared to neem seed powder and asafeotida powder which caused cent per cent mortality at 4 DAT in the both the species.

July, 2010

(B. K. Shivanna)
Major Advisor

14. Bio-ecology and Management of *Calepitrimerus azadirachtae* ChannaBasavanna (Eriophyidae: Acari) on neem

NAVIK, O. S

ABSTRACT

Studies on seasonal incidence of *Calepitrimerus azadirachtae* ChannaBasavanna and their natural enemies carried out at college of Agriculture, Shimoga during 2010 – 2011. Studies revealed that the incidence of mite was associated with rise in temperature and they were considerably high in the month of April and May and lower incidence was recorded in the month of July, September, October and from December to first fortnight of January. The maximum and minimum temperature was significantly positive correlation with the population of mites, but a negative correlation with relative humidity was observed. However, rainfall showed non-significant positive correlation with mite population. Studies on bio- ecology of mite *Calepitrimerus azadirachtae*on neem carried out during and revealed that developmental period was 7.65 $\pm$ 0.65 and 8.03 $\pm$ 0.81 days in male and female of *C. azadirachtae*, respectively.

Further studies on efficacy of *Fusarium semitectum* Berk and Ravenel and *Hirsutella thompsonii* Fisher along with new acaricides were carried out in laboratory conditions. The highest adult mortality was recorded at a concentration of 4.6 x 10^8 spores/ml of *H. thompsonii* and 2.3 x 10^9 spores/ml of *F. semitectum* with per cent mortality of 89.90 and 83.33, respectively. The nine treatments of fungi along with acaricides evaluated in laboratory conditions showed the highest mortality in difenthuron followed by propergite with 95.33 and 93.33 per cent mortality. *F. semitectum* and *H. thompsonii* showed 82 and 86 per cent in reduction of mite population at 2.3 x 10^9 and 4.6 x 10^8 spores/ ml, respectively. Among the nine treatments evaluated against the *C. azadirachtae* under field conditions, the highest mortality of 91.96 was recorded in difenthuron. Propergite and fenazaquin were next best showing 84.50 and 87.31 per cent mortality of mites. The treatment *F. semitectum* at 2.6 x 10^{15} spores/ ml showed 46.09 per cent mortality being least effective. *F. semitectum* + dicofol (0.02%) and *H. thompsonii* at 4.1 x 10^{14} spores/ ml recorded 55.49 and 54.85 per cent mortality. Treatments dicofol and wettable sulphur registered mortality of 78.35 and 68.99 per cent, respectively.

Aug, 2011

(M. Manjunatha)
Major Advisor

15. Studies on Insect Pest Complex of Promising Traditional Paddy Cultivars and their Management using Organics

PRASHANTA KUMAR, G. K.

ABSTRACT

The investigation on occurrence of insect pests on promising traditional paddy cultivars and their natural enemies in organic farming situation and management of insect pests using organics were undertaken at Organic Farming Research Center and College of Agriculture, Navile, Shimoga during *kharif* 2010.

In the present study it was found that among the promising traditional paddy cultivars Ratnachudi recorded significantly lowest mean damage of sucking pests *viz.*, thrips, green leaf hopper and ear head bug with 0.47 damage score, 0.64 damage score and 1.94% respectively. Significantly less mean damage of dead heart and white ear head due to yellow stem borer was recorded in *Selum sanna* with 9.38% and 13.70% respectively. Minimum leaf damage due to leaf folder was recorded in *Selum sanna* (1.90%). There was no significant difference among promising traditional paddy cultivars with respect to case worm damage and were below the economic threshold level (35% leaf damage). However Selum sanna (0.65%) recorded significantly least mean damage. Among the promising traditional paddy cultivars significantly higher grain yield was recorded in Selum sanna (42.55 q/ha.)

The most common and dominant highest mean number of predators in the promising traditional paddy cultivars were spiders (1.37/hill), coccinellids (1.01/hill), damselflies (1.12/m^2 area) and dragonflies (0.87/ m^2 area) was noticed in Ratnachudi, *Selum sanna*, respectively. Among the different organic management practices against green leaf hopper and ear head bug population, significantly lowest in tobacco decoction (1%), neem seed kernel extract (5%), chilli garlic extract (3%), azadirachtin 10,000 ppm and cow urine (1:5 ratio) treatment. While the case worm and leaf folder population was lowest in spinosad (0.02%) spray. Spinosad (0.02%) was more effective in reducing the stem borer dead heart and white ear head infestation, while significantly highest grain yield (49.07 q/ha.) was noticed in spinosad (0.02%) treated plots.

August, 2011

(S. Pradeep)
Major Advisor

16. Survey on the Incidence and Management of Pink Bollworm, *Pectinophora Gossypiella* (Saunders) on Bt Cotton

SANTHOSH KUMAR, K.

ABSTRACT

Investigations on survey of pink bollworm (PBW) at Shimoga, Shikaripura and Honnali taluks and its incidence and management were carried out at Agriculture College Shimoga during 2010-11. In the survey work, minimum larval population and per cent green boll damage was recorded at Agaswalli (2.00 larvae/20 green bolls and 9.00%, respectively) as against maximum larval population and per cent green boll damage at Basavanandihalli (3.10 larvae/20 green bolls and 14.00%, respectively). Studies on population dynamics of PBW moths through pheromone traps indicated the activity throughout the study period with four peaks *viz.*, 37th, 50th, 2nd and 8th standard week. Maximum temperature had negative and significant association with trap catches of PBW, while minimum temperature, morning and afternoon relative humidity were partially correlated with trap catches. Whereas, total rainfall had non-significant negative influence on PBW trap catches. *Goniozus* sp. (Hymenoptera: Bethylidae), a larval parasitoid of PBW was recorded in the month of October and November.

Insecticide treated plots performed significantly better than control for all the parameters against PBW. Three days after treatment, minimum number of larvae on bolls was recorded in novaluron, thiodicarb and spinosad as against the higher number of larvae registered in NSKE. Significantly the highest number of larvae/20 bolls was observed in control. Same trend was also followed even at seven days after treatment. Three days after treatment minimum green boll damage was recorded in thiodicarb, spinosad andlambda cyhalothrin as against highest green boll damage registered in control and NSKE. Seven days after treatment, the same trend was also followed. Significantly higher number of good opened bolls (GOBs) was recorded inspinosad,novaluron, indoxacarb, thiodicarb andlambda cyhalothrin than NSKE and control. Among the treatments minimum BOBs/plant were recorded in spinosad, novaluron and thiodicarb as against the higher number of BOBs/plant recorded in control and NSKE. Locule damage due to PBW was significantly less in spinosad, thiodicarb and indoxacarb treated plots. Maximum locule damage was registered in NSKEbut significantly different over control. Significantly higher seed cotton yield was recorded in spinosad (1935.20 kg/ha), indoxacarb (1909.83 kg/ha), thiodicarb (1890.10 Kg/ha), novaluron (1866.73 kg/ha) and lambda cyhalothrin (1802.17 kg/ha). Whereas, control (968.60 kg/ha) andNSKE (1507.27 kg/ha) recorded lower seed cotton yield.

June, 2011

(B. K. Shivanna)
Major Advisor

17. Biology and Management of Bud worm, *Helicoverpa armigera* (Hubner) on Tobacco

GIRISH, M. R

ABSTRACT

Studies on the Biology and management of bud worm, *Helicoverpa armigera* on tobacco were carried out under laboratory and field condition at agricultural college, shimoga during 2010-11. Under laboratory condition the average incubation period, larval period and pupal period of bud worm were 4.02 ± 0.64, 23.94 ± 1.21 and 10.70 ± 1.26 days, respectively. The total developmental periods of male and female were 47.40 ± 0.80 and 50.13 ± 1.23 days, respectively. The size and life span of female is comparatively more than male. Freshly laid eggs were spherical having flattened base, cream coloured which later turned dark. The insect possessed six larval instars. There was a remarkable variation in the colour pattern of the larvae which varied from greenish brown to brown with longitudinal stripes.

The fully grown sixth instar larvae measured a average length of 41.88 ± 2.11 mm. the average wing span of male and female adult moth was 34.61 ± 1.42 mm and 37.01 ± 1.64 mm, respectively. Investigation on population dynamics of bud worm using pheromone traps indicated the scattered activity of moth throughout the year. However, maximum number of moth activity was observed from 35th to 43rd standard week *i. e.* during September up to end of October. Rainfall and minimum temperature had positive and significant association with trap catches. Whereas, negative and non significant correlation was observed with maximum temperature and relative humidity.

Studies on the efficacy of new molecules and botanicals against tobacco bud worm showed that all the treatments significantly superior over control. Novaluran application yielded better result by controlling cent per cent larval population within seven days, followed by chlorpyriphos (90.0 %) and indaxocarb (87.59 %) application. The insecticides *viz.* azadirachtin (71.67 %), Nomurea (71.67%), HaNPV (80.0 %) and NSKE (83.0 %) were also effective in controlling the pest and are recorded significantly lower larval population over control.

June, 2011

(B. K. Shivanna)
Major Advisor

18. Management of POD Borers on Field Bean with Entomopathogenic Fungus *Nomuraea rileyi* (Farlow) Samson and Insecticides

LOLAKSHI, H. K.

ABSTRACT

Investigations on the status and management of pod borer complex in field bean were carried out under field conditions during 2009-10 at the College of Agriculture, Shimoga. During the investigation, as many as 21 species of insect pests have been recorded on the crop. The important sucking pests constituted *Riptortus pedestris* F.and *Nezara viridula* Linn. The important pod borers included *Helicoverpa armigera* Hübner and *Sphenarches caffer*Zeller.

The maximum damage due to pod borers throughout cropping period was 30.03 per cent. The maximum damage was done by *H. armigera* (20.27%) as its incidence was in higher level than other species. *S. caffer* contribution was next to *H. armigera* towards crop damage (9%) having medium level of incidence on crop. Among the natural enemies of pod borers, the parasitoids *Campoletis chlorideae* Uchida and Tachinidparasite were more predominant on *H. armigera*.The predators include spiders and carabids.

In the bio efficacy study, the maximum mortality of 92.59 per cent was obtained in first instar larvae of *H. armigera* followed by 83.33 per cent in second instar at 3.20 x 10^9 spores per ml concentration of *Nomuraea rileyi* indicating that early instars were more susceptible to fungus than later instars at known period after spraying. Among the insecticides, indoxacarb (36.57%) recorded very high larval mortality followed by *N. rileyi* + fenvalerate (34.73%) and*N. rileyi* + neem (31.02%) with a pod yield of 42.36q per ha, 41.98 qper ha and 36.11q per ha, respectively. However, the *N. rileyi* + fenvalerate application resulted in highest B:C ratio (2.31) followed by indoxacarb (1.99) and *N. rileyi* + neem (1.80).

August, 2011

(M. Manjunatha)
Major Advisor

19. Effect of Organic Manures and Chemical Fertilizers on the Abundance and Diversity of Above and Below Ground Arthropods in Field Bean Ecosystem

MADHU, M.

ABSTRACT

Studies on effect of organic manures and chemical fertilizers on the abundance and diversity of above and below ground arthropods in field bean ecosystem were carried out at Organic Farming Research Centre (OFRC), Navile, Shimoga, Karnataka during 2010-11. The studies revealed that among the different intervals of observations, the plots treated with organic manure and chemical fertilizer + mulching recorded significantly higher abundance of soil arthropods compared to the rest of the treatments (29.33, 31.00, 28.67, 27.67, 26.67, 21.33 arthropods per 400 gm of soil) and diversity of soil arthropods was also higher in above mentioned treatment (0.91, 0.93, 0.90, 0.89 0.80, 0.81). Abundance of collembolans, mesostigmata, and cryptostigmata was also higher in above mentioned treatment. With respect to above ground arthropods abundance (10.67, 34.67, 60.33, 65.00, 42.67, 38.67 insects per plant) and diversity (0.33, 0.40, 0.64, 0.87, 0.56, 0.49) was also higher in the plots treated with organic manure and chemical fertilizer + mulching.

The abundance of soil arthropods had a positive relationship with the soil moisture and a negative relationship to soil temperature. The plot which received recommended FYM and recommended fertilizers, FYM equivalent to N and FYM equivalent to N supplemented with P and K through inorganic fertilizers with and without mulching (T_1, T_2, T_3, T_7, T_8& T_9). Recorded significant positive relationship of soil arthropods abundance with available N, P, and K. The plot which did not receive any fertilizers with mulching (T_{13}) recorded a negative correlation with available P and K but had positive non significant relationship with available nitrogen. The plot which did not receive any fertilizers without mulching (T_{14})showed a non significant positive relationship with available nitrogen and phosphorus but negative with available potassium. The abundance of soil arthropod showed significant positive correlation with the yield of field bean. The impact of abundance of soil arthropods on the yield of field bean was 86 per cent.

July, 2011

(S. Pradeep)
Major Advisor

20. Bio-Ecology and Management of Cut Worm, *Spodoptera litura*(Fabricius) on Chewing Tobacco

LATHA, M.

ABSTRACT

Studies on the Bio-ecology and management of cut worm, *Spodoptera litura* on chewing tobacco were carried out under laboratory and field conditions at Agriculture college, shimoga during 2011-12. Under laboratory conditions, the average incubation period, larval period and pupal period of cut worm were 4.10 ± 0.32, 19.90 ± 2.33 and 13.00 ± 0.82 days, respectively. The total developmental periods of male and female were 45.50 ± 1.58 and 48.20 ± 2.10 days, respectively. The size and life span of female is comparatively more than male.

Freshly laid eggs were hemispherical in shape with pale green in colour and turned yellow on second day. The insect possessed six larval instars. There was a remarkable variation in the colour pattern of the larvae at different instars which varied from transluscent green to brown with longitudinal gray and yellow stripes. The fully grown sixth instar larvae measured an average length of 39.45 ± 1.14 mm. The average wing span of male and female adult moth was 35.80 ± 1.92 mm and 39.20 ± 1.92 mm, respectively. Investigation on population dynamics of *Spodoptera* using pheromone traps indicated the maximum activity of moths from 29th to 35th standard week. However, peak number of moths was noticed up to the 39th standard week (September). Rainfall, maximum and minimum temperature had positive and non significant correlation with trap catches. Whereas, negative and non significant correlation was observed with relative humidity.

Studies on the efficacy of new molecules and biopesticides against tobacco cut worm showed that all the treatments were significantly superior over control. Hundred per cent larval control was observed at seven and fifteen days after application of spinosad (112.5 g a.i./ha) and fluebendiamide (98.36 g a.i./ha) respectively. Maximum per cent larval reduction was observed in novaluron-100 g a.i./ha (91.15%). Further chlorpyriphos-500 g a.i./ha (87.17%), Bt Dipel-35 g a.i./ha (85.00%), SlNPV-250LE (84.96%), *Nomuraea rileyi*-350 g a.i./ha (82.63%) and NSKE 2% (66.6%) were also effective in controlling the pest and are significantly better than control.

July, 2012

(B.K.Shivanna)
Major Advisor

21. Comparative Development, Infestation Behavior and Management of Rice Weevil, *Sitophilus oryzae* (L.) (Curculionidae: Coleoptera) in Different Split Legumes

DEEPTHI N.

ABSTRACT

Experiment on comparative development, infestation behavior and management of rice weevil, Silophilusoryzae (L) in different split legumes was undertaken at Department of Entomology, College of Agriculture. Shimoga during 2011-12. Study was conducted to understand the development of Silophilits oryzaeus'mg different split legumes green gram Bengal gram, field bean and sorghum.

In study the comparative development of *S.oryzae* factors such as fecundity, fertility, developmental period, adult longevity and the progeny production were compared. The highest fecundity of *S.oryzae* was in sorghum and lowest in green gram. The highest fertility was recorded in sorghum and low fertility in green gram. The developmental period of *S.oryzae* in green gram was highest and lowest in sorghum followed by field bean and Bengal gram. Adult longevity and progeny production was highest in sorghum followed by field bean and Bengal gram and lowest in green gram. Females weighed heavier than males. Based on results, it can be concluded that, there is a chance *S.oryzae* extending host range to split legumes. Infestation behavior of *S.oryzae* three moisture levels (10%, 12%& 14%) was evaluated. In sorghum and split legumes, the highest seed weight loss was recorded at 14 % moisture level and the lowest weight loss at 10 %.Eight plant products were tested against S.oryzae. Of them, sweet flag powder (1%) afforded maximum protection. Zanduparad (2%), ginger rhizome powder (2%) and neem leaf powder (5%) were next in the order of efficacy.

July, 2012

(Manjunath, M.)
Major Advisor

22. Survey and Management of Arecanut Rootgrub

SHABBIR K

ABSTRACT

Studies on the survey and management of arecanut root grubs in Shimoga district (Sagara, Hosanagara and Thirthahalli), during 2012-13 revealed that, Thirthahalli talluk showed higher grub count (3.38 grubs per palm) compared to Sagara, Hasanagara taluks. *Leucopholis lepidophora* was the predominant species in all the root grub infested areas of shimoga district. In all the three taluk as the grub population was highly significant and negatively correlated with rain fall. The activity of scolid wasp was more during April and May and was found to decline during other months. It was confirmed that *Colpacampsomeris nr.indica* (Saussura) is the species that has been observed as an ectoparasite of rootgrubs.

Amomg the indegenious practices mechanical digging and removal of grubs coupled with application of insecticides (Chlorpyriphos) was the best method in reducing the grub population. However, application of gravel (Garchu mannu) to the garden affects the rootgrub biology and thereby the adult will not lay the eggs and the larva will move away from garden. Among the different treatments tested against the rootgrubs rynaxypur @ 0.18 mL/L had given maximum mortality (74.95%) followed by rynaxypur @ 0.12 mL/L (73.33%). The bioagents *Metarrhizium anisopliae* performance was not satisfactory even after 60 days of application.

July, 2013

(B.K. Shivanna)
Major Advisor

23. Influence of Soil Amendments on the Incidence of Sucking Pests Infesting Bt Cotton

PRASANNA, S. O.

ABSTRACT

A field investigation on "Influence of soil amendments on the incidence of sucking pests infesting Bt cotton"was carried out at College of Agriculture, Shimoga during *kharif* 2008. In the present study it was found that the lowest mean population of aphids, whiteflies and thrips (1.69, 0.19 and 0.32/3 leaves/plant, respectively) were recorded in PM+NC (poultry manure + neem cake) treated plots. While, the leafhopper, red cotton bug and dusky cotton bug (1.77/3 leaves/plant, 0.40/plant and 4.93/boll, respectively) were least in FYM+PM (farm yard manure + poultry manure)treated plots, whereas, red spider mite was lower in NC (0.04 cm^{-2}leaf area/plant). Application of VC (vermicompost) recorded highest mean coccinellids and chrysopids (0.34 and 0.47/plant, respectively) however, higher mean population of spiders and anthocorids (0.44 and 0.29/plant, respectively) were noticed in NC+VC treatment.

Application of NC (0.713, 1.613 and 3.603 mg/g leaves) had significantly higher phenol content, FYM+VC (0.410, 0.640 and 2.217 mg/g) had higher chlorophyll content, FYM+NC(2.250), FYM+VC(4.917) and NC+VC(7.147) recorded highest total sugars at 30, 60 and 90 DAS, respectively. However, PM (0.910 and 3.267 mg/g at 30 and 60DAS, respectively) and VC (5.070 mg at 90 DAS) recorded highest protein content. Aphids had significant positive correlation with chlorophyll (r=0.57*and 0.70*) at 30 and 60 DAS and protein (r=0.58*) at 30 DAS, significant negative correlation (r=-0.61*) with phenol at 90 DAS. Leafhoppers had significant positive correlation (r=0.62*) with chlorophyll at 60 DAS and mites had significantly negative correlation (r=-0.61*) with phenol at 90 DAS.

The organic carbon in soil was more in PM+NC treated plot, highest amount of N, P and K were recorded in RDF and standard check but on par between the treatments except untreated check. While, OC had significant negative correlation (r=-0.65*) with mites at 90 DAS. N had significant positive with aphid (r=0.62*) and leafhopper (r=0.57*) at 30 DAS, aphid, whitefly and leafhopper(r=0.60*, 0.69* and 0.64*, respectively) at 60 DAS, while P had significant positive correlation (r=0.66*) with aphid at 30 DAS. The K had significantly negative (r=-0.64*) with aphids at 30 DAS while, S had significant positive correlation (r=0.66*) with leafhoppers at 90 DAS and among organic amendments B:C ratio was high (1.78) in FYM+PM treated plot followed by FYM+NC (1.61).

