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. Bioassay and Evaluation of Newer Insecticides against Insect Pests of Okra

THARA, K.T.

ABSTRACT

As many as 10 species of insect pests and one natural enemy has been recorded in all stages of the okra at ZAHRS, University of Agricultural and Horticultural Sciences(UAHS), Shivamogga. Among them, grey weevil, *Myllocerusundecim pustulatus* (Fab.); flea beetle, *Nisotra cardoni*(Bryant) as defoliators; aphid, *Aphis gossypii* (Koch.); leafhopper, *Amrasca biguttula biguttula* (Ishida); mites, *Tetranychus urticae* (Koch.) and red cotton bug, *Dysdercus koenigii* (Fab.) wereserious sucking pests. The fruit borers include *Helicoverpaarmigera*(Hub.) and *Earias vittella*(Fab.) The population of all insect pests wereabundant during August to November, 2016.The activity of fruit borers commenced 6-8 weeks after sowing (WAS) and peak incidence was observed during 13th WAS. All fruit borers have showed significant negative correlation with maximum and minimum temperature andpositively correlated with relative humidity.

The per cent mortality of *H. armigera* at different regions varied, the per cent mortality was highest in population of Davanagere area recorded lesser LC_{50} values to chlorantraniliprole and flubendiamide obtained for the F_1 generations of the laboratorypopulations. Similarly, the per cent mortality was less in Raichur population of *H. armigera* and recorded higher LC_{50}values and Higher resistance ratio (3.12) followed byBangalore (2.60) and Shivamogga (2.04).Evaluation of differentinsecticides against sucking pests revealed that the least number of sucking pests were observed in case of imidacloprid 17.8 SL(4.17 aphids/3 leaves)(5.8 leafhoppers/3leaves) and buprofezin 25 SC (4.89 aphids/3 leaves) (6.7 leafhoppers/3 leaves) and found effective. With respect tomanagement of borers (*H. armigera* and*E.vittella*) the lowest larval population was noticed in chlorantraniliprole 18.5 SC(0.34 larva/plant) and flubendiamide 480 SC (0.38 larva/plant)followed by emamectin benzoate 5SG (0.60 larva/plant). Chlorantraniliprole 18.5SCproved highly effective in the management of fruit borer and recorded highest yield (86.87q/ha) with a B: C ratio of 3.56.

October, 2016

(Sharanabasappa)
Major Advisor

2. Population Dynamics and Management of Rice Leaf Folder, *Cnaphalocrocis Medinalis* Guenee (LEPIDOPTERA: PYRALIDAE)

MURALI, R.

ABSTRACT

Studies on population dynamics and management of rice leaf folder, *Cnaphalocrocis medinalis* (Guenee) were carried out at the College of Agriculture, UAHS, Shivamogga during 2014-15. Population dynamics of leaf folder and its natural enemies during summer and *kharif* of 2015 revealed that, the maximum number of eggs, larvae and pupae were observed during the 12th standard week (*i.e.*, 4th week of March), 13th standard week (*i.e.*, 1st week of April) and 14th standard week (*i.e.*, 2nd week of April), respectively during Summer season. The maximum per cent leaf damage during summer was observed in April. During *kharif* season, maximum number of eggs, larvae and pupae were observed during the 38th standard week (*i.e.*, last week of September), 39th standard week (*i.e.*, last week of September) and 42nd standard week (*i.e.*, 3rd week of October), respectively. The maximum per cent leaf damage during *kharif* was observed in September and October. Natural enemies *viz..*, spiders, ground beetles and parasitoids were noticed in both the season and these were correlated with leaf folder population.

Field screening of 25 rice germplasms was carried out against rice leaf folder during summer, 2015. Out of 25 germplasm, only one germplasm (Doddiga) had highly resistant to leaf folder. Thirteen germplasms were resistant and remaining eleven germplasms were moderately resistant to leaf folder. Among the plant morphological traits (number of trichomes, number of tillers and leaf width) studied, only number of trichomes and leaf width (cm) showed significant negative and positive correlation, respectively with leaf folder infestation. Field experiment was conducted to evaluate newer insecticide molecules against rice leaf folder during summer 2015. Chlorantraniliprole 18.5% SC @ 0.30 ml/l registered its superiority over rest of the treatments by recording least per cent leaf damage and higher grain yield. Highest B: C ratio was recorded to be 3.62 in both flubendiamide 39.35% SC and thiamethoxam 25% WG treated plots.

April, 2016

(B. K. Shivanna)
Major Advisor

3. Seasonal Fluctuation, Crop Loss Estimation and Management of Yellow Stem Borer, *Scirpophagaincertulas* (Walker) (LEPIDOPTERA: PYRALIDAE) on Paddy

PALLAVI, D.

ABSTRACT

In order to understand seasonal fluctuation, crop loss estimation and management of yellow stem borer, *Scirpophagaincertulas* (Walker) on paddy, studies were conducted during summer and *Kharif*2015 at ZAHRS,College of Agriculture, Shivamogga. During summer, the highest incidence of dead heart (DH) (46.40%) and white ear (WE) (22.00%) was noticed during third week of April and third week of May, respectively. In *Kharif*, 2015 the incidence was high during secondweek of September (31.20% DH) and first week of October (24% WE). In both the seasons, maximum temperature showed significant positive correlation with infestation. With regard to pheromone trap catches, in summer, peak moth catches of 44.40 moths /trap was recorded during fourth week of April and there was a positive correlation with maximum temperature, sunshine hours and minimum temperature, While morning relative humidity had negative correlation and during *Kharif*, peak catches of 35.20 moths / trap was recorded during third week of September. Maximum temperature, sunshinehours exerted significant positive correlation with trap catches. While total rainfall, morning relative humidity and afternoon relative humidity had negative relationship. The yellow stem borer was the most predominant species and pink stem borer was the second most predominant species observed during second week of October. The plots which were sprayed thrice at 15 days interval after sowing in nursery followed by 15 and 30 days after transplantingwas considered as best treatment and if there were no spray, stem borer can do yield loss of up to 87.66 per cent. Among the different insecticides, Chlorantraniliprole 0.4 GR proved very effective in recording lowest per cent of 7.20% DH and 6.67% WE infestation and recorded significantly highest yield (65.75q/ha).

June, 2016

(Sharanabasappa)
Major Advisor

4. Faunistic Studies on Hairy Caterpillars (LEPIDOPTERA: NOCTUOIDEA) in different Cropping Ecosystems

MALLIKARJUN WARAD

ABSTRACT

Investigations were made on faunistic studies on hairy caterpillars (Noctuoidea: Lepidoptera) in different cropping ecosystem. Among lymantrid hairy caterpillars reared, *Euproctis* was documented to feed on banana and paddy, *Lymantria* on castor and *Perina* on fig and one wingless species from *Mimosa pudica* which was not identified to species level. Among arctiids *Creatonotus* was documented from cocoa, *Utetheisa* from sunhemp, *Spilarctia* from castor and *Pericalia* from pigeonpea. *Estigmena, Argina, Amerila, Asura, Amata* were collected from light traps. Seven unidentified species were also recorded on different hosts. Biology of the Bihar hairy caterpillar, *Spilarctia obliqua* reared on field bean leaves revealed that the eggs were creamy white became pale yellow in colour.

The number of eggs per mass varied from 148 to 232 in batches. Egg period, larval and pupal period varied from 5 to 6, 20 to 21 and 8 to 9 days, respectively. The average egg laid by a female moth was 148 - 232. The length of male and female moth varied from 51 to 55 mm and 55 to 59 mm, respectively. The total life span of male and female ranged from 37 to 42 days and 39 to 44 days, respectively. Variations in morphological and genital characters of adults were studied in all the collected species of hairy caterpillars. Based on these variations, an illustrated key was prepared for families of super-family Noctuoidea, sub-families of Erebidae and to the genera of twelve species of hairy caterpillars. The developed illustrated identification key may be useful for identification of important adults of hairy caterpillars occurring in this region.