June, 2009 (Mohan I. Naik)

Major Advisor

24. Survey of Stem Borer Complex in Maize (*Zea mays* L.) and their Management

NAGARJUNA, B

ABSTRACT

The present study entitled "Survey of stem borer complex in maize (*Zea mays* L.) and their management" revealed that *Chilo partellus* (Swinhoe) and *Sesamia inferens* (Walker) were the common species debilitating the crop and their incidence ranging from 14.82 to 20.20, 17.30 to 19.33 and 20.78 to 23.75 per cent at Shimoga, Shikaripur and Honnali talukas respectively.The stem borer (*Sesamia inferens*) completed its life cycle in 35 to 57 days. The incubation period ranged from 5 to 6 days. The larval stage passed through six instars, ranged from 23 to 39 days. The adult male and female lived for 4.40±0.75 and 6.10±0.78 days, respectively with a fecundity of 96- 208 eggs. Whereas, the stem borer (*Chilo partellus*) completed its life cycle in 38 to 64 days.

The incubation period ranged from 5 to 7 days. The larval stage passed through six instars, ranged from 26 to 48 days. The adult male and female lived for 5.30±1.35 and 45±1.14 days, respectively with a fecundity of 198-348 eggs. Nine hybrids screened against maize stem borer revealed that the hybrids CP-828, NAH- 2049 and CP-818 were tolerant.While, the hybrids Bioseed-9544, Rajkumar and Allrounder were susceptible. Among the insecticides, Carbofuran 3G and phorate 10G whorl applications showed higher efficacy in suppressing the stem borer. The seed treatment with chlorpyriphos 3ml per kg had given good control upto 42 days. Hence, the ruling unrecomended farmer's practice of chlorpyriphos seed treatment in and around Shimoga and Davangere districts can be fortified from the present findings.

June, 2009

(M. Manjunatha)
Major Advisor

25. Bioecology and Management of Sugarcane Woolly Aphid (Swa), *Ceratovacuna Lanigera* Zehntner (Aphididae: Homoptera)

NIRANJANA.B

ABSTRACT

Studies on seasonal incidence of SWA, *Ceratovacuna lanigera* Zehntnerfrom June 2004 to May 2005 revealed an incidence ranging from 26.07 to 64.34, 21.33 to 66.33 and 0.00 to 57.47 aphids per 2.5 cm^2 leaf area at ARS Honnavile, Karehalli (representing Bhadra command area) and Gajanur (representing Thunga command area) of Shimoga district, respectively. The highest incidence of *C. lanigera* was observed during September in all the localities but the lowest incidence was observed during April at Honnavile; Karehalli and February–March at Gajanur. Further simple correlation between the aphid population and weather parameters revealed that, the woolly aphid incidence was negatively correlated with maximum temperature and minimum temperature but positively correlated with relative humidity and rainfall in all the localities.

The natural enemies recorded at ARS Honnavile, Karehalli and Gajanur include *Dipha aphidivora* (pyralid), *Micromus igorotus* (hemerobiid), *Eupeodes confrater* (syrphid) and *Cheilomenes sexmaculata*, *Coccinellatransversalis* (Coccinellids). In addition to this two more species of Coccinellids *viz.*, *Synonycha grandis* and *Hormoniaoctomaculata* were recorded at Karehalli and one more species of Coccinellid, *Coelophora bipalgiata* was recorded at Gajanur. Among these predators, *D. aphidivora* was predominant followed by hemerobiid, syrphid and coccinellids. The bioecology of SWA studied both in laboratory and field condition revealed that it had an anoholocyclic life cycle, where in both alate and apterous forms were reproduced by parthenogenetic viviparity and no sexual reproduction was found. The woolly matter developed only on third and fourth instar nymphs in case of apterous form. Life cycle, fecundity and longevity of woolly aphid was maximum during January–February, while the minimum was observed during April-May under field condition.

All insecticides tested were quite effective in controlling SWA, except azadirachtin 5 % treatment. The reappearance of aphid was 77.77 and 5.76 aphids (per 2.5cm^2 leaf area) in azadirachtin and endosulfan treatments, respectively at seven days after application. However, as compared to other treatments tested, Thiamethoxam (6.27), imidacloprid (7.37), phosphomidon (9.87), acephate (12.13) and monocrotophos (13.06) recorded less number of aphid (reappearance) at 21 days after application. Thus indicating the possibility of their selective use in the management of sugarcane woolly aphid.

June, 2006

(B.L. Visweswara Gowda)
Major Advisor

26. Biocenology and Management of Giant African Snail, *Achatina fulica* Bowdich (Achatinidae: Gastropoda) in Areca Ecosystem

RAVIKUMARA

ABSTRACT

The study on incidence of *Achatina fulica* Bowdich from June, 2004 to June, 2005 revealed that the population ranging from 1.00 to 91.25 snails per 10 m^2 area. The lowest and highest populations were observed during first fortnight of February, 2005 and second fortnight of September, 2004, respectively. Snail population had highly significant negative and positive correlation with the maximum temperature and relative humidity, respectively. Snails laid creamy white to yellowish bright eggs measuring 5.09 ° 0.79 mm in length and 4.18 ± 0.45 mm in width. The average fecundity was 90 ± 15.87 and 126 ± 61.5 during July-August, 2004 and June-July, 2005, respectively. Incubation period lasted for 13.85 ± 5.52 and 12.53 ± 5.31days during July-August, 2004 and June-July, 2005, respectively. Hatching percentage was 93.40 ± 11.5 and 94.12 ± 4.43 during July-August, 2004 and June-July, 2005, respectively. The snails hibernated from October, 2004 to April, 2005 at a depth of 8.01 cm, 5.17 cm, 4.52 cm, 4.25 cm and 3.96 cm in red soil, red soil mixed with organic matter, sandy soil, red loamy soil and laterite soil, respectively.

In medium sized snails highest night time feeding rate was recorded in pepper (11.32 sq. cm.) followed by vanilla (5.68 sq. cm.), while day time feeding rate was highest in pepper (1.67 sq. cm.) followed by banana (1.25 sq. cm.). In big sized snail the highest night time feeding rate of 30.13 sq. cm. found in pepper followed by banana (12.78 sq. cm.) while highest day time feeding rate of 1.76 sq. cm. recorded in areca followed by betel vine (1.68 sq. cm.). Banana was the most preferred host for small sized snails while pepper was the most preferred host for medium and big sized snails. The highest number of snails was attracted in papaya stem waste followed by vegetable waste and fishmeal waste. Of the different chemicals and baits tested along with papaya stem waste, the highest mortality (87.67%) was observed at 6 kg metaldehyde bait per acre on second day which was on par with 2 and 4 kg metaldehyde bait per acre. Similar findings were observed even on fourth and the sixth day after application of metaldehyde. Hence 2 Kg metaldehyde bait per acre can be recommended to manage the snails.

June, 2006

(Mohan I. Naik)
Major Advisor

27. Studies on Bio-Ecology and Management of Paddy Earhead Bug, *Leptocorisa Oratorius* (Fabricius) (Hemiptera: Alydidae)

VENKATESH HOSAMANI

ABSTRACT

Study conducted on biology of *Leptocorisa oratorius* under green house and field conditions revealed that, The *Leptocorisa oratorius* took an average of 25.76 ± 2.73 and 26.00 ± 3.91 days to complete life cycle from egg to adult under green house and field conditions respectively. Fecundity was 98.30 ± 27.59 and 92.90 ± 19.99 in greenhouse and field conditions respectively, with an ovipositional period of 19.00 ± 5.89 days and 13.10 ± 3.67 days respectively. The longevity of adult male and female was 30.30 ± 5.21 and 71.00 ±11.48 respectively under greenhouse condition and it was 47.70 ± 10.85 and 65.70 ± 12.96 days in field conditions respectively. The mean occurrence of bugs per hill ranged from 1.31-2.26 and 2.39-4.02 during *kharif* and 1.49-2.52 and 2.81-3.86 during summer in Shimoga and Bhadravathi taluks repectively. Whereas it was 0.21-1.62 bugs per hill during *kharif* in Shikaripura taluk. Light trap studies (6.00 pm to 6.00 am) indicated 96 per cent of attraction of bugs upto 2.00 am while it was 27.85 per cent between 11 and 12 pm being peak attraction.

During present investigation eight alternate hosts were identified, out of which *Echinocloa crusagalli* and *E. colona* were found to be the most preferred alternate hosts. In addition to these hosts, bugs were found to congregate on arecanut, banana, carambola ,papaya, maize and cinnamom for shelter during sunny hours. The study conducted on percent damage due to earhead bug revealed that the average per cent damage to paddy due to earhead bug was 5.79 and 4.08 during *kharif* and 5.57 and 3.84 during summer in Bhadravathi and Shimoga respectively, which represents command areas and 1.96 per cent during *kharif* in Shikaripura taluk, which represents tank fed area. The average germination percentage of bug infested grains at 5 th and 14 th day was 70.07 and 74.02, 37.49 and 54.45 and 54.44 and 64.96 per cent in Shikaripura, Bhadravathi and Shimoga taluks respectively. The study conducted on bio efficacy of dust and EC formulations against earhead bug revealed that, among the six treatments, the maximum of 90.49 per cent and 94.45 per cent reduction in bug population was noticed in malathion 5 per cent dust during *kharif* and summer respectively. Remaining insecticides showed either moderate or least effectiveness against earhead bug.

June, 2007

(S. Pradeep)

Major Advisor

28. Studies on Insect Pests of Maize (*Zea Mays* Linn.) with Special Reference to the Bio-Ecology and Management of Maize Stem Borer, *Chilo Partellus* (Swinhoe) (LEPIDOPTERA: PYRALIDAE)

SIDDALINGAPPA

ABSTRACT

The study conducted to know the insect pests of maize at College of Agriculture Shimoga, revealed that *Chilo partellus, Sesamia inferens, Helicoverpa armigera, Marasmia trapezalis, Mythimnaseparata, Rhopalosiphum maidis, Cicadulina bipunctella* and *Myllocerous* sp. were common. The study conducted on seasonal incidence of maize stem borer revealed an incidence ranging from 4.0 to 18 per cent, 10.0 to 22.0 per cent and 8.5 to 20.0 per cent at College of Agriculture Shimoga, Attibele village of Shikaripur taluk and Abbalgere village of Shimoga taluk respectively. The highest incidence was observed during I fortnight of September, 2007 in all the three localities while the lowest incidence was noticed during I fortnight of December, 2007 at College of Agriculture Shimoga. Similarly, in Attibele and Abbalgere village lowest incidence was noticed during I fortnight of June, 2007. Further the simple correlation between the percentage stem borer incidence and weather parameter revealed that, the per cent incidence of stem borer had the significant positive correlation with minimum temperature, relative humidity and rainfall.

The biology of maize stem borer was studied under laboratory conditions from June to August, 2007. The stem borer completes its life cycle in 30 to 69 days. The incubation period ranged from 3 to 6 days. The larval stage passed through six instars. The mean duration of I, II, III, IV, V and VI instar was 4.80± 0.78, 4.40± 1.89, 5.30± 1.88, 5.90± 2.28, 6.10± 2.37 and 8.30± 2.21 days respectively. The total larval period ranged from 20 to 51 days. The premating and mating period occupied 9.15± 1.40 and 5.04± 0.70 hours respectively, oviposition period occupied 4.2± 0.63 days. The stem borer had the fecundity rate of 262-657 eggs. The adult male and female lived for 3 to 8 days and 3 to 7 days with a mean of 6.20± 1.75 and 5.00± 1.49 days, respectively. The study on efficacy of insecticides against maize stem borer showed that, all the insecticides tested were effective in suppressing the stem borer. Indoxacarb 0.0145, lambda cyhalothrin 0.005, cypermethrin 0.01 per cent spray showed higher efficacy in suppressing the stem borer. All other chemicals showed moderate to least effectiveness but they are significantly superior to untreated control.

June, 2008

(C. Thippeswamy)
Major Advisor

29. Bio-Ecology of Leaf Hopper, *Amrasca Biguttula Biguttula* Ishida and Aphid, *Aphis Gossypii* Glover and Evaluation of Fungal Pathogen, *Fusarium Semitectum* Berk and Ravenel on them in Okra.

JAYASIMHA G T

ABSTRACT

Studies on seasonal incidence of leaf hopper *Amrasca biguttula biguttula* Ishida and aphid *Aphis gossypii* Glover on okra were carried out at Agricultural College, Shimoga during 2007-08. The results revealed a higher incidence of leaf hopper (16.44 to 0.25 per leaf) during March I fortnight and a lower incidence in December II fortnight. Leaf hopper population was positively correlated with temperature. The incidence of aphid ranged from 24.23 to 0.29 per sq cm leaf its population was correlated positively with temperature.
A study on biology of leaf hopper and aphid revealed a total development period of 28.30 to 34.00 days and for leaf hopper 12.00 to 22.00 days for aphid.

The studies on the efficacy of *Fusarium semitectum* Berk and Ravenel and *Verticillium lecanii* Zimmerman were evaluated against leaf hopper and aphid under laboratory conditions, *F. semitectum* @ 3.60 x 10^9 spores/ml recorded a mortality of 83.34 per cent for nymphs and 75.21 per cent for adults of leaf hopper and for aphid *F. semitectum* @ 4.60 x 10^9 recorded mortality of 79.90 per cent for nymphs and 64.40 per cent for adults. While *V. lecanii* @ 2.50 x 10^9 spores/ml on leaf hopper recorded mortality of 87.27 per cent for nymphs and 78.20 per cent for adults and for aphid on *V. lecanii* @ 2.10 x 10^9 spores/ml recorded mortality of 87.27 per cent for nymphs and 92.31 per cent for adults.

Under the field conditions against leaf hopper dimethoate (0.06%), *V. lecanii* @ 4.90 x10^{14} spore/ml + dimethoate (0.03%), *V.* lecanii @ 4.90 x 10^{14} spores/ml and *F. semitectum* 2.50 x 10^{15} + dimethoate (0.03%) recorded mortality of 82.12, 75.23, 60.26 and 57.08 per cent at 15 days after spray respectivrly. While for the aphid dimethoate (0.06%), *V. lecanii* 5.20 x 10^{14} spore/ml + dimethoate (0.03%), *V. lecanii* 5.20 x 10^{14} spores/ml alone and *F. semitectum* 3.60 x 10^{15} + dimethoate (0.03%) recorded mortality of 83.76, 72.59, 69.26 and 55.32 per cent respectively at 15 days after spray.

June, 2008

(M. Manjunatha)
Major Advisor

30. Effect of Organic Manures and Biopesticides on the Incidence of Insect Pests of Moth Bean and Their Natural Enemies

KUMARA SWAMY, M.C

ABSTRACT

A field investigation on "Effect of organic manures and biopesticides on incidence of insect pests of Moth bean and their natural enemies" was carried out at College of Agriculture, Shimoga during *kharif* 2011. In the present study the lowest population of aphid, *Aphis craccivora* (Koch) (1.77 aphids/ three trifoliate leaves/plant) and leaf hopper *Exitianus indicus* (Distant) (0.12/ three trifoliate leaves/plant) were recorded in neem cake (NC) applied plots.

The lowest population of beetle *Maladara* sp. was recorded in NC (0.09 adults/plant) while it was low (0.10 adults/plant) in recommended dose of fertilizers (RDF) + *F. semitectum*+*N. releyi*+NSKE. Similarly, the lowest bug, [*Riptortus pedestris* (Fabricius)] population (0.10 nymphs and adults/plant) and lowest population of leaf folder *Omiodes indicata* (Fab.) (0.09/plant) was recorded in NC. Similarly lowest pod borer damage[*Cydia ptychora* (Meyrick)] (11.3 damaged pods/plant) was recorded in NC, while pod borer damage of 13.0 pods/plant was recorded in RDF + *F. semitectum*+*N. releyi* + NSKE sprayed plots. Significantly higher numbers of coccinellid, *Coccinella transversalis* (Fab.) (0.38 grubs and adults/plant) were recorded in RDF.

The highest organic carbon content was recorded in farm yard manure (FYM) treated plots at 30, 45 and 60 days after sowing (DAS) (0.45%, 0.47% and 0.49%) respectively. Similarly, highest available nitrogen (162.67, 165.44 and 167.74 Kg/ha) phosphorous (56.58, 59.29 and 59.15 Kg/ha) and potassium (187, 184 and 185 Kg/ha) were recorded at 30, 45 and 60 DAS in RDF and poultry manure (PM) treatment plots respectively.

The lowest population of aphid (2.42/ three trifoliate leaves/plant) and leaf hopper (0.11/ three trifoliate leaves/plant) were recorded in GMO-01-09 and Shikaripura-2 respectively, while 0.18 beetle per plant were recorded in GMO-01-09. Similarly lowest number of bug (0.11 nymphs and adults/plant) were recorded in GMO-01-09, while a reasonable population of leaf folder (0.13 larvae/plant) and pod borer (11.4 damaged pod/plant) were recorded in Local-2 and GMO-01-09, respectively. Among organics, FYM had highest net returns (Rs.16960.00 per ha) with B:C ratio of 6.78 followed by vermi compost (VC) (Rs.14260.00 per ha) with B:C ratio of 5.94.

(M. Manjunatha)

June, 2011 Major Advisor

31. Seasonal Incidence and Management of Scarlet Mite *Raoiellaindica* Hirst (Tenuipalpidae: Acari) using *Fusarium Semitectum* Berk and Ravanel on Arecanut

RAGUNATHA

ABSTRACT

Studies on seasonal incidence of *Raoiellaindica* Hirst and its management using *Fusarium semitectum* Berk and Ravanel on arecanut was carried out at college of Agriculture, shimoga during 2011-12. The higher incidence of the mite was noticed in April and May and lower incdiecne was recorded in the months of July to January. The incidence of mite was observed more on lower portion of the frond. The mite population was positively correlated with temperature and negatively with relative humidity, whereas with rainfall the relation was non-significant. Studies on host preference of *Raoiellaindica*to different areca cultivars revealed that cv. Thirthalli was severely affected and colonized by more mites compared to other cultivars. Whereas, cv. Sreemangala recorded lowest mite population. Further studies on efficacy of fungi *Fusarium semitectum* and *Hirsutella thompsonii* on different stages of *R. indica* was carried out under laboratory conditions. The highest adult mortality was recorded at a concentration of 4.6 x 10^8 spores/ml of *H. thomponii* and 2.3 x 10^9 spores/ml of *F. semitectum* with per cent mortality 84 and 80 respectively. Eight treatements evaluated under laboratory conditions showed highest mortality in propergite followed by dicofol with 91.30 and 84.00 per cent mortality. Among eight treatments evaluated against the R. indica under field conditions, the highest mortality of 83.44 was recorded in propergite. Dicofol and azadiractin were next best showing 76.35 and 59.30 per cent mortality of mites. The treatment *F. semitectum* at 2.6 x 101^5 spores/ml showed 44.37 per cent mortality being least effective. *F. semitectum* + dicofol and *H. thompsonii* 4.1 x 101^4 spores/ml recorded 53.32 and 54.75 per cent mortality

June, 2012

(M. Manjunatha)
Major Advisor

32. Studies on the Effect Of Herbicides on the Soil Fauna in Soybean Ecosystem

PRADEP KUMAR C. S

ABSTRACT

A field experiment entitled "Effect of herbicides on the soil fauna in soybean ecosystem" was conducted during kharif 2011 at ZARS, Navile, Shimoga. The experiment was laid out in randomized complete block design with three replications.

The studies revealed that among the different intervals of observations, post emergent application of fluzifop butyl @ 50 g a.i./ha recorded significantly lower soil arthropod population at 80 DAS as compared to the rest of the treatments (20.00 arthropods per 400 gm of soil) an diversity of soil arthropods was also lower (0.62). Abundance of collembolans, mesostigmata and cryptostigmata was lower at 80 DAS (0.67, 0.33 and 0.67 per 400 g of soil, respectively). Fluzifop butyl at recommended dosage recorded higher conidial inhibition of *Metarrhiziumanisopliae* (34.43 per cent) and application of recommended dose of trifluralin recorded lower (15.06 per cent) inhibition. Application of chlorimuron ethyl recorded higher inhibition (34.42 per cent) at recommended dosage and lower inhibition (15.51 per cent) of conidial germination *Beauvaria bassiana* with a n application of recommended dose of clethodim.