June, 2016

(Kalleshwaraswamy, C. M)
Major Advisor

5. Development of Trap Nests and Hives for Stingless Bee, *Tetragonula iridipennis* (Smith)

IMRANALI

ABSTRACT

Present study on development of trap nests and hives for stingless bee, *Tetragonula iridipennis* (Smith) was carried out during 2015-16 in apiary at College of Forestry, Ponnampet, UAHS, Shivamogga. Cavities or wooden logs and wall cavities were found to be the most important nesting sites of *T. iridipennis.* The external tunnel of nest was made of resin. Natural nest characteristics revealed the length and breadth of entrance tube ranged between 4-12 mm and 3-6 mm respectively, height of entrance from the ground ranged from 23 cm to 188 cm. The food storage zone was divided into pollen and honey zone. The honey and pollen were stored in separate pots, but these pots were often intermixed. Different trapping materials were used for attracting swarms of stingless bee like cardboard nest, plastic bottles or plastic containers, bamboo slits, earthen pots, coconut shells and cement pipes smeared with honey and cerumen but no colonies were trapped in any of above traps except one in the bamboo slit of two liter volume.

Among the different kind of hives rectangular box with two halves was found more favorable for the growth of the colonies, followed by UTOB hive with two storey space, but there was no honey pot segregation in both of them. UTOB hive and rectangular box with two compartments showed honey pot segregation among these UTOB hive showed highest brood growth. Black ants, earwigs, red ants, termites and spiders are the five different species of organisms found associated with stingless bee colonies. A total of 43 species were recorded as bee forage plants among which 12 species were exclusively stingless bee forage plants and remaining 31 species were served as bee forage plants for stingless bees and other honey bees. Among 43 species 19 species served as pollen source 5 species served as nectar source and 19 species served as both pollen and nectar source. The mean temperature of brood of stingless bees was found to be 20.33 ^{0}C.

August, 2016

(R. N. Kencharaddi)
Major Advisor

6. Bio-ecology and Management of Aphid Complex in Radish (*Raphanussativus*L.)

MEGALADEVI, P.

ABSTRACT

Studies on population dynamics of the radish aphids, effect of nitrogen on the incidence of aphids and management of radish aphids using newer insecticides and bio-pesticides were conducted during 2014-15at College of Agriculture, UAHS, Shivamogga. Radish crop was raised in 16x12 m size plot at monthly interval with hot water treated seeds for aphid monitoring. The aphid (*Myzuspersicae* and *Brevicorynebrassicae*) population was high during first week of December tolast week of April and third week of October to last week of November with peak population during first week of December (24.1 and 40.8 aphids/plant, respectively). At the same time, predatory coccinellid population was low varying from 0.0 to 1.3/plant with maximum population during first week of December (1.3/plant).

The aphids had positive significant correlation with maximum temperature and bright sunshine hours. Significant negative correlation was observed with rainfall, minimum temperature, morning humidity and afternoon humidity. The effect of Nitrogen on aphid, *Brevicorynebrassicae* was clearly evident. Highest population (478.13 aphids/plant) was observed on plants receiving more Nitrogen (450.00 mg N/plant)and minimum population (33.51/ plant) on plants receiving no Nitrogen(0.00 mg N/plant).Effect of nitrogen on plant height was significant.

The response was higher when N application increased from 168.75 to 225.00 mg/plant later there was decrease in plant height with increase in N application. Root yield was positively related to the rate of Nitrogen application.Thiomethoxam (0.5g/l),imidacloprid (0.3ml/l) and dimethoate (1.7ml/l) were best and effective chemicals in reducing the population of aphids (*Myzuspersicae*and *Brevicorynebrassicae*)(3.83, 3.98 and 17.67 aphids/plant, respectively), whereas the two microbial pesticides(*Fusariumsemitectum* and *Verticilliumlecanii)*were less effective.]

June, 2016

(M. Manjunath)
Major Advisor

7. Monitoring of Major Pests on Capsicum with special reference to Management of *Spodoptera Litura* (Fab.) (Lepidoptera: Noctuidae) under Naturally Ventilated Polyhouse Condition

MARUTHI, M. S.

ABSTRACT

The investigations were carried out on monitoring of major pests of capsicum, management of *Spodoptera litura* through safer insecticides and bio-pesticides under naturally ventilated polyhouse during *kharif* 2015 at Zonal Agricultural and Horticultural Research Station, University of Agricultural and Horticultural Sciences, Navile, Shivamogga. A total of five insect and mite pests belonging to five orders and five families were observed on capsicum. They were mite, *Polyphagotarsonemus latus* (Banks) (Acarina: Tarsonemidae), thrips, *Scirtothrips dorsalis* (Hood) (Thysanoptera: Thripidae), aphid, *Myzus persicae* (Sulzer) (Hemiptera: Aphididae), leaf miner, *Liriomyza trifolii* and fruit borer, *S. litura* (Fabricius) (Lepidoptera: Noctuidae). The peak incidence of mite, *P. latus* was noticed during 1st and 2nd week of October and that of thrips, *S. dorsalis* was noticed during 4th week of August and 1st, 2nd, 3rd week of September.

The maximum incidence of aphid was observed during 1st, 2nd and 3rd week of September. The peak infestation of leaf miner was observed during 4th week of July. Further, more number of egg mass of *S. litura* was recorded during 3rd and 4th week of August and that of larval population and fruit damage due to *S. litura* was noticed during 1st and 2nd week of September. Management of *S. litura* on capsicum by safer insecticides revealed that, the treatment chlorantraniliprole 18.5 SC was effective by recording lesser larval population (0.19 larva/ plant) with lowest fruit damage of 11.01 per cent with fruit yield of 29800 kg/ha and the next best treatment was cyantraniliprole 10.26 OD (0.30 larva/ plant with 12.25% fruit damage and fruit yield of 28600 kg/ha).

Assessment of different bio-pesticides for management of *S. litura* on capsicum showed that the treatment Sl-NPV was proved very effective in recording the lowest larval population (0.74 larva/ plant) with least mean fruit damage of 13.99 per cent with fruit yield of 19250 kg/ha followed by *Bacillus thuringiensis* var. *kurstaki* (0.91 larva/ plant with 15.85 % and fruit yield of 18820 kg/ha).

October, 2016

(B. C. Hanumanthaswamy)
Major Advisor

8. Biology and Management of *Tetranychus urticae* Koch (Acarina: Tetranychidae) on Carnation under Polyhouse Condition

SANDEEPA, A.R.

ABSTRACT

An investigation on the biology and management of *Tetranychusurticae*Koch (Acarina: Tetranychidae) on carnation was undertaken at College of Agriculture, University of Agricultural and Horticultural Sciences (UAHS), Navile, Shivamogga during 2015-16. Studies on biology of *T. urticae*revealed that both the sexes (male and female) passed through five stages *viz.*, Egg, larva, protonymph, deutonymph and adult with a short resting period known as quiescent. Morphology of all the stages, immature stagesperiods, longevity of adults and reproductive potential of *T. urticae* were also studied.The incubation period was 3.36 ± 0.56 days.The larval period was 1.79 ± 0.64 days and2.79 ± 0.57 days of male and female, respectively. Total nymphal period of male was 6.67 ± 0.91days and female was 8.10 ±1.16days.The adult male period was 10.00 ± 1.41days and adult female was 12.60 ± 1.43 days. The mean fecundity was 76.80 ± 16.38 eggs/female. The total life period of *T. urticae*of male and female was 21.65 ± 1.63daysand26.85 ± 1.15 days, respectively.