Among the herbicidal treatments significantly higher soybean seed yield and haulm yield (26.00 q/ha and 3880 kg/ha respectively) was recorded with pre-emergent application of pendimithalin at 1 kg a.i./ha. Abundance of arthropods showed significant negative correlation with the yield if soybean. Soil arthropods population significantly influenced the yield of soybean.

June, 2013 (Pradeep S)

Major Advisor

33. Studies on Insect Pest Complex on Traditional Varieties of Brinjal (Solanum Melongena L.) Cultivars

SOWMYA, E

ABSTRACT

Thirty four traditional brinjal cultivars were screened against shoot and fruit borer *Leucinodes orbonalis* Guen, Hadda beetle *Henosepilacna vigintoctopunctata*, Leaf folder Antoba olivacea and leaf hopper *Amrasca biguttulla biguttulla*. Maximum shoot infestation was noticed in dodda badane (42.63 per cent) and minimum in holesalu badane (27.52 per cent). The maximum number of leaf hopper was noticed in hassiru udda badane (12.81) and minimum in Kanakapura badane (2.54). Screening of cultivars against hadda beetle revealed that the maximum number of hadda beetle reported in hasiru udda badane (24.25) and minimum in 40-A badane (0.50). The maximum leaf damage caused by leaf folder was noticed in Heddaragulla badane (25.47 per cent) and minimum 40-A badane (11.75). An attempt was made to study the relationship between shoot and fruit borer infestation with morphological and biochemical characters of both shoot and fruit.

The results were highly significant and gave a very strong significant negative correlation between shoot infestation with leaf trichomes (-0.391*) phenol content in shoot (-0.710**), fruit weight (-0.455**), mesocarp thickness (-0.389*), number of seeds (-0.740**), phenol content in fruit (-0.357*) and fruit yield (-0.825**). Among the different chemicals used to manage the shoot and fruit borer higher larval reduction of 56.01 per cent recorded with spinosad which was on par with flubendi amide (55.66 per cent) followed by indoxacarb (51.22 per cent). The lower larval reduction of 10.53 per cent recorded with Metarhizium anisopliae which differed significantly from the control. The higher benefit cost ratio was obtained in spinosad 45 EC (4.58) which was on par with flubendiamide 480 EC (4.44) followed by chlorantraniliprole 18.5 SC (3.71), indoxcarb 14.5 SC (3.61) and chlorpyrifos 20 EC (3.59). Lower B:C ratio was observed in treatment untreated check i.e., 1.56 which was on par with Metarhizium anisopliae 2g/L (1.57) followed by 2.1 for NSKE (4%).

June, 2014

(Pradeep, S)
Major Advisor

34. Bio-Ecology and Management of *Phyllocoptruta oleivora* (Ashmead) (Eriophyidae: Acari) on Italian Lemon Citrus limon (L.) Burm.f."

MANJUNATH D.K

ABSTRACT

Studies on seasonal incidence of *Phyllocoptruta oleivora* (Ashmead) and their natural enemies carried out at college of Agriculture, Shimoga during 2013 - 2014. Studies revealed that the incidence of mite was associated with rise in temperature and they were considerably high in the month of March and April and lower incidence was recorded in the month of July, August and from December to second fortnight of February. The maximum and minimum temperature had significantly positive correlation with the population of mites, but a negative correlation with relative humidity was observed. However, rainfall showed non-significant positive correlation with mite population.

Studies on bio- ecology of mite *P. oleivora* on lemon carried out during and revealed that in summer developmental period from egg to adult was 8.63 + 2.13, 9.83 ± 1.79 days for male and female respectively on leaf, similarly 7.57 + 1.52, 8.98 + 1.61 days for male and female respectively on fruits. However, during winter, it was 17.67 + 1.85, 19.03 +2.11 days for male and female respectively on leaf, similarly 14.43 + 1.94 and 15.06 + 1.99 days for male and female respectively on fruits.

Further studies on efficacy of *Fusarium semitectum* Berk and Ravenel and *Hirsutella thompsonii* Fisher along with new acaricides were carried out in laboratory conditions. The highest adult mortality was recorded at a concentration of 4.6 x 108 spores/ml of *H. thompsonii* and 2.3 x 109 spores/ml of *F. semitectum* with per cent mortality of 90.33 and 81.33, respectively. The nine treatments of fungi along with acaricides evaluated in laboratory conditions showed the highest mortality in fenazaquin followed by propergite with 96.30, 94.70 and 93.70, 94.30 per cent mortality on leaves and fruits respectively. *F. semitectum* and *H. thompsonii* showed 79.30, 78.70 and 82.30, 80.70 per cent in reduction of mite population at 2.3 x 109 and 4.6 x 108 spores/ ml on leaves and fruits, respectively. Among the nine treatments evaluated against the P. oleivora under field conditions, the highest mortality of 90.89, 90.79 was recorded in fenazaquin on leaves and fruits respectively. Propergite and diafenthiuron were next best showing 86.32, 90.39 and 87.79, 83.28 per cent mortality on leaves and fruits, respectively. The treatment F. semitectum at 2.6 x 1015 spores/ ml showed 49.84 and 42.36 per cent mortality on leaves and fruits respectively being least effective. *F. semitectum* + dicofol (0.02%) and *H. thompsonii* at 4.1 x 1014 spores/ ml recorded 54.04, 43.70 and 50.43, 49.21 per cent mortality on leaves and fruits respectively.

June, 2014

(M. Manjunath)
Major Advisor

35. Spatial Distribution, Adult Emergence Pattern and Field Evaluation of Insecticides Against Areca Nut White Grubs, *Leucopholis lepidophora* (Blanchard) (Coleoptera: Scarabaeidae)

ADARSHA, S.K.

ABSTRACT

Studies on spatial distribution, adult emergence pattern and field evaluation of insecticides against areca nut white grubs were conducted under the field conditions during 2013-2014. Spatial distributions of root grubs were examined in between the palms (BP) and around the palm (AP) in new and old traditional gardens at Kabbinamane and Bheemanakone, Sagara taluk and Kesere, Thirthahalli taluk (Shimoga District) revealed that the I and II instar root grubs were distributed in random to aggregated manner in new and old gardens at both the locations. The early instars were found to be distributed throughout the gardens during July to October in both the type of gardens. No later instar larval population was recorded in old traditional garden from November on wards. Vertical distribution of larval population was in top surface (0-15 cm) during rainy season and up to 60 cm in summer season. Flooding of entire garden for eight days brought the larvae from deeper layer to surface layer up to 15 cm depth. The pattern of adult emergence of *L. lepidophora* and *L. burmeistri* was observed during emergence periods. Peak emergence of adult beetles of both species was noticed at 7.00 to 7.30 PM. No beetles where rain occurred between 6.00 to 9.00 PM no emergence of adult beetles. The sex ratio of *L. lepidophora* was male biased in Harakere, Shimoga taluk and Gulukoppa, Hosanagara taluk (female:male; 1:1.46 and 1:2.46) respectively. Whereas, in female dominance was observed in *L. burmeistri* in Aladka, Udupi taluk (1:0.02). When freshly emerged females were placed in small nylon mesh trap, they attracted males. Adult beetles of both the species were feeding on different host plants belonging to family Anacardiaceae and Dipterocarpacea after emergence under field condition. Among the different insecticides treated imidacloprid 17.8 SL 1 1/ha (75 %) gave good reduction over the untreated check in Gulukoppa. Whereas, in Harakere imidacloprid 17.8 SL 1 1/ha, fipronil 5 SC 2.5 1/ha and chlorantraniliprole 18.5% SC 658ml/ha gave 100 per cent reduction of larval population. Some insecticides *viz.*, chloropyriphos 20 EC 10 1/ha, chlorantraniliprole 18.5% SC 658ml/ha, imidacloprid 17.8 SL 1 1/ha and Phorate 10G 25Kg/ha also had negative effect on soil arthropod and earth worms.

June, 2014

(C. M. Kalleshwara Swamy)
Major Advisor

36. Bio-Ecology And Management of Turmeric Shoot Borer, *Conogethespunctiferalis Guenee* (Lepidoptera: Pyralidae)

CHETHAN, K. S

ABSTRACT

The nine genotypes of turmeric were screened against insect pests viz., leaf eating caterpiller (*Spodoptera litura*), shoot borer (*C. punctiferalis*}, leaf folder (*Udaspes folus*) and thrips (*Panchaetothrips indicus*) during 2013- 14 at College of Agriculture UAHS, Shimoga. Maximum leaf damage caused by leaf eating caterpillar was noticed in Prathiba (19.75 per cent) and minimum leaf damage was noticed in Belgam local (2.21 per cent). The genotypes Salem, Alleppy supreme, PTS-24 and Bidar-4 were moderately resistant whereas, Rajapuri and Kadapa were susceptible to shoot borer. The maximum leaf damage caused by leaf folder was noticed in Alleppy supreme (14.03 per cent) and minimum leaf damage was noticed in PTS-24 (7.89 per cent). Screening of genotypes against thrips revealed that, the Rajapuri, PTS-24, Salem, Alleppy supreme and Belgam local were highly resistant to thrips while, the genotypes CLI-325, Kadapa, Prathiba and Bidar-4 were resistant to thrips. An attempt was made to study the relationship between weather parameters with incidence of shoot borer revealed that per cent dead heart has significant positive correlation with maximum temperature (0.791 '). Whereas, significant negative correlation with rainfall (-0.815') and afternoon relative humidity (-0.798). Biology of *C. punctiferalis* studied in laboratory conditions revealed that, the incubation period of egg was 5.15 ± 0.36 days and total larval period was 17.80 ± 3.42 days. The pupal period was 9.50 ± 0.51 days in male, whereas in female, 9.90 ± 0.55 days. The total life cycle from egg to the death of adult in male was 36.45 ± 5.38 days, whereas in female 39.05 ± 5.24 days. Among the different insecticide tested against shoot borer, highest mean per cent larval mortality over check was recorded in the treatment lamda cyhalothrin 2.5% EC (59.30 per cent) followed by carbofuron 3G (56.63 per cent) and chlorpyrifos 20% EC (53.19 per cent). However, the B:C ratio was higher in lamda cyhalothrin 2.5% EC treated plots (2.38) followed by plots treated with chlorpyrifos 20 EC (2.07) and carbofuron 3G (2.04).

June, 2014

(Hanumantha Swamy B C)
Major Advisor

Agronomy

University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Agri.) theses abstracts produced in the

Department of Agronomy

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1. Effect of Enriched FYM and Fertilizer Levels on Growth and Yield of Aerobic Rice *(Oryza Sativa* L.)

ASHWINI, M.

ABSTRACT

A field experiment was conducted during 2013 at Agronomy field unit, ZAHRS, University of Agricultural and Horticultural Sciences, Navile, Shimoga. The experiment was laid out in factorial randomized complete block design with three fertilizer level viz., 125:62.5:62.5 NPK.kg ha^{-1}, 100:50:50 NPK kg ha^{-1} and 75:37.5:37.5 NPK kg ha^{-1} with four methods of application *viz.*, separate application of manure and fertilizer, spot application of manure and fertilizer, broadcasting of enriched manure and spot application of enriched manure.Application of 125:62.5:62.5 NPK kg ha-1 recorded higher plant height (66.07 cm), leaf area (1737.4 cm2 plant'1), number of tillers plant1 (37.94), total dry matter accumulation (103.27 g plant-1), water use efficiency (46.33 kg ha-cnr1), grain yield (53.54 q ha-1) and filled grain (111.86 panicle-1) but less unfilled grains (12.83 panicle-1) recorded in application 75:37.5:37.5 NPK kg ha^{-1} which was on par with level 100:50:50 NPK kg ha-1 (12.26 panicle-1). Significantly higher 1000 grain weight (23.37 g) recorded in application of 100:50:50 NPK kg'ha-1 which was on par with level 75:37.5:37.5 NPK kg ha-1 (22.78 g).

Among the methods of application spot application of enriched manure recorded significantly higher plant height (66.12 cm), total dry matter accumulation (97.10 g plant^{-1}), number of tillers (37.06 panicle^{-1}), 1000 grain weight (24.24 g) and grain yield (54.03 q ha^{-1}) due to timely available of nutrients. Interaction of spot application of enriched manure with 125:62.5:62.5 NPK kg ha^{-1} has registered higher grain yield (60.58 q ha^{-1}) and filled grains panicle^{-1} (128.75 panicle^{-1}). Significantly higher 1000 grain weight (25.80 g) in spot application of enriched manure with 100:50:50 NPK kg ha^{-1}. Higher gross returns (Rs. 90,870 ha^{-1}), net returns (Rs. 65, 319.74 ha^{-1}) and B: C ratio (1: 2.56) was observed in spot application of enriched manure with fertilizer level 125:62.5:62.5 NPK kg ha^{-1}.

June, 2014

(C J Sridhara)
Major Advisor

2. Comparative Evaluation of Pre and Post Emergent Herbicides for Control of Weeds in Maize (Zea *Mays* L.)

UMESHA C

ABSTRACT

An experiment entitled "Comparative evaluation of pre and post emergent herbicides for control of weeds in maize (Zea Mays L) was conducted during *kharif*, 2013 at College of Agriculture, UAHS, shimoga. Ten treatments [Tembotrione 42 SC at 100 g a. i. ha- Tembotrione 42 SC at 110 g a. 1. ha-1, Atrazine 50 WP at 10OO g a. i. ha-1, 2, 4-D Na salt 80% WP at 1000 a. i. ha-1, Tembotrione 42 SC at 100 g a. i. ha-1 + atrazine 50 WP at 1000 g a. i. ha^{-1}, Atrazine 50 WP at 1000 g + 2, 4-D Na salt 80% WP at 1000 g a. i. ha-1, Atrazine 50 WP at 1000 g a. i. har^fb Tembotrione 42 SC at 100 g a. i. ha-1, Atrazine 50 WP at 1000 g a. i. ha^{-1} + inter-cultivation, Weedy check and Weed free check] were replicated thrice in RCBD.

Major weeds observed were *Cyperus rotundus*, *Cyperu sesculantus* (sedges), *Cynodon dactylon*, *Elusina indica* (grasses) and *Commelina benghalensis*, Cleome if is cosa, *Celosia argentia* and *Acanthospermun hispidumaxnong* broad leaved weeds. Significantly higher grain yield, water use efficiency and nitrogen use efficiency, phosphorus use efficiency and potassium use efficiency were recorded in application of Tembotrione 42 SC at 100 g a.i. ha-1 + Atrazine 50 WP at 1000 g a.i. ha^{-1} (58.81 q ha^{-1} 9.16 and 39.20, 178.28, 176.44, respectively), Atrazine 50 WP at 1000 g a.i. ha^{-1} (58.47 q ha and 38.98, 177.17, 175.42, respectively), Atrazine 50 WP at 1000 g + 2, 4-D Na salt 80 % WP at 1000 g a.i. ha^{-1} (58.03 q ha-1, 9.04and38.69, 175.80, 174.12, respectively) and Atrazine 50 WP at 1000 g a.i. ha^fb Tembotrione 42 SC at 100 g a.i. ha^{-1} (57.67 q ha^{-1}, 8.98 and38.45, 174.77, 173.04, respectively) and without any residual effect on succeeding Green grain Crop.

June, 2014

(S Sridhar)
Major Advisor

Plant Pathology

University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Agri.) theses abstracts produced in the Department of Plant Pathology

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1. Studies on Sheath Blight of Rice *(Oryza Sativa* L.) Caused by *Rhizoctonia Solani* Kuhn.

KISHOR UMESH KAMATAGI

ABSTRACT

Rice is the staple diet of over 60 per cent of the world's population. Sheath blight of rice once a minor disease now has been considered as one of the major constraint in all most all rice growing areas. Survey conducted during 2013-14 revealed that maximum sheath blight incidence was recorded at Bhadravati (28.74%) and least incidence was recorded at Soraba (7.11%). *In vitro* studies revealed that amongst different solid and liquid media used, the fungus grew rapidly on PDA and potato dextrose broth (PDB) respectively. The maximum dry mycelial weight was observed on PDB on 13th DAI. Temperature of 25° C was best for the growth of *R. solani,* least growth was observed at temperature 15 C and 30° C was found favourable for production of sclerotia. *In vivo* screening of 49 rice germplasm against *R. solani,* of which three germplasm were found resistant with grade 1. Among 24 paddy cultivars screened against *R. solani,* none of the cultivars were immune or resistant.

In vitro evaluation of bio-agents and botanicals against *R. solani* revealed that *Trichoderma viride* (IIHR, strain) (70.83%) and *Pseudomonas fluorescens* (IIHR strain) (56.00 %) and *Gliricidia maculata* (27.04%) respectively found most effective. *In vitro* evaluation of eight fungicides against *R. solani* revealed that, hundred per cent inhibition was seen in carbendazim, propiconazole, hexaconazole, thiophanate methyl, carbendazim 12% + mancozeb 63%. *In vivo* integrated disease management revealed that among different treatments used, least disease severity (18.52 PDI) was recorded in hexaconazole treated plot with highest yield of 4375.00 kg ha"^{1} and maximum disease severity (40.74 PDI) was observed in vermicompost treated plot yield of 3765 kg ha"^{1} compared to untreated control plot yield of 3666.67 kg ha"^{1}.

June, 2014

(Ganesha Naik, R.)
Major Advisor

2. Studies on Alternaria Leaf Blight of Sunflower Caused by *Alternaria Helianthi* (Hansf.) Tubaki and Nishihara

MAHADEVASWAMY, G.

ABSTRACT

Sunflower is one of the important oilseed crop grown in India. This crop is affected by several diseases among mem Alternaria leaf blight is one of the most important disease caused by *A. helianthi*. During the survey highest disease severity was recorded in Chithradurga (43.75%) followed by Davanagere (39.25%). The different isolates were categorized into four group's *viz.*, *Ah-1 Ah-2*, *Ah-3* and *Ah-4* based on their morphological characters. Among them Hiriyur isolate produced maximum radial growth followed by Challakere isolate, with grayish black to light brown mycelial colony on Potato Dextrose Agar medium. During cultural studies Carrot medium supported maximum mycelial growth of all the isolates both on solid as well as on liquid medium. During nutritional studies maltose as a carbon source and Asperagine as a nitrogen source supported the maximum dry mycelial weight.

During physiological studies the temperature of 30° C and pH 5 has favoured good growth and development of all the isolates. The epiderniological studies revealed that among the weather parameters, maximum temperature and maximum relative humidity (morning) showed positive correlation with disease development. *In vitro* evaluation of fungicides revealed mat, Hexaconazole and Propiconazole at 600 ppm showed 100 per cent inhibition of mycelial growth whereas among the bio pesticides NSKE at 10 per cent, and *T. hanianum* were induced maximum reduction in colony growth. Fungicides and bio-pesticides tested under field condition revealed that Hexaconazole at 0.1 percent and a combi product Carbendazim+Mancozeb at 0.1 per cent were found to be the most effective chemical in managing the disease as well as in increasing the yield.

June 2014

(B. Gangadhar Naik)
Major Advisor

3. Studies on Stern Rot of Tuberose *(Polianthes Tuberosa* L.) Caused by *Sclerotium Rolfsii* Sacc.

DIVYA BHARATHI, A.R.

ABSTRACT

Tuberose (Polianthes tuberosa L.) is a leading commercial flower crop, because of its multipurpose uses. Stem rot disease caused by Sclerotium rolfsii Sacc. has become threat for successful flower production, under severe condition the losses go up to 50-60 per cent. In present investigation attempts were made to study the symptoms of the disease, identification of the pathogen, survey on disease incidence, cultural, physiological and nutritional studies of pathogen, in vitro evaluation of different fungicides and integrated disease management practices against stem rot.The pathogen isolated from stem of diseased tuberose plant and was identified as Sclerotium rolfsii based on its cottony white radiating mycelium and formation of brown colour sclerotial bodies in petri dish. The pathogenicity of the fungus was confirmed on healthy plant under in vivo. Maximum per cent disease incidence (35.2) was recorded in Harnalli village of Shimoga.