Further studies on varietal screening of carnation against *T. urticae* revealed that Trinidad (25.41 mites/plant) proved less susceptible variety with low mite population incidence. *The highest population was found on variety Pingu with 72.44 mites/plant.The acaricides tested against T. urticae under polyhouse conditions revealed that the treatment of propargite 57 EC recording significantly highest mite reduction (65.35 per cent) andthe next best treatment was diafenthiuron 50 WP (59.91 per cent).The least effective treatments against T. urticaeweregarlic extract 5% (29.84 per cent) and onion extract 5% (23.57 per cent).*

September, 2016

(S. Pradeep)
Major Advisor

Agricultural Extension

University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Agricultural Extension

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1. A Study on Knowledge and Adoption of Improved Cultivation Practices of Pomegranate Growers in Chitradurga District of Karnataka

NAVYASHREE M.

ABSTRACT

The study was conducted in Chitradurga district of Karnataka state to know the knowledge and adoption of improved cultivation practices of pomegranate during the year 2015-16considering area and production of pomegranate as criterion. In Chitradurga district, Hosadurga, Hiriyur and Challakere taluks were purposively selected. Further, from each taluk 4 hoblis were selected. From each hobli, 15 pomegranate growers were selected randomly making a total sample size 180. Around 50.00 per cent of the pomegranate growers had medium level of knowledgeabout recommended cultivation practices. About 42.00 per cent of the respondents had fallenunder medium adoption category.

Majority of respondents belonged to middle age group and had medium farmingexperience and medium land holding. Majority of the respondents had high (42.78%) risk orientation, medium (43.89%) economic motivation and medium(42.78%) innovative proneness. Cent per cent of therespondents had knowledge onfertilizer application, micro nutrients application, irrigation method, growth regulators and had adopted the recommended varieties of pomegranate, fertilizer application, pruning, growth regulators, optimum population and harvesting period. Very meager percentage (26.67 %) of them had knowledge about pest control measures.More than 90 per cent of the respondentshad knowledge about recommended inter crops and grades of pomegranate.

A positively significant relationship was observed betweenlevel of knowledge and adoption with variables like education, cosmopoliteness, mass media participation, extension contact, innovative proneness, risk orientation and scientific orientation.Cent percent of the respondents expressed the problems like incidence of pests and fluctuation in market price.

July, 2016

(Sudheendra M.)
Major Advisor

2. A Study on Adoption of Dairy Management Practices by KVK Trained Farmers

PUNEET

ABSTRACT

A study on adoption of dairy management practices by KVK trained farmers was carried out in the operational area of Shivamogga district of Karnataka state during the year 2015-16. The number of respondents selected for the study was 120. The data was collected by personal interview method

The results showed that majority (85.00%) of the KVK trained dairy farmers had medium adoption level and medium knowledge level (39.17%) regarding improved dairy management practices. Majority (61.67%) of the KVK trained dairy farmers were middle aged. Around 36 per cent of the respondents were educated up to high school, cent percent of respondents engaged in dairy activity and 70.00 per cent of the respondents had high level of annual income. Majority of the respondents had medium level of extension contact (80.00%), mass media participation (50.00%), extension participation (36.67%) and management orientation (70.83%). More than half (55.00%) of the respondents had high scientific orientation and high economic motivation (54.16%). Variables such as education, land holding, occupation, annual income, mass media exposure, extension contact, management orientation and economic motivation were positively and significantly correlated with knowledge and adoption level of the KVK trained farmers.

Majority (76.66%) of the respondents expressed the motivational factors such as, to increase income from the dairy by learning the new practices, followed by to have contact with extension agency (55.00%) for respondents to attend training. The major constraints faced by dairy farmers were financial problem (71.67%) followed by shortage of green fodder during summer season (59.17%) and low price for the milk (44.17%).

June, 2016

(Basavaraj Beerannavar)
Major Advisor

3. A Comparative Analysis of Public, Private and Corporate Extension System

KAVYASHREE, S.