Among solid media tested maximum growth was observed on Oat meal agar and Potato dextrose agar (90 mm.), among liquid media tested dry mycelial weight was maximum on Corn meal broth (224.33 mg.), the fungus attained maximum growth on 10th day after inoculation in Potato dextrose broth (213.13 mg). Continuous light favoured maximum dry mycelial weight, temperature range of 25°C to 30°C was found to be optimum; maximum growth of the fungus was obtained at pH 5.0. Sucrose recorded maximum dry mycelial "weight among different carbon sources and potassium nitrate among different nitrogen sources tested. Among systemic fungicides Hexaconazole found effective at all the concentrations, Mancozeb was found effective among contact fungicides. Under field condition least disease incidence (10.66%) was recorded on plants treated with treatment combinations of Trichoderma viride, Press mud and Carbendazim with maximum plant height (127.18 cm), more number of flowers per plant (50), weight often flowers (17.20 g.) and maximum yield (7858.8 kg/ha.).

June 2014

(H. Narayana Swamy)
Major Advisor

4. Investigations on Root-Knot Nematode *(Meloidogyne Graminicola* Golden and Birchfield, 1965) of Rice *(Oryza Sativa* L.)

NARASIMHAMURTH

ABSTRACT

Of late, *Meliodogyne graminicola* is a serious menace in all types of rice situations and causes yield loss of 16-32 per cent. Investigations were carried out during 2013-14 on survey for the incidence of *M. graminicola* in rice growing areas of Shimoga and Davanagere districts, invasion studies, screening of 20 germplasm against *M. graminicola* and integrated management of *M. graminicola* using bioagents *viz., Trichoderma viride, Paecilomyces lilacinus, Pseudomonas fluorescens* and *Pochonia chlamydosporia,* organic amendements *viz.,* neem cake and poultry manure, combination of nematicide with bio-agent *viz.,* carbofuran+ *Trichoderma viride,* carbofuran+ *Pseudomonas fluorescens* and nematicide carbofuran alone under field conditions.

The survey revealed maximum nematode population both in soil and root samples in Shimoga, Bhadravathi, Sagara, Davanagere and Honnali taluks with root-knot index ranging between 3 and 4. In invasion studies, 2nd stage juveniles were attracted to roots and moved towards the root tip within 24 hrs after inoculation and within 48 hrs, entered into the root system and started feeding. Among twenty germplasm tested against *M. graminicola,* the entry KMP-179 recorded least root-knot index of 1.6 indicating that the disease intensity was very mild to mild thus, it was resistant to *M. graminicola.* Among various treatments tested, the maximum plant height, better root length, root volume, root weight and maximum yields were observed in *P. fluorescens* + carbofuran treated plots followed by *T. viride* + carbofuran and carbofuran alone. The maximum reduction in nematode population of soil as well as roots, number of galls per root system and least number of egg masses per root system were noticed in *P. fluorescens* + carbofuran compared to other treatments.

June 2014

(H. Ravindra)
Major Advisor

Soil Science and Agricultural Chemistry

University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Agri.) theses abstracts produced in the

Department of Soil Science and Agricultural Chemistry

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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 T4 (0.2g of SiO2 kg^{-1} of soil as sodium iilicate) recorded highest grain and straw yield followed by T_7 (0.2g of SiO2 kg^{-1} 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 40kg/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 407kg/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 of 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 (ZnSO4, 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^{-1} 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 *(Arachies 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 mg kg^{-1}) and boron (0.43 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 kg $ha^{-1}$and zinc sulphate at three levels (5,10 and 20 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 kg ha^{-1}significantly increased DTPA-Zn status from 0.57 to 0.71 mg kg^{-1}without any effect on available boron status in soil. Whereas, application of borax significantly increased available boron status in soil (0.41mg 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 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 BATABYAL

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^{-1} (Kundapura Taluk) to 18.58 mg kg^{-1} (Sagar Taluk) and that of profile soils ranged from 7.23 mg kg^{-1} (Kundapura Taluk) to 15.50 mg kg^{-1} (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^{-1} (Sagar Taluk) to 79.93 mg kg^{-1} (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 fpommended package of practices.From the experimental results, it was observed that the cured leaf yield varied significantly, the highest yield (1086 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 if of FCV tobacco in terms of top grade equivalent (TGE). The highest value of TGE (625 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 K2O ha^{-1}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 K2O ha^{-1}in two splits (12.5 kg K2O $^{-1}$as basal + 12.5 kg K2O ha^{-1}at flowering stage) significantly increased pod yield (20.47 q ha-1), haulm yield of 32.85 q ha-1, kernel yield (14.87 q ha^{-1}),crude protein (18.74%) and oil yield (697.99 kg ha^{-1}) compared to all other treatments except the treatment (which received 31.25 kg K_2O ha^{-1}in splits. The uptake of nutrients were recorded significantly higher in the treatment which received the potassium level (25 kg K_2O ha^{-1}) in two splits compared to all treatments except the treatment which received the potassium level of 31.25 kg ha^{-1}in splits.

An increase in the level of potassium application (12.5 to 31.25 kg ha^{-1}) 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 randamised 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 panic m^{-2}, grain and straw yield of rice crop in 50% nitrogen through urea + 25% nitrogenthrough 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. Theconcentration 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 werepositively and significantly correlated with grain yield of rice. In the present investigationnetreturn was maximum by adopting integrated nutrient management practices asto 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^{-1}) 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 $ha^{-1}$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^{-1}) However in the high soil fertility strip we could see a plateau in the response curve beyond 225 kg $ha^{-1}$of applied N. The N applied at levels greater than 200 kg ha^{-1} 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 $ha^{-1}$is the optimum N take level to produce a maximum grain yield of 6835 kg ha^{-1}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^{-1}in the low fertility situations, 240 kg $ha^{-1}$of N fertilizer in medium fertility situations and a dose of 218 kg $ha^{-1}$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 mg kg^{-1}) and lowest in current fallow land (11.94 mg kg^{-1}), while mean exchangeable potassium was highest in agri system - Rice (137.51 mg kg^{-1}) and lowest in current fallow land (64.43 mg kg^{-1}) and the mean non exchangeable potassium was highest in horti system -Arecanut (303.45 mg kg^{-1}) and lowest in current fallow land (168.10 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+) kgunder 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 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 t ha^{-1}) and stover 8.90 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 t ha^{-1}) and stover (3.73 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 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 fanning methods. But, it showed an increasing trend up to 54^{th} days in package of practices and 48^{th} 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, Thirtahalli, 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^{-1}) 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^{-1} in 0-20 cm and 0.65 (Sagar and Kundapur) to 2.04 (Sringeri) mg kg $^{-1}$ in 20-40 cm depth respectively. In profile soils, it ranged from 0.49 (Sagar) to 1.55 (Sringeri) mg kg-^{1} 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^{-1}). 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, seebinakere, 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 Mg m^{-3}) and PD (2.65 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 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 kg ha^{-1}under different land use systems, available phosphorus was higher (22.86 kg ha) in areca systems and lowest (11.83 kg ha^{-1}) in sapota system and available potassium was highest (775 kg ha) in forest land use system. All primary nutrients were decreased with depth. The exchangeable calcium and magnesium were higher (6.10 and 4.50 cmol (P^{+}) kg) 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 mg k g) in areca system, highest manganese was noticed in mango-cashew systems, where us copper was highest (3.25 mg kg) 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 phosphorous, 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, Seebinakere, Thirtahalli.

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, $ZnSO_4$ 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^{-1} and 10 kg ha^{-1}. 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-1 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^{-1} and 15 kg ha^{-1} gave the highest net returns as compared to other treatments

June, 2009

(H. C Prakasha)
Major Advisor

15. Effect of Zinc Enriched Compost and Defeerent 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^{-1}, followed by 150% N+ Zinc Enriched Compost @ 15 kg ha^{-1}. 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^{-1}, followed by 150% N + Zinc Enriched Compost @ 15 kg ha^{-1}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 Systmes

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 $kg^{-1}$and decreased down with the depth. Total mineral and organic P contents of soils ranged from 175.46 to 362.1 1 mg $kg^{-1}$and 142.20 to 386.36 mg kg^{-1}, 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 hav^{-1} and that of profile soils ranged from 13.29 (current fallow land - Control) to 69.24 (horti system-Arecanut) kg $ha^{-1}$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^{-1} (current fallow land -Control) to 77.60 mg kg^{-1} (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 t ha^{-1}) and stover (11.00 t ha^{-1}) yield and total uptake of N, P and K by maize(249.30, 56.50 and 268.00 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 kg ha^{-1}) including absolute control compared to all other treatments (238.00-243.60 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 q ha^{-1}) and stover yield (64.15 q ha^{-1}) followed by POP+ lime sludge @45 per cent calcium saturation (66.73 and 53.33 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 ZnSO4 enriched composts. Experiment was laid out in RCBD and replicated thrice. Application of 125kg N+Zn enriched compost @15 kg ha^{-1} 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^{-1}. Higher growth and yield attributes were recorded in 125kg N+Zn enriched compost @15 kg ha^{-1}, followed by 125 kg N+Zn enriched compost @ 10kg ha^{-1}. 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^{-1} as compared to control. Maximum concentration of Fe was recorded in treatment 125 kg N+ Fe enriched compost @15 kg ha-1 and maximum uptake of Fe was recorded in treatment 125 kg N+ Zn+Fe enriched compost @ 15kg each ha^{-1}. 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^{-1} 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^{-1}, 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^{-1}) recorded a maximum yield of stover (7.52 t ha^{-1}) and grain(6.96 t ha^{-1}) and total uptake of zinc(551.92 g ha^{-1}) 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^{-1}recorded a maximum of 1.1.6 mg kg^{-1}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^{-1}, poultry manure @ 3 t ha^{-1}, vermicompost @ 3 t $ha^{-1}$with gypsum @ 100 kg ha^{-1}.

The application of NPK + poultry manure @ 3 t ha^{-1}+ gypsum @ 100 kg ha^{-1}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^{-1}, NPK + FYM @ 6.25 t ha^{-1}+ gypsum @ 100 kg $ha^{-1}$and NPK + vermicompost @ 3 t ha^{-1}+ gypsum 100 kg ha^{-1}.Highest pod yield, grain yield and haulm yield is recorded in treatment receiving application of NPK + FYM @ 6.25 t ha^{-1}+ gypsum @100 kgha^{-1}.

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^{-1}+ gypsum @ 100 kg ha^{-1}compared to only NPK applied treatment whereas P, Ca, Mg, is higher with application of NPK + poultry manure @ 3 t ha^{-1}+ gypsum 100 kg ha^{-1}. Exchangeable Ca and Mg and major nutrient status in soil is significantly higher in treatment supplied with NPK + poultry manure @ 3 t ha^{-1}+ gypsum @ 100 kg ha^{-1}compared to all other treatments.

June, 2012

(H.M Chidanandappa)
Major Advisor

22. Productivity and NPK Use Efficiency in Maize (Zea Mays L.) asInfluenced 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 neemoil coated urea (NOCU) + PK fertilizers and compost enriched with neemcake+PK fertilizers compared with only compost and recommended package of practice (POP). The highest grain yield (8626 kg ha^{-1}), stover yield (11033 kg ha^{-1}) and NPK uptake was recorded by compost + NPCU + PK fertilizers. The grain yield was on par with recommended POP (7924 kg ha^{-1}) although 20kg ha^{-1} lees 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 + neemcake + 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^{-1} 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^{-1} as single super phosphate significantly increased the growth parameters and yield attributes. Highest grain (10.20 q ha^{-1}) and stover yield (20.55 q ha^{-1}) were recorded in the treatment that received 40 kg sulphur ha^{-1} 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-^{1} as single super phosphate. Whereas calcium concentration was highest in the treatment that received 40 kg sulphur ha^{-1} as gypsum. Uptake of nitrogen (227.50kg ha^{-1}), phosphorus (34.13kg ha-1), potassium (118.11kg ha^{-1}), calcium (60.59 kg ha^{-1}), magnesium (34.74 kg ha^{-1}) and sulphur (19.68 kg ha^{-1}) was highest in the treatment that received 40 kg sulphur ha-1 as single super phosphate. Quality parameters like crude protein content (35.42%), crude protein yield (360.26 kg ha^{-1}), oil content (19.07%) and oil yield (194.51kg ha-1) 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^{-1} tested against control (no sulphur).

Results of the field experiment indicated that among the treatments, application of sulphur at 30 kg ha^{-1} as ammonium sulphate recorded significantly higher growth parameters. Highest grain (74.80 q ha^{-1}) and stover yield (86.91 q ha^{-1}) were recor4ded in the treatment receiving sulphur at 30 kg ha^{-1}as ammonium sulphate followed by sulphur at 3- kg ha^{-1} 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^{-1} 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^{-1} as ammonium sulphate. The primary nutrient concentration in grain and stover of maize were significantly higher in the treatment sulphur at 30 kg ha^{-1} as ammonium sulphate followed by sulphur at 30kg ha^{-1} as gypsum. The calcium and magnesium concentration in grain and stover of maize were significantly higher in the treatment sulphur at 30 kg ha^{-1} as gypsum followed by sulphur at 30 kg ha^{-1} as ammonium sulphate. The sulphur concentration in grain and stover of maize were significantly higher in the treatment, sulphur at 30 kg ha^{-1} sulphate recorded significantly highest uptake of primary nutrients in grain and stover followed by sulphur at 30 kg ha^{-1} as gypsum. The crude protein content and oil content of maize was higher in the treatment sulphur at 30kg ha^{-1} 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^{-1} as ammonium sulphate.

June, 2012

(Y. Vishwanath Shetty)
Major Advisor

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

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 phsico-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^{-1}) and C_aCO_3 equivalent was found to be low.

DTPA - extractable copper (0.382 to 4.634 mg Kg^{-1}) was found to be sufficient in these soils. DTPA- extractable zinc was in the range of 066 to 0.85 mg $Kg^{-1}$and 85 percent of the soils recorded the available zinc status below 0.60 mg kg^{-1} (deficient). In respect of available boron status, all soils recorded the values in deficient range (0.007 to 0.166 mg Kg^{-1}). Available Fe and Mn status were in the range of 1.40 to 87.51 mg Kg^{-1} and 0.124 to 28.44 mg Kg^{-1}, 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 C_aCO_3) 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^{-1}). The CEC of soils were varied from 11.21 to 16.81 cmol(p+)kg^{-1}. 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^{-1}, 30.84 to 150.09 mg kg-1, 1.24 mg kg^{-1}, 0.24 to 1.24 mg kg^{-1} 0.10 to 0.72 mg kg^{-1} 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_aCO_3.

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, $NH4^{+}$-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 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 need 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^{-1} with or without fertilizers, significantly increased soil pH, organic carbon, DTPA-Zn (0.97 mg kg^{-1}) and DTPA-Cu (0.9 mg kg^{-1}) 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_2 evolution rate throughout the incubation period was recorded in the treatment that received FYM @ 22.5 t ha^{-1} and minimum was recorded in the treatment that received only recommended dose of fertilizers (RDF).

Similarly, the treatment receiving FYM @ 22.5 t ha^{-1} + RDF was found to be significantly superior in respect of grain (30.28 q ha^{-1}) and straw yield (18.90 q ha^{-1}), content and uptake of zinc and copper by grain and straw of ragi. Hence, applicationof 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 Groudnut 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^{-1} of pod yield was obtained when FeSO4 +$ZnSO_4$ were applied to soil @ 10 kg ha^{-1} each along with FYM as compared to 1140 kg ha^{-1} 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 FeSO4+ $ZnSO_4$ were applied to soil @ 10 kg ha^{-1} each along with FYM. Similarly, seed quality parameters like seedling length and seedling vigour index also increased significantly. Seedling vigour index was higher when FeSO4 were applied to soil @ 10 kg ha^{-1} each along with FYM. There was a significant increase in available Fe and Zn content in soil particularly when $FeSO_4$+ZnSO4 were applied to soil at 10kg ha^{-1} each along with FYM. Highest Fe levels of 11.87, 13.45 and 11.33 mg kg^{-1} 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 form the present investigation that application of $FeSO_4$ and $ZnSO_4$ 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 ofRDF + compost 10 t ha-1, RDF + 50 % NK + compost 10 t ha-1, STCR based NPK + compost 10 t ha-1, STL based NPK + compost 10 t ha-1RDF 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-1 for targeted yield 40 q ha-1 recorded a highest grain yield (3238.00 kg ha-1) and straw yield (8926.00 kg ha-1). The per cent deviation for targated yield of 40 q ha-1 (19.05%).

Similarly higher uptake was recorded in STCR based NPK + compost 10 t ha-1 both in grain and straw. However, the NUE and AUE was highest in STCR based NPK and compost 10 t ha-1 for targeted yield 40 q ha-1. 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-1. However the available NPK and exchangeable Ca, Mg and available sulphur were highest in STCR based NPK + compost 10 t ha-1. 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 P2O5 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"1 with PSB seed treatment significantly increased the growth, yield and yield attributes of groundnut. Highest pod yield of groundnut (24.29 q ha-1) was noticed in with 50 kg P2O5 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"1 with PSB seed treatment.

Higher values of saloid - P, Ca - P and available P status in soil were recorded with 50 kg P2O5 ha-4 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 P2O5 ha-1 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 *kharief* 2014 on a sandy clay loam soil belongs to the soil taxonomy of Typic Haplustalf, located at Agricultural and Horticultural Research station (AHRS), Kathalgere , 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"^{1} and 53.73 q ha"^{1} 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"^{1}) as compared to control (205.6 kg ha"^{1}). 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 $100g^{-1}$ compost) than no green waste (74.15 mg $l00g^{-1}$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^{-1} with CAN respectively. An increase of 21.16 per cent in organic carbon was recorded in PMC over control. The NH^4-N levels increased up to 15 days and then after it decreased. (NO_2+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

Horticulture

Crop Improvement and Biotechnology

University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Hort.) theses abstracts produced in the

Department of Crop Improvement & Biotechnology

1. Genetic Analysis of Yield and Quality Traits in Tomato *(Solanum Lycopersicum* L.)

M.D SAMIYODDIN

ABSTRACT

A field experiment was conducted to study heterosis and combining ability for yield and quality traits, titled "Genetic analysis of yield and quality traits in tomato *(Solanum lycopersicum* L.)". The experiment was conducted at KRC College of Horticulture Arabhavi. Thirty FI hybrids were produced by crossing ten lines with three testers by following line x tester mating design.

Variances due to the parents were found significant for entire yield related components and quality attributes except plant height, number of fruit clusters and ascorbic acid. Variances due to crosses found significant for all the yield related components and quality attributes. The line x tester analysis revealed that no single line or tester is superior for all the traits under consideration. Significant *per se* performance and economic heterosis in desirable direction was recorded in several crosses. Maximum standard heterosis for total yield per plant was observed in the cross AR 21 x Arka Vikas followed by AR 56 x PKM 1 and AR 29 x PKM 1. All the characters expressed greater SCA variance than GCA variance indicating the predominance of non-additive gene action. Among the lines, Podlandt Pink and among the testers, Arka Vikas is good general combiner. AR 29 x PKM 1, AR 28 x Arka Vikas and AR 39 x Arka Alok crosses had significant SCA effects for yield per plant. AR 4 x PKM 1 and AR 21 x PKM 1 are good cross combinations for lycopene and ascorbic acid contents whereas AR 56 x PKM 1 and AR 21 x Arka Vikas are good cross combinations for total soluble solids. The present study revealed that heterosis breeding is useful for improvement of tomato crop through exploitation of non-additive gene action

August 2014

(Narayanaswamy, M)
Major Advisor

Entomology

University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Hort.) theses abstracts produced in the

Department of Entomology

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1. Studies on Insect and Mite Pests of Chilli and Their Management under Hill Zone of Karnataka

ASMA, A.