ABSTRACT

The study on comparative analysis of Public, Private and Corporate Extension system was conducted in Tumkur and Chitradurga districts of Karnataka state during 2015-16. Thirty farmers and twenty extension workers were selected from public, private and corporate sector by following simple random sampling procedure. Total sample size for the study was 150 respondents. The data was collected using structural interview schedule developed for farmers and questionnaires for extension workers. The results showed that majority of farmers had favourable (43.33%) perception towards private extension system and extension workers had favourable perception towards public (55.00%) and private (45.00%) extension system. Criteria like technical knowledge (public), job satisfaction (private) and communication (corporate) were found to be a pivotal factor determining the performance of extension workers in respective extension system.Majority of farmers in public, private and corporate extension system were belonged to the category of middle age and medium level of cropping intensity. Whereas, farmers under both public and private extension system had medium level of irrigation intensity.

In public sector they had medium level of socio economic status and high level of risk orientation. In corporate sector, farmers had medium level of mass media participation. In private sector they had medium level of innovative proneness, scientific orientation, extension participation and management orientation. Similarly, farmers had low level of economic motivation, extension agency contact and decision making ability. Extension participation had significant relationship with perception of farmers towards extension system. Major constraints faced by the farmers were ‘insufficient training’ in public sector, ‘no government support’ in private and ‘labour intensive’ in corporate sector. The extension workers expressed ‘farmers were less responsive’ (public), ‘timely operation is not possible’ (private) and ‘labour intensive’ (corporate) as constraints. The suggestions given by farmers and extension workers were increase number of extension staff and conduct extension activities.

July, 2016

(Sahana, S.)
Major Advisor

4. Impact of Bhoochetana Programme in Shivamogga District of Karnataka

PRIYANKA, G.P.

ABSTRACT

The study was conducted in Shivamogga district of Karnataka state during 2015- 16 to measure the adoption of recommended Bhoochetana practices, impact of Bhoochetana programme and to ascertain the constraints and suggestions for effective implementation of Bhoochetana programme. Sixty beneficiaries and sixty non-beneficiaries were selected as the sample for study. The data was collected by personal interview with the help of structured schedule which was developed keeping in view the objectives and variables of the study.Majority of the beneficiaries (70.00 %) belonged to high adoption category. On the other hand most of the non-beneficiaries (86.66 %) belonged to low adoption category. Integrated nutrient management practices like usage of organic manures (100.00 %), soil testing (80.00 %) and fertilizer recommendations (66.66 %), integrated pest and disease management practices like proper spacing (76.66 %), insecticidal spray (73.33 %) and crop rotation (68.33 %) and soil and water conservation practices like land smoothening (60.00%), strengthening of existing bunds (56.66 %) and construction of small section bunds (53.33 %) were the major Bhoochetana practices adopted by the beneficiary farmers.

Majority of beneficiary farmers (58.34 %) belonged to medium annual income category and non-beneficiary farmers (91.67 %) farmers belonged to low income category. There was increase in 12 per cent of nitrogen content in the beneficiaries land compared with the non-beneficiaries. Similarly there was increase of 42.5 per cent of phosphorous, 50.00 per cent of zinc and 42.85 per cent of boron was observed in beneficiaries land. Non-availability of labour (98.33%) and non-availability of inputs in time (93.33 %) were the major constraints in adoption expressed by respondents of improved crop production practices. Adequate and timely provision of inputs (65.00 %) and frequency of visits of field staff need to be increased (51.66 %) were the major suggestions given by the farmers.

July, 2016

(Chandranaik, S.)
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. Nitrogen Management in Rainfed Maize (*Zea mays* L.) through Slow Release Nitrogenous Fertilizers Under Light Textured Soils

SHILPHA, S. M.

ABSTRACT

The field experiment entitled "Nitrogen management in rainfed maize through slow release nitrogenous fertilizers under light textured soils" was conducted during *Kharif*, 2015 at Agronomy field unit of College of Agriculture, UAHS, Navile, Shivamogga. The experiment consisting of ten treatments replicated thrice was laid out in Randomized Complete Block Design. The treatment comprises of three types of oil coated urea *viz*, neem coated urea, pongamia and castor oil coated urea which were applied either in single application at sowng as basal and in split applications as top dress at 30 days after sowing along with application of normal urea without any coating.

Significantly higher grain (69.45 q ha^{-1}) and stover yield (79.42 q ha^{-1}) were recorded by the application of 100 percent recommended N through neem coated urea as basal. Superiority of the treatment was due to the significant improvement in growth attributes *viz.*, plant height (207.70 cm), leaf area (39.00 dm^2 $plant^{-1}$), leaf area index (2.17), leaf area duration (91.92 days), total dy matter production (321.70 g $plant^{-1}$), crop growth rate (9.55 g m^{-2} day^{-1}), relative growth rate (0.0018 g g^{-1} day^{-1}) and yield atttibutes such as cob length (15.7 cm), test weight (42.72 g) and grain weight per plant (124.95 g $plant^{-1}$). Significant improvement in growth and yield parameters with application of different slow release nitrogenous fertilizers was mainly due to higher availablility of nutrients in soil (239.36, 74.9 and 272.4 kg N, P_2O_5 and K_2O ha^{-1}, respectively) which may be attributed for higher total nutrient uptake (128.54, 38.36 and 110.95 kg N, P_2O_5 and K_2O ha^{-1}, respectively) by the crop.

June, 2016

(T. M. Soumya)
Major Advisor

2. Weed Management in Rice Through Application of Pre and Post Emergent Herbicides in Coastal Zone of Karnataka

ATHAULLA, P.

ABSTRACT

A field experiment entitled "Weed management in rice through application of pre and post emergent herbicides in coastal zone of Karnataka" was conducted during *kharif* 2015 at Zonal Agricultural and Horticultural Research Station, Bramhavara to evaluate suitable pre and post emergent herbicides for rice. The herbicides tested were two pre emergent *viz.* Bensulfuron methyl 0.6% G + Pretilachlor 6% G, Pyrazosulfuran ethyl 10 WP, three post emergent herbicides *viz.* Bispyribac sodium 10 SC, Penoxsulum 240 SC, Ethoxysulfuron 15 WG. Post emergent herbicides were preceded by the application of pre emergent herbicide Pyrazosulfuran ethyl 10 WP. In addition hand weeding twice at 20 and 40 DAP and weedy check was also included for comparison. The experiment was laid in RCBD design with three replication.

The results revealed that sequential application of Pyrazosulfuran ethyl 10 WP @ 25 g a.i. ha^{-1} at 3 DAP followed by Penoxsulum 240 SC @ 22.5 g a.i.ha^{-1} at 20 DAP recorded significantly lower weed count, weed dry weight, weed index (8.11 %) and higher weed control efficiency (94.09 to 78.55 %) without being phytotoxic to the crop. The same treatment combination recorded significantly higher growth and growth attributes *viz.* Plant height, number of tillers, number of leaves, leaf area, LAI, AGR and CGR. Significantly higher grain yield (5351 kg ha^{-1}), straw yield (6208 kg ha^{-1}) and major nutrients uptake by crop was also recorded in the above mentioned treatment. These results are on par with hand weeding twice at 20 and 40 DAP. The unweeded check recorded significantly lower growth and its attributes and also recorded higher major nutrients removal by weeds. The maximum net returns (Rs. 34,378 ha^{-1}) and profit per rupee invest (1:1.58) was achieved in sequential application of Pyrazosulfuran ethyl 10 WP @ 25 g a.i. ha^{-1} at 3 DAP followed by Penoxsulum 240 SC @ 22.5g a.i.ha^{-1} at 20 DAP.

June, 2016

(K.V. Sudhir Kamath)
Major Advisor

3. Crop Weather Relationships in Maize as Influenced by Sowing Dates

DADAPEER, B. H.

ABSTRACT

A field experiment was conducted at College of Agriculture, UAHS, Shivamogga during *kharif* 2015 to study the crop weather relationships in maize as influenced by sowing dates. The experiment was laid out in factorial RCBD with three replications. There were eight treatment combinations comprised of four dates of sowing (June 15th, June 30th, July 15th and July 30th) and two hybrids (PAC - 740 and CP - 818).