ABSTRACT

The investigations were carried out on survey of insect, mite pests and natural enemies of chilli at selected talukas of Chikmagalur district (Mudigere, Chikmagalur and Kadur), population dynamics of insect, mite pests and natural enemies and evaluation of organic and inorganic pesticides for the management of pests of chilli (var. Rudra) was conducted during summer 2013 at Sabbenahalli, Mudigere taluka of Chikmagalur district, Karnataka, India.Eight insect pests belonging to five orders and one non insect pest were found to be infesting chilli. The pests included six sucking pests of which four species were Hemiptera: *Aphis gossypii* Glover; *Nezara virudula* Linneus; *Bemisia tabaci* Gennadius; *Empoasca* sp.; one species of Thysanoptera, *Scirtothrips dorsalis* Hood, one species of Acari, *Polyphagotarsonemm latus* Banks, one spcies of Diptera, *Asphondylia* sp. and two species of lepidopteran, *Helicoverpa armigera* Hubner and *Spodoptera litura* Fabricius. Further, the natural enemies recorded were *Cheilomenes sexmaculata* Fabricius, *Coccinella septumpunctata Linnaeus, Coccinella transversalis Fabricius, Brumoides suturalis* Fabricius, Chrysoperla sp. and spiders.

The peak incidence of *S. dorsalis* and *P. latus* was noticed during the last week of April and last week of May, respectively in population dynamics studies. Whereas, the peak LCI due to thrips and mites were noticed during the second week of April and third week of May, respectively. The peak incidence of *H. armigera* and *S. litura* were noticed during the second week of April and third week of May, respectively. Further, the peak incidences of aphids, plant bug, whitefly and leaf hopper were recorded in last week of February, May, April and May, respectively. During survey, the maximum population of sucking insect and mite pests, fruit borers and natural enemies were recorded at Kadur during the month of May. Management of insect and mite pests of chilli by organic and inorganic pesticides revealed that, among the different insecticides, two sprays of Imidachloprid 36 SL @ 0.3ml/1 at 2 & 5 WAT, two sprays of Flubendiamide 480 SC @ 0.2 ml/ 1 at 7 & 11 WAT, one spray of Fenazaquin 10 EC @ 1ml/1 of at 9 WAT recorded lowest population of insect and mite pests with highest net return and cost benefit (C: B) ratio.

July, 2014

(L. Hanumantharaya)
Major Advisor

2. Insect and Mite Pests of Capsicum and Their Management through Organic and Inorganic Approaches under Hill Zone of Karnataka

KUNDATY DEEPIKA

ABSTRACT

The investigations were carried out on population dynamics of insect, mite pests and natural enemies of capsicum, the management of insect and mite pests of capsicum through organic manures and inorganic fertilizers as well as with the superimposition of safer molecules during summer 2013 at Sabbenahalli, Mudigere, Chikkamagaluru, Karnataka, India.

Sixteen insect and mite pests along with natural enemies belonging to 7 orders and 10 families occurred on capsicum. They included thrips *Scirtothrips dorsails* (Hood), aphids *Aphis gosypii* (Glover), mite *Polyphagotarsonemus latus* (Banks), fruit borer *Helicoverpa armigera* (Hubner), defoliator *Spodoptera litura* (Fabricius), gall midge *Asphondylia capsici* (Barnes), plant bugs *Nezara virudula* (Linnaeaus), white flies *Bemesia tabaci* (Gennadius), leaf hoppers *Empoasca sp*., coccinellids included *Cheilomenus sexmaculata* (Fabricius), *Coccinella septumpunctata* (Linnaeaus), *Coccinella transversalis* (Fabricius), *Brumoides suturalis* (Fabricius), *Hormonia octomaculata* (Fabricius), Chrysopid, *Chrysoperl*a sp. and unidentified spiders.In population dynamics, the peak incidence of thrips, *S. dor sails* and LCI due to thrips, mites. *P. latus* and LCI due to mites was noticed during the third week of April and third week of May, respectively. The peak incidence of *H. armigera* and S. litura were noticed during the first week of June. Further, the peak incidence of aphids and plant bug, whitefly and leaf hopper were recorded during third week of April and June, last week of April and June, respectively.

Management of insect and mite pests of capsicum by organic manures revealed that NPK100% + RPP proved to be better management tactic. Whereas, among the organics amended treatments, 50% N + 100% PK + 2500 kg/ha VC and 50% N + 100% PK + 500 kg/ha NC were found to be effective as it registered significantly lower population of insect and mite pests and leaf curl index with highest net returns and C: B ratio.Among the superimposed treatments with one spray of each nimbecidine 1500 ppm @ 3 ml/1 at 3 WAT, spinosad 45 SC @ 0.25 ml/1 at 8 WAT, NSKE @ 5% at 1 1 WAT and abamectin 1.9 EC @ 0.5 ml/1 on 13 WAT, 50% N + 100% PK + 2500 kg/ha VC and 50% N + 100% PK + 500 kg/ha NC were found to be better in management of insect and mite pest and on par with NPK 1 00% + RPP with highest net returns and C: B ratio.

December, 2014

(L. Hanumantharaya)
Major Advisor

Floriculture and Landscape Architecture

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Hort.) theses abstracts produced in the Department of Floriculture & Landscaping

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1. Evaluation of Marigold *(Tagetes erecta* L.) Genotypes Under Hill Zone of Karnataka

SHIVAKUMAR

ABSTRACT

A study on evaluation of fifteen African marigold genotypes *viz*., Pusa Narangi Gainda, Pusa Basanti Gainda, Double Orange, Bhuvana, Kalyan-2, Best of All, Dwarf Yellow, Pusa Narangi Orange, Coimbatore Local Yellow, Coimbatore Local Light Yellow, Darmapuri Local, Nilakkotai Local Yellow, Bangalore Local Dwarf Double, Nilakkotai Local Orange and Coimbatore Local Orange for their growth, yield and xanthophyll content was carriedout in Randomized Block Design in the experimental block of Department of Floriculture and Landscape Architecture. College of Horticulture, Mudigere, during the period from September 2013 to February 2014. The genotype Nilakkotai Local Orange recorded maximum plant height (104.20 cm), number of primary and secondary branches per plant (17.73 and 29.27 respectively), number of leaves per plant (392.47) and stem diameter (17.43 mm) whereas minimum plant height (66.80 cm), number of leaves per plant (135.53), stem diameter (9.99 mm) was recorded in the genotype Pusa Narangi Gainda. In case of flower yield and quality attributes such as days taken flower bud initiation (16.53) and days to 50 per cent flowering (22.67) was found early in genotype Dwarf Yellow. The genotype Nilakkotai Local Orange recorded the maximum flowering duration (86.53), number of flower per plant (59.4), flower yield per plant (529.33 g), flower yield (19.60 t/ha), petal meal yield (122 g/kg), flower diameter (8.47), number of petals per flowers (264.07), xanthophyll content (20.19 mg/g petal meal) and shelf life (6.00 days), whereas minimum flowering duration (38.56), number of flower per plant (20.60), flower yield per plant (120.93 g) and petal meal yield (72 g/kg) was recorded in the genotype Dwarf Yellow. Among these marigold genotypes studied, better performance in terms of vegetative growth, flower yield and quality parameters, genotypes Nilakkotai Local Orange, Coimbatore Local orange, Coimbatore Local Yellow were found promising for loose flower production under hill zone condition of Karnataka.

July, 2014

(V. Srinivasa)
Major Advisor

2. Standardization of Drying Techniques in Gerbera for Value Addition

SHIVAYYA MATHAPATI

ABSTRACT

The investigations were carried out on 'Standardization of drying techniques in gerbera for value addition' at Department of Floriculture and Landscape Architecture, College of Horticulture Mudigere, during the year 2013-2014 for best quality of dry gerbera flowers.

Data on drying of gerbera flowers in laboratory condition had significant difference for dry weight, moisture loss, dry diameter, shrinkage of flower and duration of drying. Among the varieties, variety Impireal recorded least in dry weight (1.64 g/flower), shrinkage of flower (9.06 %) and time taken for drying (9.67 days). It also scored maximum values in colour retention (3.35) texture (3.46) shape (3.42) and overall acceptability (3.54). Among the desiccants studied silica gel recorded the least dry weight (1.85 g/flower) and it took minimum time (9.62 days) for drying followed by borax (10.76 days) and sand (11.44 days). Among the positions, position face up found to be the best position for drying of flowers than face down position. Glycerol pre-treated flowers took minimum time (5.21 days) for drying, whereas control treatment took maximum time for drying (8.36 days).

Influence of hot air oven found significant difference in quality parameters. Among the different temperatures and durations studied the flowers dried at 50° C for 55 hours scored least dry weight (1.25 g/flower) and maximum moisture loss (87.20 %). Whereas, flowers dried at 45° C for 45 hours recorded maximum values for colour retention (3.93), texture (4.04), shape (4.01) and overall acceptability (4.12). In an effort made to standardize drying level and time in microwave oven for gerbera variety Impireal, significant difference was noticed for dry weight, moisture loss, dry flower diameter and shrinkage of flowers. Flowers dried at higher level of micro power density recorded least dry weight (1.21 g/flower) and maximum moisture loss (87.70 %). Whereas, the flowers dried at medium level of micro power density at three minutes recorded maximum values for colour retention (4.10), texture (3.70), shape (3.60) and overall acceptability (4.20).

July, 2014

(Hemla Naik)
Major Advisor

3. Studies on Value Addition of Tuberose Flowers by Tinting for Value Addition

SURESH CHOUGALA

ABSTRACT

The present investigation entitled 'studies on value addition of tuberose flowers by tinting' was conducted with a view to adding value in the spikes of tuberose by artificially colouring them with different synthetic food dyes while maintaining its other beneficial virtues, in the research laboratory, Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, University of Agricultural and Horticultural Sciences, Shimoga, during the year 2013-14.

The complete research work was carried out with single experiment with completely randomized design with factorial concept. The tuberose spikes were treated with different food dyes used are tomato red, rose pink, lemon yellow, kesar yellow, apple green and blue with two concentrations (6 and 8 %) and three durations (4, 6 and 8 hrs). The darkest shades of colours were obtained at 8 per cent concentration with 8 hrs durations of food dyes treatments for tuberose spikes. The maximum amount of colour solution absorbed for apple green food dye (2.57 ml/spike). Maximum colour solution absorbed for 8 hour duration (3.23 ml/spike), whereas minimum colour solution absorbed for 4 hour duration (1.20 ml/spike). The maximum vase life was found in control (7.00 days) and minimum vase life recorded for blue (5.94 days). Water uptake of tinted spikes was showed optimum absorption for different food dyes but minimum amount of water absorption found in blue (2.60 ml/spike). Total numbers of florets were maximum dropped in lemon yellow (12.02) and minimum number of florets dropped in blue food dye (4.94). The maximum florets drop was found for 8 hour duration (11.69), whereas minimum found in control (6.00). Mean number of maximum florets were opened in lemon yellow food dye (4.08) and minimum number of florets opened in blue food dye (3.47). The mean maximum fragrance score was found in control (1.45), where as minimum found in blue food dye (1.01). The highest B:C ratio was obtained for lemon yellow food dye (1.91) with concentration of 6 per cent.

July, 2014

(B. Hemla Naik)
Major Advisor

4. Performance of Gerbera *(Gerbera jamesonii* Hook.) Genotypes Under Protected Cultivation

AMREEN TAJ

ABSTRACT

Gerbera is one of the important commercial cut flower crops. It is one among the top ten cut flower of the world flower trade. There is always demand for novel types with high yielding genotypes. Hence, the present study was conducted to identify the suitable gerbera enotypes under. Naturally ventilated polyhouse in hill zone, with respect to yield and uality cut flowers and also to find out the best chemical preservative for enhancing the vase life of gerbera cut flowers in the Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere.

Among the ten genotypes studied there were wide and highly significant variations observed for various growth, floral, cut flower yield and quality parameters. The genotype Naike (38.01) produced maximum number of quality cut flowers and was statistically on par with Kyllian (36.94) and significantly superior over other genotypes. The genotype Amlet produced the longest stalk length, bigger sized flowers were produced by Kyllian and Vilassar and the genotype Elite Produced maximum number of ray florets compare to other genotypes. The vegetative parameters like number of leaves per plant, suckers production and total leaf chlorophyll content was maximum in the genotype Naike, where as plant spread, leaf area and leaf area index were maximum in the genotype Amelie.

The genotype 'Naike' realized maximum net return of 2,39,894 in 560 m2 area with a B:C ratio of 2.35 followed by Kyllian (Rs. 2,30,294; 2.25, respectively) and Amlet (Rs.2,20,754; 2.16, respectively) compared to other genotypes studied.

The vase life study was carried out with the genotype 'Naike' which had less lasting ability (5.55 days) in tap water. Among the chemical preservatives (viz., citric acid, cobalt chloride and 8-HQS) tried, citric acid @ 200ppm recorded maximum vase life of gerbera (9.16 days) followed by citric acid @ 150 ppm (8.45 days) and cobalt chloride @ 200 ppm (8.31 days).

July, 2014

(B. Hemla Naik)
Major Advisor

5. Standardization of Drying Techniques in Carnation for Value Addition

ANUROOPA, T.R.

ABSTRACT

Experiments were carried out during the year 2011-12 at College of Horticulture, Mudigere on drying of cut Carnation flowers for obtaining best quality dry flowers. Quality parameters were recorded according to sensory evaluation using five point hedonic scale. Data on shade drying of three varieties (Soto, White Dona, Dona) of Carnation flowers embedded in three desiccants (sand, silica gel, sand + silica gel) in two positions (face up and face down) revealed that embedding the Carnation flowers of var. Soto in silica gel in face up position was best with respect to colour (3.67), shape (3.78) and over all acceptability (3.67), it took less number of days (5.50) for drying. Experiment on glycerol pre-treatment showed improvement in suppleness of dried Carnation flowers of var. Soto.

The flowers treated with 1:5 glycerol to water for 12 hours maintained best in maintaining colour (4.11), texture (4.11), shape (4.11) and over all acceptability (4.00). In the hot air oven, flowers dried at 300 C for 89.33 hours were found superior in maintaining colour (3.38), texture (3.13), shape (3.13) and over all acceptability (3.25) of Carnation var. Soto. While in micro wave oven, drying at medium low level for 2.0 minutes and then at low level for 4.5 minutes produced the best quality in dried Carnation flowers of var. Soto. Minimum dry weight (1.17 g/flower) with maximum moisture loss (78.87 %) was noticed in the Carnation flowers of var. Soto when exposed to sun drying + Black cotton cloth. Shade + Sun drying can produce best quality dried flowers of Carnation cut flower of var. Soto with respect to colour (3.63), texture (3.25), shape (2.87) and over all acceptability (3.00).

July, 2014

(Srinivasa, V)
Major Advisor

6. Integrated Nutrient Management Studies in Carnation *(Dianthus caryophyllus* L.) Cv. Soto under Protected Condition

BASAVARAJ D. DALAWAI

ABSTRACT

Carnation (*Dianthus caryophyllus* L.) is one of the most popular florist's flowers belonging to the family Caryophyllaceae. They are immediately recognizable flowers and possess a charm and allure that continues to captivate people around the globe. In fact, in many parts of the world, the popularity of Carnations surpasses that of any other flower including Roses. The powerful sentiments these flowers can express are a perfect complement to their classic beauty and long- lasting freshness.

The study was conducted with 11 treatment combinations including RDF as check to find out the best integrated nutrient approach with Azospirillum (60 g/m2), PSB (60 g/m2), FYM (2 kg/ m2) and, vermicompost (500 g/m2) along with 75 per cent RDF for higher growth, higher quality cut flower yield in Carnation cv. Soto at the Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere during 2011-12.

The results on growth parameters viz., plant height, number of branches, number of leaves, plant spread, leaf length, leaf width, leaf area, leaf area index and intermodal length, total dry matter production and chlorophyll content were found maximum and statistically significant values in the treatment Ti i compared to the check. Similarly the flowering and floral traits, *viz*., flower bud development and opening, days for 50 % flowering, flower stalk length (cm) and girth, flower length, flower weight along with stalk, flower bud and diameter as well as vase life (days) were also found maximum and significant difference by the same combined application of Azospirillum (60 g/m2), PSB (60 g/m2), FYM (2 kg/m^2), vermicompost (500 g/m^2) along with 75 per cent RDF compared to other treatments and check. Besides the above the same treatment also recorded maximum number of cut flowers production per plant and per square meter, lesser mortality to insect pests and diseases and ultimately it has resulted in maximum net returns (Rs. 3,75,223.00) with a BCR of 2.9.

July, 2014

(B. Hemla Naik)
Major Advisor

7. Integrated Nutrient Management Studies in China Aster *[Callistephus chinensis* (L.) Nees]

MALLIKARJUNA, G.T.

ABSTRACT

A field experiment was conducted to know the effect of "Integrated Nutrient Management Studies in China aster [*Callistephus chinensis* (L.) Nees.]" in the Department of Floriculture and Landscape Architecture, at College of Horticulture Mudigere during rabi season of 2011-2012.The experiment was laid out in randomized complete block design with 3 replications and 11 treatment combinations viz., Tl: 100% RDF, T2:Azospirillum +75% RD'N' +100% RD'P' and K, T3: PSB+75% RD'P'+100% RD'N & K, T4: Azospirillum+ FYM+ 75% NPK, T5:Azospirilium +VC + 75% NPK, T6: PSB+ FYM + 75% NPK, T7: PSB+ VC +75% NPK, T8:Azospirillum+ PSB+ 75% N&P + 100% RD-K', T9:Azospirilium+ PSB+FYM +75% NPK, T10: Azospirillum+ PSB +VC +75%NPK, T11:Azospirillum+ PSB+ FYM + VC+ 75% NPK. The treatments comprising of inorganic fertilizers (NPK), organic manures (FYM & VC) and blofertilizers (Azospirillum & PSB) in cv.Kamini. The treatment receiving Azospirillum + PSB + FYM + VC + 75% recommended NPK recorded the highest plant height (54.67 cm), number of leaves (103.3), leaf area (15.83 dm2], total dry weight of plant (43.26 g) and yield attributes such as flower yield (11.73 t/ha) and seed yield (4.61 q/ha). Significantly higher available nutrients in soil (N-227.00, P2O5-47.33 and K2O-177.67 kg/ha) and maximum NPK per cent content by plant parts were recorded in treatment receiving Azospirillum +PSB +FYM +VC +75% recommended NPK. The same treatment also recorded significantly higher quality pararneters such as stalklength (25.08 cm), flower diameter (4.87 cm) and vase life of cut flowers (7.04 days). The economic analysis clearly indicated that net returns and benefit cost ratio was found highest in the 11tl1C treatment (T11) combination (Rs. 1, 22,264/ha and 2.74 respectively.

July, 2014

(Srinivasa, V)
Major Advisor

8. Performance of Carnation *(Dianthus caryophyllus* L.) Genotypes under Protected Cultivation

TARANNUM

ABSTRACT

The Divine flower Carnation in the modern times has become one of the most important and highly remunerative flower crops grown under polyhouse, occupies an esteem position among top ten flower crops in the International trade mainly for its cut flowers. It is also used for bedding, pots, rock gardens, window boxes and edging. There is always demand for novel types with high yielding genotypes. Hence, the present study was conducted to identify the suitable Carnation genotypes under naturally ventilated polyhouse in hill zone during 2011-12, with respect to yield and quality cut flowers and also to find out the best chemical preservative for enhancing the vase life in the Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere.

Among the eight genotypes studied there were wide and highly significant variations observed in performance with respect to growth, floral, cut flower yield and quality parameters. The cv. Soto produced maximum number of quality cut flowers and was found to be significantly superior over others. Dona and White Dona were next superior types. Soto produced the longest stalk length, bigger sized flowers with maximum number of petals whereas; stalk girth was more m White Dona followed by Soto and Dona. The genotype Soto, Golem and White Dona were early in flowering. Most of the morphological parameters *viz*., plant height, plant spread, number of branches, internodes and leaves; leaf length and width, leaf area, dry matter production, chlorophyll content etc., were found superior in cv. Soto followed by White Dona, Dona and Harish.

The genotype 'Soto' realized maximum net return and B:C ratio (Rs. 3,50,483; 2.50) in 560m^2 area followed by Dona (Rs. 2,80,343; 2.00,respectively) and White Dona (Rs. 2,59,343;1.85) compared to other Rcnotypes studied.In the vase life study, among the chemical preservatives [viz., citric acid, cobalt chloride and 8-HQS) tried, citric acid @ 200ppm r corded maximum vase life of Carnation (12 days) followed by citric acid @ 150 ppm (11 days).

July, 2014

(B. Hemla Naik)
Major Advisor

9. Evaluation of Anthurium Cultivars for their Performance under Protected Cultivation

LATHA, S.

ABSTRACT

An investigation on evaluation of anthurium cultivars for their performance under protected cultivation was carried out in randomized block design in the experimental block of department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, Karnataka during 2012-13. The varieties viz., Fantasia, Acropolis, Arabhavi Local, Tropical, Fire, Cheers and Midori were taken for study. Among seven anthurium varieties, variety Tropical recorded maximum plant height (63.11 cm), petiole length (46.91 cm), leaf length (31.50 cm), leaf width (22.91 cm), leaf area (4320 cm^2) and leaf area index (4.80). Variety Arabhavi Local recorded maximum number of leaves per plant (8.67) and maximum number of suckers per plant (1.27) at 360 days after planting. In case of flower quality and yield attributes, such as peduncle length (64.42 cm), spathe length (12.00 cm), spadix length (6.89 cm) and spadix girth (10.11 mm) was maximum in variety Tropical. Spathe width (14.83 cm) was maximum in variety Midori. Varieties Cheers and Arabhavi Local showed minimum spadix angle to spathe (27.33^0 and 28.33^0, respectively). Variety Arabhavi Local recorded maximum number of flowers per plant (1.53). Maximum vase life was observed in Variety Midori (35.00 days). Correlation study revealed that number of flowers per plant showed significant and positive correlation with number of leaves per plant, leaf area per plant and number of suckers per plant. Occurrence of anthracnose and bacterial blight disease incidence was less in varieties Arabhavi Local and Cheers compare to rest of the cultivars under study. Highest benefit cost ratio was recorded in Variety Arabhavi Local (2.17). Among the anthurium cultivars studied, better performance in terms of vegetative growth and flower quality of anthurium, variety Tropical was found superior, in terms of flower yield, varieties Arabhavi Local and Midori are identified as promising suitable cultivars for cultivation under protected condition.

July, 2014

(Sathyanarayana Reddy)
Major Advisor

10. Evaluation of Asiatic Lily Cultivars Under Protected Cultivation

SHWETHA, B.S.

ABSTRACT

The study was conducted to identify the suitable Asiatic lily cultivars under naturally ventilated polyhouse during 2012-13, with respect to yield and quality cut flowers and also to find out the best chemical preservative for enhancing the vase life in the Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere.

There are seven cultivars included in the study *viz.*, Gironde, Levi, Navona, Pavia, Pollyanna, Turandot and Tresor. Among them there were wide and highly significant variations observed in the performance with respect to growth, floral, cut flower yield, quality and bulb yield and bulb quality parameters. The cv. 'Levi' produced maximum number of quality cut flowers and was found to be significantly superior over others. 'Gironde' and 'Pavia' were found to be the next superior cultivars. 'Gironde' produced the longest stalk length, whereas; stalk girth, diameter of bud, dry matter production and flower weight was more in 'Turandot'. 'Pavia' produced longest bud before opening, whereas, bigger flowers were produced by 'Levi'.

The morphological parameters *viz.*, leaf width, leaf area and chlorophyll content etc., were found superior in Pavia. The cv. 'Tresor' produced maximum number of leaves and leaf length. Most of the bulb parameters like weight of bulb (g), number of bulblets per bulb, bulb size (cm) were found superior in cv. 'Pollyanna' followed by cv. 'Turandot'. From this study it can be concluded that 'Turandot' and 'Tresor' are classified as early cultivars. Whereas, 'Levi' and 'Gironde' as late cultivars. The cultivars 'Gironde' and 'Tresor' realized maximum net return (2, 72,695 Rs/560 m^2).In vase life study the cv. 'Turandot' was used to standardize the chemical preservative, among those chemical preservatives *(viz.*, GA_3, 8-HQC and sucrose) tried, combination of GA_3 (25 ppm) and 8-HQC (200 ppm) with sucrose (2%) recorded maximum vase life of Asiatic lily (20.40 days).

July, 2014

(B. Hemla Naik)
Major Advisor

11. Evaluation of Gladiolus Genotypes under Hill Zone of Karnataka

SUDEEP, H. P

ABSTRACT

An investigation on evaluation of gladiolus genotypes under hill zone of Karnataka was carried out in Randomized Block Design in the experimental block of Department of Floriculture and Landscape Architecture.College of Horticulture, Mudigere, during the period from October 2012 to April 2013. The cultivars *viz*., Jester, Charms Flow, Red Ginger, White Prosperity, American Beauty, Her Majesty, Green Bay, Red Majesty, Summer Sunshine and Candy Man were taken for the study.

Among ten cultivars, Red Majesty was early to sprout (5.67 days). Per cent of corm sprouting was maximum in cultivar Summer Sunshine (95.00). Plant height was maximum in cultivar Red Majesty (76.31 cm). Sucker production per plant was maximum in cultivar Summer Sunshine (0.47) whereas leaf production per plant was maximum in cultivar Green Bay (8.93). In case of flower yield and quality attributes, such as days taken for bud initiation and first floret opening were found early in cultivar Red Majesty (62.80 days and 73.87 days, respectively). Spike length was maximum in cultivar Red Ginger (114.23 cm) and the longest rachis length was recorded in cultivar Jester (61.39 cm). Cultivar Summer Sunshine recorded maximum number of spikes per plant (1.53), but vase life was maximum in cultivar American Beauty (11.67 days). Number of corms per plant was maximum in cultivar Summer Sunshine (1.47) and number of cormels per plant was maximum in cultivar White Prosperity (94.17). Corm yield per hectare was maximum in cultivar Summer Sunshine (9058.67 Kg). Among the gladiolus cultivars studied, better performance in terms of vegetative, flower yield and corm production, cultivars Summer Sunshine, Red Ginger, Red Majesty and White Prosperity were found promising for cut flower production under hill zone condition of Karnataka. Among these four cultivars, Summer Sunshine, Red Ginger and Red Majesty were good in flower and corm yield, while White Prosperity was good with respect to quality.

July, 2014

(Sathyanarayana Reddy)
Major Advisor

12. Standardization of Spacing and Nutrition for Growth and Flower Yield of Asiatic Lily Under Hill Zone

VEDAVATHI.R.S

ABSTRACT

The study was conducted to find out the optimum spacing and nitrogen levels in Asiatic lily cultivar Gironde in open field condition at College of Horticulture, Mudigere, UHS, Bagalkot during 2012-13. The experiment consists of three spacing levels (30 x 15, 30 x 30 and 40 x 15 cm) and four levels of nitrogen (0, 100, 150 and 200 kg/ha) in all possible combinations were assessed for vegetative, flowering and bulb characters. Among the different spacings, S_1 (30 x 15 cm) and among the different nitrogen levels, N_4 (200 kg/ha) recorded maximum plant height, number of leaves per plant, leaf length and breadth, leaf area, specific leaf area, specific leaf weight, absolute growth rate, crop growth rate, relative growth rate, net assimilation rate, dry matter accumulation in different plant parts like leaves, stem, flowers and bulbs, total dry matter production and the same treatments also recorded maximum flower yield, bulb yield and quality parameters. Similarly, leaf N, P, K and soil available N, P and K content after harvest were found to be maximum in the same spacing and nitrogen levels.

While, lower morphological, flowering and bulb parameters were observed at wider spacing S_2 (30 x 30 cm) and in control N_1 (0 kg/ha). Interactions of spacing and nitrogen levels were found significant with respect to flower quality and bulb yield parameters. S_1N_4 (30 x 15 cm + 200 kg/ha) treatment combination recorded significantly higher values with respect to bud diameter (2.01 cm), diameter of flower (12.70 cm), number of florets per spike (7.40), number of bulblets per plant (1.32), weight of bulblet (1.23 g) and the same treatment combination also recorded maximum benefit cost ratio (1.70) compared to other treatment combinations.

July, 2014

(Srinivasa, V)
Major Advisor

13. Response of Marigold *(Tagetes Erecta* L.) to the Inoculation of Vam Fungi at Different Phosphorus Levels for Xanthophyll Yield

G. SWATHI

ABSTRACT

A filed experiment was conducted at experimental unit of Department of Floriculture and Landscape Architecture, college of Horticulture, Mudigere to study the response of marigold (*Tagetes erecta* L.) to the inoculation of Vesicular – Arbuscular Mycorrhizal (VAM) fungi at different P levels on plant growth, yield and xanthophylls yield. The VAM fungi viz., *Glomus fasciculatum, G. mosseae, G. instraradices* with an uninoculated control was maintained at P levels viz., 60, 90, 120 kg/ ha were tried. The resultgs brought out that with G. *fasciculatum* and given P at 90 kg/ ha recorded significantly maximum plant height, plant spread, secondary branches, number of levels total dry matters Production, number of leaves, leaf area duration, crop growth rate, net assimilation rate. The same treatment combination also recorded maximum flowers duration, maximum flower yield (17.83 t/ ha), petal meal yield (15.66 q/ ha), xanthophylls yield (34.49 kg/ha).

Shoot P concentration, P – uptake, available N.P. Ca, mg and S were significantly maximum in the treatment inculcated with G. *fasciculatum* and given P at 120 kg/ ha. Whereas, available K was significantly maximum in the treatment with G. *fasciculatum* at P 90 kg/ ha. The plants inoculated with G. *mosseae* and given P at 90 kg/ha recorded significantly maximum percent root colonization and sporulation. The same treatment combination also recorded maximum net return (Rs. 225655/ ha) and cost: benefit ratio (1: 5.39) for flower production. Whereas, for maximum net return of Rs. 539695/ ha and cost: benefit ratio (1: 11.57). This clearly indicates the possibility of reducing P fertilization by 25 per cent of the recommended dose by inoculation with G. *fasciculatum* and G. *mosseae* in marigold.

July, 2014

(B. Hemla Naik)
Major Advisor

14. Spacing and Nutrition Trial in Anthurium Under Hill Zone of Karnataka

JYOTHI S.

ABSTRACT

An investigation on spacing and nutrition trial in anthurium cv. Arabhavi Local under protected cultivation was carried out in factorial randomized complete block design in the experimental block of Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, Kamataka during 2013-14. The experiment consists of three spacing levels (30 x 30, 30 x 40 and 30 x 50 cm) and three levels of nutrients (312 : 448 : 375 kg NPK/ha, 262 : 398 : 325 kg NPK/ha and 212 : 348 : 275 kg NPK7 ha) in all possible combinations were assessed for vegetative and flowering characters. Among the different spacings, S[(30 x 30 cm) recorded maximum number of flowers per square meter (48.33) and among the different nutrient levels, N, (312:448:375 kg NPK/ha) recorded maximum Plant height (54.64 cm).

Number of leaves per plant (24.09), leaf length (27.04 cm), Leaf width (27.40 cm), petiole length (53.62 cm), number of suckers per plant (3.07). In case of flower quality and yield attributes, such as peduncle length (49.38 cm), spathe length (14.63 cm), spathe width (14.44 cm), spadix length (6.80 cm), spadix girth (6.29 mm), number of flowers per square meter (46.00) and vase life (25.23 days) were maximum in NI (312 : 448: 375 kg NPK/ha). Similarly, leaf content N (2.34%), P (0.42%) and K (2.91%) were found to be maximum in the same nutrient levels. Interactions of spacing and nutrient levels, SjNi (30 x 30 cm + 312:448:375 kg NPK/ha) treatment combination recorded maximum benefit cost ratio (1.61) compared to other treatment combinations.

September, 2014

(Sathyanarayana Reddy)
Major Advisor

15. Evaluation of Daisy (Aster Amellus L.) Cultivars in the Hill Zone of Karnataka

KETANA G B

ABSTRACT

An investigation on evaluation of daisy cultivars in the hill zone of Karnataka was carried out in Randozized Complete Block Design in the experimental block of Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, Karnataka dring 2013-14. Selection, Section – 1, Section -2, Section -3, Section -4, Section – 5, Section – 6, Section -7, and Dharwad Local wre taken for study. Among the eight cultivars selection – 4 performed better in tgerms of plant height (91.93 cm), number of suckers (11.48), plant spread leaf area per plant (117010.44 cm^2), (51.51cm^2), leaf area index (19.52) and dry matter production (101.84 g/plant).

The cultivar Dharwad Local was earlier for first flowering (73.27 days) and days to 50 per cent flowering (80.64 days)d, selection – 1 took maximum days for first flowering (84.13 days) and 50 per cent flowering (89.53 days). Spike length was maximum in the cultivar selection – 4 (72.43 cm). The number of spikes yield per plant (8.37 spikes/plant), spike yield per plot (251.20 no's) and vase life (8.67) were also maximum in cultivar selection -4(5.3), whereas, the lowest was recorded in the cultivar Dharwad Local (3.6). Among the daisy genotypes studied, better performance in terms of vegetative growth, flower yield and quality parameters, cultivars selection -4 and selection 007 were found promising for loose flower production under hill zone condition of Karnataka.

July, 2014

(Sathyanarayana Reddy)
Major Advisor

16. Performance of China Aster *(Callistephus Chinensis* L. Nees) Cultivars Under Hill Zone of Karnataka

SAVITHA, K. H.

ABSTRACT

A study on performance of nine China aster cultivars *viz.*, Kamini, Poornima, Shashank, Phule Ganesh Violet, Phule Ganesh White, Phule Ganesh Pink, Namdhari Pink, Namdhari White and Budiguppa Local for their growth, flower yield and quality was carried out in Randomized Block Design in the Experimental block of Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, during the period from September 2013 to February 2014. Among the nine cultivars studied there were highly significant variations observed in performance with respect to growth, flower yield and quality parameters. The cultivar Phule Ganesh White produced maximum plant height (62.25 cm), number of primary branches per plant (18.21), stem girth (12.08 mm), intermodal length (1.87 cm), leaf area (33.21 cm^2), leaf area index (0.0368),flower yield per plant (308.68 g), seed yield per plant (8.70 g), fresh weight of flower (5.70 g), dry weight of flower (0.81 g), flower diameter (6.80 cm), stalk length (46.90 cm) and vase life (13.55 days) and which was found to be significantly superior over other cultivars. Early flowering (53.53 days) was observed in cultivar Shashank followed by cultivar Poornima (58.40 days). Maximum and minimum flowering duration was recorded in cultivars Kamini (35.17 days) and Poornima (29.92 days), respectively. Occurrence of *Fusarium* wilt incidence was less in cultivars Phule Garesh Violet, Phule Ganesh White, Phule Ganesh Pink and Shashank, whereas cultivar Poornima was moderately susceptible. The cultivar Phule Ganesh White realized maximum net return and B:C ratio (Rs. 5,49,350:11.79, respectively) followed by cultivar Phule Ganesh Violet (Rs. 4,20,850:9.27, respectively) and Phule Ganesh Pink (3,45,100:7.78, respectively), whereas minimum net return and B:C ratio (Rs. 1,40,600:3.76, respectively) was recorded in cultivar Budiguppa Local. Among these China aster cultivars studied, cultivar Phule Ganesh White was found promising for loose flower production under hill zone of Karnataka.

February, 2014

(Srinivasa, V)
Major Advisor

Fruit Science

University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Hort.) theses abstracts produced in the

Department of Fruit Science

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1. Studies on Bunch Feeding on Yield and Quality of Banana Cv. Robusta (Aaa-Group) Under Hill Zone of Karnataka

SREEKANTH, H. S.

ABSTRACT

The field investigation was carried out during the year 2011-12 in .the farmer's field at Palguni village of Mudigere taluk to study the effect of bunch feeding on yield and quality of banana cv. Robusta. The banana bunch stalk were fed with urea (2.0, 4.0 and 6.0 %), sulphate of potash (1.5, 2.0 and 2.5 %), 2, 4-Dichlorophenoxyacetic acid (10, 20 and 30 ppm) , panchagavya (2.0, 4.0 and 6.0 %) and banana special (0.2, OA and 0.6 %) and compared with control (without bunch stalk feeding). The experiment was laid out in a completely randomized block design with sixteen treatments, which were replicated thrice.

The bunch stalk fed with 2.0 per cent sulphate of potash recorded significantly highest internodal length (8.93 ern], bunch length (85.20 cm), finger girth (12.79 cm), finger weight (170.10 g), weight of hand (2.60 kg), weight of bunch (24.21 kg), total yield (60.53 t/ha), pulp weight (109.16 g), peel weight (42.31 g), pulp to peel ratio (2.58), total soluble solids (23.51 o Brix) and benefit cost ratio (2.68). The lowest PLW (10.44 %), more number of days taken to ripe (14.33 days), highest reducing sugar (15.86 %), non-reducing sugar (2.64 %), total sugar (18.49 %), sugar to acid ratio (73.14 %) and lowest titratable acidity (0.25 %) was found in bunches fed with 2.5 per cent sulphate of potash. Both 2.5 per cent sulphate of potash and 6.0 per cent panchagavya recorded the longest shelf life of 8.67 days. While, 2.0 per cent sulphate of potash improved the yield and quality parameters of banana cv. Robusta under Hill zone of Karnataka.

June, 2012

(D. Thippesha)
Major Advisor

2. Response of Soil and Foliar Application of Silicon on Growth, Yield and Quality of Banana cv. Elakkibale under Hill Zone of Karnataka

HAUMANTHAIAH, M.R.

ABSTRACT

A field experiment was conducted to examine the response of banana plants to soil and foliar application of silicon at RHREC, Mudigere during the year 2011-2012. Potassium silicate and calcium silicate were used as source of silicon. Potassium silicate was given 90 days after planting as a foliar spray at a concentration of 2 and 4 ml VI per plant at 15 and 30 days interval. Similarly, soil application of calcium silicate @ 1000g per plant at once and in combination with foliar spray of potassium silicate was tried during the same period.

The highest plant height (239.67 cm), plant girth (68.43 cm], leaf area (0.6626 m2), number of fingers per bunch (150.11), total bunch weight (11.95 Kg), yield per hectare (29.88 t), benefit cost ratio (1.57: 1) and early days taken from shooting to maturity (91.60 days) were recorded due to combined soil application of calcium silicate @ 1000 g/plant + foliar application of potassium silicate @ 4 ml L-I/plant at 30 days interval followed by foliar application of potassium silicate alone @ 4 ml VI/plant at 15 days interval. The maximum pulp peel ratio (7.44 %), days to full ripe (7.67 days), shelf life of fruits (6.33 days), total soluble solids (26.670 B) and the lowest titratable acidity (0.76 %) were recorded due to foliar application of potassium silicate @ 4 ml L-I/plant at 15 days interval. The combined application of calcium silicate @ 1000 g/plant and foliar application of potassium silicate @ 4 ml L-I/plant at 30 days interval had significantly influenced the growth and yield parameters of banana over control.

September, 2012

(Kulapati Hipparagi)
Major Advisor

3. Response of Soil and Foliar Application of Silicon and Micronutrients on Growth, Yield and Quality of Sapota Under Hill Zone of Karnataka

LALITHYA, K.A.

ABSTRACT

The field experiment was conducted during the year 2011-12 to know the response of soil and foliar application of silicon and micronutrients on growth, yield and quality of sapota at RHREC, Mudigere. Silicon sources like potassium silicate as foliar application at the concentrations of 6 and 8 ml per litre and calcium silicate as soil application were applied only once at the concentrations of 1.0, 1.5, 2.0 and 2.5 kg per tree. Boron was applied at the concentration of 2 and 3 g per litre and micronutrients were applied at 3 and 4 ml per litre at monthly intervals.

The maximum total leaf chlorophyll content (8.47 mg/g), maximum number of shoots (23.96), maximum number of flowers (250.16), fruits per square meter (27.16) and the maximum number of fruits per tree (1216.66) and traits like, the highest yield per tree (124.81
kg), yield per hectare (12.48 t), fruit weight (99.66 g), fruit length (5.55 cm), diameter of fruit (5.85 cm] and volume of fruit (102.38 ml) and the quality traits like maximum total soluble solids (25.16 %), shelf life (10.90 days), minimum physiological loss in weight (8.91 %) and the minimum number of mummified fruits (34.00) were observed In treatment with foliar application of potassium silicate at 8 ml per litre.

September, 2012

(Kulapati Hipparagi)
Major Advisor

4. Effect of Integrated Nutrient Management on Growth, Yield and Quality Parameters in Banana Cv. Ney Poovan Under Hill Zone of Karnataka

D. BHAVANI

ABSTRACT

A field experiment was conducted at the College of Horticulture, Mudigere, Chikmagalur district, Karnataka, during 2011-2012 to study the "Effect of integrated nutrient management on growth, yield and quality parameters in banana cv. Ney Poovan under hill zone of Karnataka". The experiment was laid out in randomized block design with 13 treatment combinations, comprising of inorganic fertilizers, organic manures and biofertilizers and with 3 replications. The treatment received 100% recommended dose of fertilizers (RDF) along with Vermicompost (2kg) + Neemcake (250g) + *Azospirillum* (50g) + PSM (50g) + VAM (250g) recorded the highest plant height, pseudostem girth,number of functional leaves, total leaf production, total leaf area and leaf area index and yield attributes such as length of bunch, weight of hand, number of hands per bunch, number of fingers per hand, total number of fingers per bunch, finger weight, finger length, finger girth, bunch weight per plant, total yield per hectare and also registered better quality parameters such as shelf life, total soluble solids (TSS), acidity, reducing sugar and non-reducing sugar. The available nutrients (N, P_2O_5 and K_2O) and plant nutrients content was significantly higher in the treatment received 100% recommended dose of fertilizers along with organic manures and biofertilizers. The economic analysis clearly indicated that the net returns/ha and C:B ratio was the highest in the plants treated with 100% recommended dose of NPK (P as rock phosphate) in combination with Vermicompost (2kg), Neemcake (250g), *Azospirillum* (50g), PSM (50g) and VAM (250g) and also the plants supplied with 75% recommended dose of fertilizers with Vermicompost (2kg) and *Azospirillum* (50kg). The present findings can be commercially used in making banana production more profitable by the integration of nutrients under hill zone of Karnataka .

July, 2013

(D. Thippesha)
Major Advisor

5. Standardization of Grafting Techniques in Jack Fruit

PRIYANKA, H.L.

ABSTRACT

The study was conducted to find out the most suitable method of grafting, curing period of scion and also age of rootstock for softwood grafting in jack fruit at the college of horticulture, Mudigere. Out of two experiments conducted, in the first experiment, among the three grafting methods and curing periods, the highest success (64.00%) and the least number of days (17.50) to sprout was recorded in epicotyl grafting with ten days old cured scion. Number of leaves, number of branches and length of shoot were also maximum in epicotyl grafting with scion cured for ten days. Vigour of grafts was maximum in softwood grafting with ten days old cured scion. The least mortality (32.20%) was recorded in epicotyl grafting with ten days old cured scion.

In the second experiment, seven months old rootstock recorded the maximum graft success (72.39%). No sprouting was observed in six months old rootstock and the least success (23.60%) was in five months old rootstock. The days to bud sprout was minimum (21.50) in seven months old rootstock and recorded the maximum number of leaves (5.60), number of buds (3.49), length (19.50cm) and girth of shoot (0.86 cm), whereas the number of branches was highest (1.91) in four months old rootstock. The mortality of grafts was minimum (25.65%) in seven months old rootstock, while it was highest in case of six months old rootstock.

Among the different grafting methods, epicotyl grafting was found to be efficient than softwood and approach grafting and among the curing periods, ten days cured scion was found to produce higher graft success when compared to 20 days old cured scion and uncured scion. Among the rootstocks tested, seven months old was effective in getting higher graft success, better growth with low mortality. Hence, with the results obtained higher success can be achieved under Mudigere conditions and could be adopted for large scale multiplication of grafts.

July, 2013

(Kulapati Hipparagi)
Major Advisor

6. Effect of Bunch Spray of Nitrogen and Potash on Yield And Quality of Banana Cv. Grand Naine Under Hill Zone of Karnataka

GEETHA SHETTY, S.

ABSTRACT

The field investigation was carried out during the year 2012-13 in the farmer's field at Halekote village of Mudigere taluk, Chikmagaluru district of Karnataka, to study the "Effect of bunch spray of nitrogen and potash on yield and quality of banana cv. Grand Naine under hill zone of Karnataka". The banana bunches were sprayed with urea (1 %, 2 %, 3 %), sulphate of potash (1 %, 2 %, 3%) and combination of urea and sulphate of potash during shooting, after shooting and one month after second spray and compared with control (without bunch spray). The experiment was laid out in a completely randomized block design with sixteen treatments, which were replicated thrice.

The bunch sprayed with two per cent sulphate of potash and one per cent urea recorded less number of days for complete shooting (12.17), shooting to harvest (122.92) and significantly the highest bunch length (90.93 cm), internodal length between hands (11.67 cm), weight of hand (4.41 kg), weight of bunch (40.67 kg), total yield (102.70 t/ ha), length of finger (25.17 cm), girth of finger (13.67 cm), weight of finger (221.00 g), physiological loss in weight (14.73 %), green life (10.67 days), days to ripe (13.67), shelf life (8.67 days), pulp weight (120.67 g), peel weight (44.33 g), TSS (24.73^0brix), reducing sugar (15.74 %), non-reducing sugar (2.70%), total sugars (18.44 %), lowest titrable acidity (0.24 %), sugar to acid ratio (76.90) and also the highest cost: benefit ratio (3.04) compare to control. Spraying of two per cent sulphate of potash and one per cent urea during shooting, after shooting and one month after second spray improved the yield and quality parameters with highest profit in case of banana cv. Grand Naine under hill zone of Karnataka.

July, 2013

(D. Thippesha)
Major Advisor

7. Studies on Different Age of Rootstocks and Month of Budding on Success Rate of Patch Budding in Gumless Jack (*Artocarpus Heterophyllus* Lam.)

NATARAJ, G. N.

ABSTRACT

"Studies on different age of rootstocks and month of budding on success rate of patch budding in gumless jack (*Artocarpus heterophyllusLam.*)". The study was conducted at the College of Horticulture, Mudigere during the year 2012-13, in low cost polyhouse with factorial CRD replicated four times with two factors ie., six age of rootstocks and four month of budding.

The observation on sprouting per cent, number of sprouts per plant, length of budling, girth of budling, number of leaves per budded plants, per cent budding success and establishment percentage of the budlings were recorded periodically.

Patch budding was carried out during the months of September, October, November and December. The maximum per cent budding success (78.75) and final establishment percentage (77.63) was noticed when the budding was done during the month of December.

The age of rootstocks greatly influenced on the success rate of patch budding which was done on one to six month old rootstock. Among them, the per cent patch budding success (75.69 and 72.88) and final establishment percentage of the budlings (75.25 and 71.69) was found maximum on one and two month's old rootstocks respectively.

The interaction effect showed the maximum percentage of budding success on one month old rootstocks on 60th (90.00) and 90th (92.25) days after patch budding during the month of December. While, the establishment percentage recorded maximum (93.30) on one month old rootstocks budded during December at 120 days after budding.

Hence, patch budding can be carried out successfully during the month of December on younger rootstocks to achieve maximum success for Mudigere conditions under low cost polyhouse.

July, 2014

(D. Thippesha)
Major Advisor

8. Effect of Soil Application and Foliar Spray of Micronutrients on Growth, Yield and Quality of Ratoon Banana Cv. Grand Naine under Hill Zone of Karnataka.

NINGAVVA B. VYAPARI

ABSTRACT

The field investigation was carried out during the year 2013-14 in the farmer's field at Maggalamakki village of Mudigere taluk, Chikmagalur district of Karnataka, to study the "Effect of soil application and foliar spray of micronutrients on growth, yield and quality of ratoon banana cv. Grand Naine under hill zone of Karnataka". The experiment was laid out in randomized block design with 14 treatment and 3 replications. The treatment received of 100% recommended dose of fertilizer (RDF) along with foliar spray of zinc sulphate (0.5%) + boron (0.2%) with ~ouble suckers per hill recorded the highest plant height (196.33cm), pseudo stem girth (76.29cm), number of functional leaves (19.55), leaf length (138.73cm), leaf breadth (72.31cm), leaf area (15.71m2), leaf area index (4.85), Total crop duration (345.00), chlorophyll content (19 .l8mgll OOg) and yield attributes such as length of bunch (94. 1 5cm), internodal length of hands (15.21cm), weight of hand (8.24kg/hill), number of hands per bunch per hill(l8.00), number of fingers per hand (22.00), total number of fingers per hill (235.67), finger weight (192.67g), finger length (26.67cm), finger girth (14.33cm), bunch weight per hill (49.00)and total yield per hectare (151.21). The application of 100% recommended dose of fertilizer (RDF) along with foliar spray of zinc sulphate (0.5%) + boron (0.2%) with double suckers per hillregistered better quality parameters such as physiological loss in weight (13.32days to ripe (13.67days), shelf life (10.67), TSS (28.50oBrix), reducing sugar (15.97%), non- reducing sugar(2.93%), total sugars (18.97), titrable acidity (0.29%) and sugar: acid ratio (65.41). The present findings can be commercially used in making banana production more profitable by the micronutrient application under hill zone of Karnataka.

August, 2014

(Kulapati Hipparagi)
Major Advisor

9. Effect of Growth Regulators on Rooting and Success of Air Layers in Rose Apple (*Syzygium Jambos* L.) Under Hill Zone of Karnataka

KHANDADE SURESH

ABSTRACT

The study was conducted to know the "effect of growth regulators on rooting andsuccess of air-layers in rose apple (*Syzygium jambos* L.) under hill zone of Karnataka"was carried out in Rose apple block at Zonal Agricultural and Horticultural ResearchStation, Mudigere and in low costpolyhouse at College of Horticulture, Mudigere duringthe year 2013-14. Among the different growth regulators with or without synergist used,the layers treated with IBA 5000 ppm + 1, 2, 4 acid 1000 ppm resulted in better rootingpercentage of 74.67 as against 42.67 in control. The promotive effect was also observeddue to the treatment of IBA 8000 ppm + 1, 2, 4 acid 1000 ppm and IBA + NAA 5000ppm recorded 72 and 68 per cent respectively. However, use of both IBA and NAA incombination with 1, 2, 4 acid synergise the effect of auxins in rose apple air-layers.Among the growing media and growth regulators tried, the rose apple air-layers treated with IBA 8000 ppm + 1, 2, 4 acid 1000 ppm and planted in media containing soil, sand and vermicompost (1:1:2) recorded maximum survival percentage of 94.67, which was on par with soil, sand and vermicompost (1:1:1) with IBA 8000 ppm + 1, 2, 4 acid 1000ppm (92%) and soil, sand and vermicompost (1:1:1) with IBA + NAA 5000 ppm + 1, 2, 4 acid 1000 ppm (92%). The studies revealed that, rose apple air-layers could be produced easily by treating with IBA 8000 ppm + 1, 2, 4 acid 1000 ppm and grown in the media of soil, sand and vermicompost (1:1:2) with alternatively 1:1:1 can also be used in places where, vermicompost is scarce and costly. By this way, higher turnover can be obtained the commercial nursery entrepreneurs.

July, 2014

(D. Thippesha)
Major Advisor

10. Studies on Growth Regulators on Rooting and Success of Air-Layers in Litchi (*Litchi Chinensis* Sonn) Under Hill Zone of Karnataka

SHASHIDHAR. N. G.

ABSTRACT

The study was conducted to know "Studies on growth regulators on rooting and success of air layers in Litchi (Litchi chinensis Sonn) under hill zone of Kamataka" was carried out in Litchi block at Zonal Agricultural and Horticultural Research Station, Mudigere and in low cost polyhouse of College of Horticulture, Mudigere during the year 2013 -14. The study pointed out that, among the different growth regulator formulations used, the formulation with IBA + NAA 200 ppm resulted better rooting percentage of 93.33% as against 76.67% in control. The next promotive effect in this regard was by treatment of IBA 300 ppm and IBA + NAA 100 ppm recorded 91.67% and 91.00% respectively. Among the growing media and growth regulators tried, Litchi air-layers were treated with IBA + NAA 200 ppm and planted in media containing soil, sand and vermicompost (1:I:2) recorded maximum survival percentage i.e. 97.85% which was on par with soil, sand and FYM (1:1:2); IBA 300 ppm (95.35%). The studies revealed that Litchi air-layers could be multiplied easily by treatment with IBA + NAA 200 ppm and growing in the media of soil, sand and vermicompost (1:1:2) in polyhouse condition. As an alternative, media comprising of soil, sand and FYM (1:1:2) can also be used in places where, vermicompost is scarce and costly. By this way, higher turnover can be obtained.

July, 2014

(D. Thippesha)
Major Advisor

11. Effect of NPK Levels and High Density Plants on Growth, Yield and Quality of Ratoon Crop of Tissue Culture Banana Cv. Grand Naine Under Hill Zone

BASAVARAJ, A. KANTI

ABSTRACT

A field experiment was carried out to study the effect of NPK levels and high density plants on growth, yield and quality of ratoon crop of tissue culture banana cv. Grand Naine under hill zone in farmer's field at Maggalamkki, Mudigere taluk, Chikmagalore district during the year 2013-2014.

The different doses of fertilizers along with different levels of suckers per hill were used during this study. The plants provided with 100% recommended dose of NPK with double suckers per hill gave the maximum plant height (173.45 cm at 120 days after harvesting of the main crop in Ta), 150% of recommended dose of NPK with double suckers per hill registered the maximum pseudostem girth (56.1 cm and the maximum leaf area of 8.28 rrT at shooting in T4). The maximum number of leaves (8.27 at shooting) when plants were supplied with 200% of recommended dose of NPK.

The early harvesting of bunches was observed with 175% of recommended dose of XPK with double sucker per hill (86.19 days). The per cent light intensity (88-89%) was foiitd higher in closer spacing system of planting in comparison with conventional (65%) planting system at all the stages of crop growth. The maximum banana yield 177.75 t/ha as obtained with three suckers per hill with the application of 450:270:560 g NPK/hill. The

plants supplied with 200% of recommended dose of NPK with triple suckers per hill had the maximum benefit cost ratio of 7.05:1.

August, 2014

(Kulapati Hipparagi)
Major Advisor

Plantation, Spices, Medicinal and Aromatic Crops

University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Hort.) theses abstracts produced in the

Department of Plantation, Spices, Medicinal and Aromatic Crops

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1. **Influence of Integrated Nutrient Management on Growth and Yield of Davana [*Artemisia pallens* Wall.]**

KUSUMA, M.V.

ABSTRACT

An investigation to study the effect of "Influence of Integrated Nutrient Management on Growth and Yield of Davana [*Artemisia pallens* Wall.]" was carried out in the experimental field, Department of Plantation, Spices, Medicinal and Aromatic crops, at College of Horticulture Mudigere during *rabi* season of 2011-2012. The experiment was laid out in randomized complete block design with 3 replications and 12 treatment combinations, comprising of inorganic fertilizers, organic manures and biofertilizers. Application of 75%RDF + *Azospirillum* 2 kg ha^{-1} (T_5) recorded the highest plant height (45.18 cm), highest fresh weight of leaves (7.02 g), dry weight of shoot (6.4 g), less number of days (58 days) for inflorescence initiation, maximum fresh herbage yield (20.64 g) and fresh herbage yield per hectare (18.3 t). Application of 50%RDNPK + Vermicompost 2.5 t ha^{-1}+ *Azospirillum* 2 kg ha^{-1} + PSB 2 kg ha^{-1} (T_{12}) recorded the highest number of leaves per plant (147.2), number of laterals per plant (19.49), stem girth (1.41 cm), dry weight of leaves (3.12 g), fresh weight of shoot (29.56 g), fresh and dry weight of root (4.57 g and 1.15 g respectively) and recorded maximum length of inflorescence (25.34 cm). The maximum net return (Rs. 66,946 ha^{-1}) and benefit cost ratio (1.56) for herbage yield and the maximum net profit per hectare (Rs. 3, 90, 046) and benefit cost ratio (6.40) essential oil yield was recorded in the treatment supplied with 75%RDF + *Azospirillum* 2 kg ha^{-1} (T_5). There was an improvement in growth, yield and quality parameters with the application of *Azospirillum*, PSB andVermicompost along with RDF.

November, 2012

(Raviraja Shetty, G.)
Major Advisor

2. Performance of Turmeric (*Curcuma Longa* L.) Cultivars in Hill Zone of Karnataka.

VEENA HANCHINAMANI

ABSTRACT

Afield experiment was carried out in randomized block design with three replications to asses the performance of turmeric cultivars under hill zone condition of Karnataka at College of Horticulture, Mudigere, Karnataka during 2011-12. Among nineteen turmeric cultivars evaluated, Kanti recorded highest plant height (41.44 cm), and maximum number of tillers per plant (5.83), cultivar CLT-325 showed higher number of leaves per plant (19.00), leaf area (38.52 dm^2) and leaf area index (4.28) at 180 days after planting. Maximum fresh rhizome yield of 21.34 t ha^{-1} was observed in Kanti followed by Rajapuri (21.04 t ha^{-1}), CLT-325 (20.99 t ha^{-1}) and PTS-24 (20.95 t ha^{-1}), whereas highest cured rhizome yield was exhibited by Kanti (5.59 t ha^{-1}), CLT-325 (5.33 t ha^{-1}) and PTS-24 (5.33 t ha^{-1}). Highest percentage of curcumin content was observed in PTS-24 (7.23 %), Kanti (7.13 %,) and Sobha (6.83 %). The cultivars Kanti (245 days), CLT-325 (235 days), Rajapuri (225 days) and PTS-24 (216 days) are medium duration types which are showed better performance. CLT-325, Kanti and PTS-24 are found resistant to leaf blotch and shoot borer compare to rest of the cultivars under study. Correlation study revealed that fresh rhizome yield per hectare exhibited positive and significant correlation with plant height (0.394), number of tillers per plant (0.325), number of leaves per plant (0.298), petiole length (0.555), number of mother rhizome per plant (0.473), number of primary fingers per plant (0.456), number of secondary fingers per plant (0.492), weight of mother rhizome (0.548), weight of secondary fingers (0.425), length of primary fingers (0.603) and fresh rhizome yield per plant (0.811). Among the turmeric cultivars studied, Kanti, CLT-325, PTS-24 and Rajapuri showed better performance with respect to growth, yield and quality parameters and found promising suitable cultivar for rainfed situations of hilly region of Karnataka.

November, 2012

(Raviraja Shetty, G.)
Major Advisor

3. Genetic Variability for Herbage and Seed Yield in Coriander (*Coriandrum Sativum* L.) Under Hill Zone of Karnataka

ARIF A

ABSTRACT

The experiment was undertaken to evaluate seventy one coriander genotypes in Randomized Complete Block Design with two replications to study the genetic variability, heritability, correlation and path analysis at College of Horticulture, Mudigere during the period between January-2012 to March-2012. Analysis of variance revealed highly significant (at P=0.01) difference among genotypes for thirty one parameters studied. Broad genetic base was evident as the value of genotypic and phenotypic coefficient of variance was high for plant height at 30 DAS, thousand seed weight, number of secondary branches at 60 DAS and harvest index. High heritability coupled with high genetic advance was observed for number of leaves and fresh weight of the plant at 30 DAS, dry weight of the plant at 30, 60 DAS at harvest, herbage yield, number of seeds per umbellet at 60 DAS and at harvest, seed yield per plant and seed yield per hectare indicated the predominant role of additive genetic component in governing of these traits. Correlation studies indicated highly significant and positive association of seed yield per plant with number of umbels per plant at 60 DAS, number of umbellets per umbel at 60 DAS and thousand seed weight both at genotypic and phenotypic level, whereas herbage yield and number of seeds per umbel at 60 DAS showed positive and significant correlation for both at genotypic and phenotypic level. Path coefficient analysis revealed that plant height at 60 DAS, number of leaves at 60 DAS, dry weight of the plant at 60 DAS, herbage yield, days to fifty per cent flowering, number of umbels per plant at 60 DAS, number of umbellets per umbel at 60 DAS, crop duration, harvest index, seed yield per hectare characters have direct positive effect on seed yield. Among 71 genotypes evaluated, the genotypes DCC 37, DCC 49 and DCC 51 were found promising in terms of both herbage and seed yield under hill zone of Karnataka.

November, 2012

(Vishnuvardhana)
Major Advisor

4. Effect of Growth Regulators and Media on Rooting of Black Pepper (*Piper nigrum*) Cuttings.

AKSHAY K.R.

ABSTRACT

An investigation on Effect of media and growth regulators on rooting of black pepper (*Piper nigrum* L.) cuttings was conducted during 2011-12 at the Regional Horticultural Research and Extension centre, Mudigere, University of Horticultural Sciences, Bagalkot. The study pointed out that, among the different growth regulator formulations tried, IBA 1000 ppm formulation helped in better induction of rooting by over 70 per cent as against 43.33 per cent in the control. The next promotive effect in this regard was by treatment of IBA 500 ppm and NAA 250 ppm which recorded 66.67 and 63.33 per cent respectively. However, use of higher concentrations of both IBA and NAA were not appreciable for black pepper cuttings. Among the different rooting media tried, black pepper cuttings which were pre-treated with IBA 1000 ppm and planted in the media containing soil +sand + FYM + vermicompost (1:1:1:1) recorded highest rooting percentage i.e. 80 per cent which is on par with soil + sand + FYM + vermicompost in 2:1:1:1 proportion (76.67 %) and soil + sand + FYM + coir dust in 1:1:1:1 proportion (76.67 %). The studies revealed that black pepper plants could be multiplied easily by pretreatment of cuttings with IBA 1000 ppm and growing in the media comprising soil + sand + FYM + vermicompost (1:1:1:1 v/v) in polyhouse conditions. As an alternative, the medium comprising of coir dust can also be used in the places where, vermicompost is scarce and costly. By this way, higher turnover of planting material can be accompanied quite easily.

November, 2012

(Narayana Swamy, M.)
Major Advisor

5. Performance of Ginger (*Zingiber Officinale* Rosc.) Varieties Under Hill Zone of Karnataka

KALLAPPA S NARODE

ABSTRACT

A field experiment was carried out in randomized block design with three replications to asses the performance of ginger varieties under hill zone condition of Karnataka at College of Horticulture, Mudigere, Karnataka during 2012-13. Among ten ginger varieties evaluated, Maran recorded highest plant height (71.80 cm), maximum number of tillers per plant (23.43), higher number of leaves per clump (308.33), leaf area (45.06 cm^2) and leaf area index (15.41) at 180 days after planting. Maximum fresh rhizome yield of 29.37 t/ha was observed in Maran followed by Rio-de-Janeiro (28.04 t/ha) and Karkal Local (25.84 t/ha) whereas highest curing percentage was recorded in Maran (28.97%) and the lowest was recorded in the variety Humanabad Local (19.27%). There was significant difference among varieties for cured yield and it ranged from 8.41 tonnes per hectare (Maran) to 3.65 tonnes per hectare (Humanabad Local). The highest crude fibre content was recorded in variety Karkal Local (6.73%) and the lowest was recorded in variety IISR-Varada (3.70%). Essential oil content was maximum in variety Rio-de-Janeiro (2.31%) and the minimum was recorded in variety Humanabad Local (1.06%). The oleoresin content was maximum in Rio-de-Janeiro (9.06%) and the minimum was recorded in variety Himagiri (4.20%). The varieties Rio-de-Janeiro, Maran, IISR-Mahima and IISR-Varada are early (< 209 days) types which showed better performance. Maran and Humanabad Local are found resistant to soft rot and shoot borer compare to rest of the varieties under study. The highest cost-benefit ratio (Rs. 6.93) was obtained in the variety Maran. Among the ginger varieties Maran, Rio-de-Janeiro and Karkal Local showed better performance with respect to growth, yield and quality parameters and found promising suitable varieties for rainfed situations of hilly region of Karnataka.

September, 2013

(Raviraja Shetty, G)
Major Advisor

6. Effect of Spacing and NPK on Growth, Yield and Alkaloid Content of Makoi (*Solanum Nigrum* L.) Under Hill Zone of Karnataka

NAGARAJ GOKAVI

ABSTRACT

A field experiment was carried out to study the response of makoi to different levels of spacing and NPK during 2012-2013 at Horticulture Research Station, Thirthahalli, University of Horticultural Sciences, Bagalkot. The experiment comprised 16 treatment combinations consisting of two levels of spacing and eight levels of nutrients i.e., two levels of nitrogen, two levels of phosphorus and two levels of potassium and their combination. Results revealed that significantly higher plant height (70.41 cm), fresh (14.33 t ha^{-1}) and dry (2.58 t ha^{-1}) herbage yield per hectare, alkaloid content (0.33 % w/w) and higher uptake of nitrogen (92.41 kg ha^{-1}), phosphorus (13.13 kg ha^{-1}), potassium (43.94 kg ha^{-1}) in plants was recorded at 60 x 45 cm spacing. Application of 125:75:75 kg NPKha^{-1} recorded significantly higher plant height (74.27 cm), fresh (16.03 t ha^{-1}) and dry (3.71 t ha^{-1}) herbage yield per hectare, alkaloid content (0.37 % w/w) and higher uptake of nitrogen (132.56 kg ha^{-1}), phosphorus (15.34 kg ha^{-1}), potassium (66.85 kg ha^{-1}) in plants. Among the different interactions, significantly higher plant height (76.00 cm), fresh (16.74 t ha^{-1}) and dry (4.52 t ha^{-1}) herbage yield per hectare, alkaloid content (0.38 % w/w), higher net returns (Rs. 49, 388.78) and B: C ratio (3.69:1) was observed in crop spaced at 60 x 45 cm and supplied with 125:75:75 kg NPK ha^{-1}. The study indicated that planting the crop at the spacing of 60 x 45 cm and application of 125:75:75 kg NPK ha^{-1} was found optimum for realizing higher herbage yield, alkaloid content and B:C ratio under hill zone of Karnataka.

September, 2013

(Ravikumar M)
Major Advisor

7. Evaluation of Turmeric (*Curcuma Longa* L.) Cultivars in Southern Dry Zone of Karnataka

SIDDALINGAYYA SALIMATH

ABSTRACT

Afield experiment was carried out in randomized block design with three replications to evaluate the turmeric cultivars under southern dry zone of Karnataka at College of Horticulture, Mysore during 2012-13. Among sixteen turmeric cultivars evaluated, Salem recorded highest plant height (37.07 cm), and maximum number of tillers per plant (3.80), cultivar CLT-325 showed higher number of leaves per plant (17.67), the Cuddapah recorded highest leaf area (55.83 dm^2) and leaf area index (7.40) at 180 days after planting. Maximum fresh rhizome yield of 33.67 t ha^{-1} was observed in Salem which was on far with Rajapuri (32.67 t ha^{-1}), Prathibha (32.56 t ha^{-1}) and CLT-325 (32.49 t ha^{-1}), whereas highest cured rhizome yield was exhibited by Salem (8.31 t ha^{-1}) and CLT-325 (7.98 t ha^{-1}). Maximum percentage of curcumin content was observed in PTS-24 (7.20 %) and Prabha (6.45 %,). The cultivars Cuddapah (253 days), Rajapuri (251 days), Salem (240 days), CLT-325 (236 days) and PTS-24 (246 days) were of medium duration types showed better performance. PTS-24, Rajapuri and Prabha were found resistant to leaf blotch and shoot borer compared to rest of the cultivars under study. The Correlation study revealed that fresh rhizome yield per hectare exhibited positive and significant correlation with plant height (0.773), number of tillers per plant (0.689), number of leaves per plant (0.725), petiole length (0.293), leaf area index (0.510), number of mother rhizome per plant (0.609), number of primary fingers per plant (0.686), number of secondary fingers per plant (0.408), weight of mother rhizome (0.778), weight primary fingers (0.819), weight of secondary fingers (0.724), length of primary fingers (0.687), length of secondary fingers (0.700) and fresh rhizome yield per plant (0.988). Among the turmeric cultivars studied, Salem, Rajapuri, Prathibha and CLT-325 showed better performance with respect to growth, yield and quality parameters and found promising suitable cultivars for southern dry zone of Karnataka.

May, 2013

(J. Venkatesh)
Major Advisor

8. Performance of Fenugreek (*Trigonella Foenum-Graecum* L.) Genotypes for Leafand Seed Yield Under Hill Zone ofKarnataka

BASAVARAJA, O.

ABSTRACT

The present investigation was carried out at Regional Horticulture Research and Extension Centre, Mudigere during rabi season of 2011-12 to study the performance of thirty genotypes fenugreek originated in various region. Variability, correlation and path analysis followed to identify the promising genotypes for hill zone of Karnataka. All the genotypes varied significantly with respect to growth, yield and yield attributing characters. Among tested genotype the DFC-17 superior with respect to growth parameters, DFC-21 for yield characters and DFC-16, Belur local genotypes for leaf yield at early and late harvest stage. The phenotypic coefficient of variance (PCV) and genotypic coefficient of variance (GCV) were maximum for the seed yield per plant, plant spread at 60 DAS, number of pods per plant and harvest index. The estimation of Heritability and genetic advance over mean were highest for fenugreek seed yield per plant, harvest index, 1000 seed weight, and number of branches per plant at 60 DAS. The harvest index was found to be positive and significantly correlated with seed yield per plant at genotypic and phenotypic levels. In path analysis it is revealed that plant height at 90 DAS, plant spread at 90 DAS, number of pods per plant, number of seeds per pods and 1000 seed weight were having high positive direct effect on seed yield of fenugreek. Existence of high variability, wide variation between PCV and GCV coupled with moderate to low heritability and genetic advance of both additive and non additive interaction may be exploited for further breeding programme.

May, 2013

(Vishnuvardhana)
Major Advisor

9. Effect of Integrated Nutrient Management on Kasuri Methi *(Trigonella Corniculata* L.) Under Hill Zone of Karnataka

SUNANDA B. BABALESHWAR

ABSTRACT

Kasuri methi is an herbaceous, annual spice crop. The herb as well as seed having the economic importance, the dried herb is used as a spice for seasoning of varieties of foods and the seeds is having medicinal importance. The field experiment entitled "Effect of integrated nutrient management on kasuri methi *(Trigonella corniculata* L.) under hill zone of Karnataka" was conducted at ZAHRS Mudigere, during the *rabi* season of 2013 on red sandy loam soil to study the effect of integrated nutrient management on growth, yield, nutrient uptake and to work out the economics. The experiment was laid out in a randomized complete block design with twelve treatments replicated thrice. Significantly the maximum plant height (45.64 cm), number of leaves (86.05), number of branches (25.64), plant spread NS and EW (30.14 and 30.47 cm respectively), leaf area 60 DAS (414.27 cm^2), leaf area index (1.38), AGR at 30-60 DAS and 60-90 DAS (0.21 and 0.26 g/day respectively), CGR at 30-60 DAS and 60-90 DAS (7.09 and 9.23 g/m^2/day respectively), chlorophyll content (21.44 mg/l00.mg of tissue), fresh herb yield (8.02 t ha^{-1}) and dry herb yield (1.88t ha^{-1}) were recorded in the plants supplied with 75% N (60 kg/ha) + RD PK (25:50 kg ha^{-1}) + FYM (7.5 t/ha) I *Rhizobium* (1.5 kg/ha) + *Azo.spirilhim (5* kg/ha) + PSB (5 kg/ ha). Similarly number of pods per plant (620), pod length (2.14 cm), seed yield (465.31 kg ha^{-1}), crude protein content in the herb and seed (13.31 % and 21.33 % respectively), nitrogen, phosphorous and potassium uptake in whole plant (70.92 kg ha^{-1}, 21.64 kg $ha^{-1}$and 31.82 kg ha^{-1}respectively) and net returns (79951.94 Rs/ha) and B:C ratio (2.97:1) were recorded in the same treatment.

July, 2014

(Raviraja Shetty. G,)
Major Advisor

10. Ffect of Integrated Nutrient Management on Growth, Yield and Quality of Ginger *(Zingiber Officinale* Rosc.) Under Hill Zone of Karnataka

HEMANTH, C. V

ABSTRACT

A field experiment was conducted to study the "Effect of integrated nutrient management on growth, yield and quality of ginger *(Zingiber officinale* Rose.) under hill zone of Karnataka" at the field of Department of plantation, spices, medicinal and aromatic crops, College of Horticulture, Mudigere, during 2013-14. The experiment was laid out in Randomized Complete Block Design with eleven treatments replicated thrice. Significantly the maximum plant height (63.29 cm), number of tillers (20.07), number of leaves (220.76), leaf length (24.42 cm), leaf breadth (2.43 cm), leaf area (39.55 cm^2), fresh weight of the plant (314.64 g), dry weight of the plant (60.23 g), number of primary rhizomes (6.80), length of rhizome (18.96 cm), fresh rhizome yield (36.21 t/ha), cured rhizome yield (9.65 t/ha), dry recovery percentage (26.69) and highest oleoresin content (8.42 %) were recorded in the plants supplied with 50% N + PK + coffee husk compost (10 t/ha) + *Azospirillum (5* Kg/ha) + PSB (5 Kg/ha). Similarly minimum incidence of shoot borer and soft rot disease at 90, 120 and 150 days after planting (10.57 and 9.60, 11.44 and 10.71, 11.90 and 8.64 (%) respectively), maximum uptake of nitrogen (115.62 Kg/ha), phosphorous (29.29 Kg/ha) and potassium (214.88 Kg/ha), higher net returns (Rs 11,23,256 per ha) and B:C ratio (7.79:1) were recorded in the same treatment. The maximum number of secondary rhizomes (20.20) was recorded in T_1 (RD NPK + coffee husk compost (10 t/ha)). The highest essential oil content (2.42 %) was recorded in T_7 (50% N + PK + FYM + *Azospirillum* (5 Kg/ha) + PSB (5 Kg/ha)), whereas highest crude fibre content (6.66 %) was recorded in T_5 (75% N + PK + vermicompost (5 t/ha) + *Azospirillum* (5 Kg/ha) + PSB (5 Kg/ha)).

October, 2014

(Raviraja Shetty G)
Major Advisor

11. Effect of Organic Manures and Inorganic Fertilizers on Growth and Herbage Yield of Makoi *(Solan Urn Nigrum* L.) Under Hill Zone of Karnataka

SHIVAKUMAR, H. J.

ABSTRACT

A field experiment was carried out to study the effect of organic manures and inorganic fertilizers on growth and herbage yield of makoi at Agricultural and Horticulture Research Station, Thirthahalli during 2013-2014. The experiment comprised often treatments of organic manures (FYM and vermicompost) and inorganic fertilizers in different combinations, tested in a randomized complete block design with three replications. The study revealed that significant difference was observed among the treatments for all growth and yield characters under studied. Maximum plant height (65.03 cm), number of leaves/plant (210.33), leaf area (650 cm), number of branches/plant (14.80), plant spread, north-south direction (51.25 cm) east-west direction (44.23 cm), fresh herbage yield (13.07 t ha^{-1}) and dry herbage yield (4.05 t ha^{-1}), higher alkaloid content (0.40 % w/w), Alkaloid yield (16.20 kg ha'^higher uptake of nitrogen (126.21 kg ha^{-1}), phosphorus (8.23 kg ha^{-1}), potassium (29.56 kg ha^{-1}) in plants and higher net returns (Rs. 73,781) and B: C ratio (1:3.69) was observed in treatment with the application of vermicompost (It/ ha) + 100 % RD NPK ha^{-1} followed by the treatment with the application of vermicompost (It/ ha) + 75 % RD NPK recorded higher net returns (Rs.49,437) and B:C ratio (1:2.88).

The study indicated that the application of vermicompost (It/ ha) + 100 % RD NPK was found optimum for realizing higher herbage yield, alkaloid content, higher uptake of nutrients and B: C ratio under hill zone of Karnataka.

July, 2014

(M. Ravikumar)
Major Advisor

Forestry

Silviculture and Agroforestry

University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Forestry) theses abstracts produced in the Department of Silviculture and Agroforestry

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1. Assessment of Growth Performance of Agarwood *(Aquilaria malaccensis* Lamk.) Under Different Farming Situations in Karnataka

KARANJIT N SINGH

ABSTRACT

Western Ghats parts of Karnataka are one of the series of mountains and valleys harbouring complex diversity of flora and fauna. Recently, Agarwood *(Aquilaria malaccensis)* is being planted as associated crop in coconut garden, areca garden, coffee plantations and also as monoculture. The spread of agarwood cultivation and the subsequent rise in yield in Karnataka will definitely make the natural products of agarwood easily available to common people. Present study on assessment of growth performance of Agarwood *(Aquilaria malaccensis* Lamk.) under different farming situations in Karnataka generated information on growth performance of the species in different farming situations under different spacing, different ages and at different locations. The results indicated that the spacing, location and different farming situation has a pronounced effect on growth (height, diameter at breast height, basal area, clear bole length, crown width and volume of individual trees) and yield properties (total volume per hectare and MAI) of agarwood. Effect of spacing, farming situations and location was not found to be significant on survival rate in most of the ages. Growth performance of agarwood was found to be superior in areca nut and associated crops in both four and five years after planting. Generally, in recent days, the five year old agarwood trees with 10 cm diameter are subjected to artificial inoculation to get agarwood. In the present study, it was observed that, at the age of five the diameter of trees was ranging from 6.34 cm to 11.27 cm under different farming situations.

Key words: *Aquilaria malaccensis*, growth performance, different farming situation, spacing, location.

June, 2014

(Ramakrishna Hegde)
Major Advisor

2. Growth and Yield Estimation in *Grevillea robusta* A. Cunn. ex R. Br.

SANJITHA D. P.

ABSTRACT

Traditional shade coffee plantations of Kodagu district, in the Western Ghats of Southern India, harbor a high density and diversity of trees. Local farmers appreciate native biodiversity, but plantation economics and public policies drive them to gradually replace the original diversified cover with exotic shade trees such as *G. robusta*, which grows faster and can easily be traded as timber.Information on growth and yield of silver oak under different farming system with different crops is one of the important aspects of cultivation. Recently, several farmers are marketing their timbers to the traders on tree basis. Many a times, the stumpage prices were fixed arbitrarily resulting in considerable loss to the farmers.

Present study on assessment of growth and yield estimation in *Grevillea robusta* generated information on growth performance of the species in different farming situations under different spacing, different ages and at different locations. The results indicated that the spacing and farming situation has a pronounced effect on growth (height, diameter at breast height, basal area and volume of individual trees) and yield properties (total volume per hectare and MAI) of silver oak in different ages of stands. Effect of spacing and farming situations was not found to be significant on survival rate in most of the ages. Significant difference was evident for the all the growth and yield properties at different locations. In order to determine the stumpage value of standing trees, volume tables were prepared for different farming situation with specific age and spacing.

June, 2014

(Ramakrishna Hegde)
Major Advisor

3. Assessment of Variability for Seed and Oil Traits in *Kingiodendron pinnatum* (Roxb. ex DC) Harms

VINOHARA, V.

ABSTRACT

The present study on *Kingiodendron pinnatum*, an important endemic tree species occurring in Western Ghat region, attempts to assess the variability among the altitudes as well as between candidate trees within altitudes for various pod and seed parameters including seed oil content and biodiesel parameters. Nursery experiment was conducted to evaluate the altitudinal variation in seed germination at College of Forestry, Ponnampet. During the year 2012-13.With respect to pod dimensions, population of altitude-II was found to be superior and this altitude can be aimed in future for identifying CPT's with heavier and thicker pods. The seeds collected from altitude-I were longest, while altitude-II recorded wider and thicker seeds compared to other altitudes. The germination per cent of seeds from altitude-II was highest followed by altitude-Ill and the least was observed from altitude-I.

The maximum seed oil content was recorded from seeds collected from altitude-II and altitude-Ill while it was low in altitude-I. Based on the values recorded for seed morphology, weight and oil content within each altitude, it is apparent that CT1, CT2, CT7 and CT4 from altitude-II; CT4, CT5, CT6 and CT8 from altitude-I; CT5, CT3, CT7 and CT8 from altitude-Ill have topped in their performance. Therefore, these CTs may be focused for further identification and selection of plus trees which could be used in the future tree improvement programme.Biodiesel was produced through transesterification of oil using Methanol and NaOH and yields 75% conversion, fuel properties like viscosity (5.7 cSt at 40° C), density (890 kg/m^3), copper strip corrosion test (class 1), flash point (178° C) and fire point (184° C) were found to be on par with ISO standards for fossil diesel.

June, 2014

(G.M. Devagiri)
Major Advisor