Among the dates of sowing June 15th sown crop recorded significantly higher plant height (201.03 cm), total dry weight (305.65 g plant^{-1}), kernel yield (7632.57 kg ha^{-1}), stover yield (9512.56 kg ha^{-1}), HUE (17.87 x 10^{-2} g ^{0}C day^{-1}), PTUE (14.27 x 10^{-3} g ^{0}C hrs^{-1}), HTUE (35.84 x 10^{-3} g ^{0}C hrs^{-1}) and RUE (3.14 g MJ^{-1}) compared to other dates of sowing. Between the hybrids CP - 818 recorded significantly higher plant height (191.85 cm), total dry weight (277.65 g plant^{-1}), kernel yield (7060.72 kg ha^{-1}), stover yield (8839.98 kg ha^{-1}), HUE (16.49 x 10^{-2} g ^{0}C day^{-1}), PTUE (13.35 x 10^{-3} g ^{0}C hrs^{-1}), HTUE (28.77 x 10^{-3} g ^{0}C hrs^{-1}) and RUE (3.00 g MJ^{-1}) compared to PAC - 740. Interaction effects were non significant. However, higher kernel yield (7983.00 kg ha^{-1}) was recorded with CP – 818 sown on June 15th.

Rainfall (r = 0.79**), sunshine hours (r = 0.42*), maximum temperature (r = 0.46*), solar radiation (r = 0.83**), relative humidity (r = 0.75**) and evaporation (r = 0.85**) during silking to maturity had positive significant relationship with kernel yield in maize. On the other hand maximum temperature from emergence to knee high stage (r = - 0.63**), knee high stage to tasseling (r = - 0.71**), silking to maturity (r = - 0.46*) and minimum temperature from emergence to knee high stage (r = - 0.62**), knee high stage to tasseling (r = - 0.52) had negative significant relationship with kernel yield in maize. From the study it can be inferred that CP - 818 is suitable for early sowing and PAC - 740 can be used under delayed sowing for getting higher kernel yield in maize.

September, 2016

(S. Sridhara)
Major Advisor

4. Efficiency of Slow Releasing Nitrogenous Fertilizers on Growth and Yield of Paddy in Coastal Karnataka

BHANUPRAKASH, H. R.

ABSTRACT

A field experiment was conducted during the *kharif* 2015 at Zonal Agricultural and Horticultural Research Station Brahmavara, UAHS, Shivamogga to study the efficacy of urea coated with different substances on growth and yield of transplanted paddy. The experiment was laid out in randomized complete block design with nine treatments replicated thrice. The treatments consisted of neem oil coated urea, mud coated urea, pongamia oil coated urea and cashew nut shell liquid coated urea at 100 per cent and 75 per cent recommended dose of nitrogen. Only the basal applications of these fertilizers were coated.

Application of 100 per cent recommended dose of nitrogen through neem oil coated urea produced significantly higher grain and straw yield (5541, 7995kg ha^{-1}respectively),as compared to recommended dose of fertilizer (4209, 6793 kg ha^{-1} respectively) in normal form. This was mainly due to growth attributing parameters like plant height (97.09 cm), number of leaves per hill (66.90), number of tillers per hill (19.60), leaf area per hill (1014.96 cm^2), total dry matter production per hill (62.66 g) and yield contributing characters like number of productive tillers per hill (19.48), panicle length (23.73 cm), panicle weight (3.67 g), 1000 grain weight (23.64 g), number of filled grains per panicle (110.29) and harvest index (0.40).

The total nutrient uptake of nitrogen, phosphorus and potassium (117.71, 35.40 and 126.10 kg ha^{-1}, respectively) with higher benefit cost (1.61) and net returns (Rs. 63167.36) were found higher in the same treatment, this is followed by 100 per cent recommended dose of nitrogen through cashew nut shell liquid coated urea has recorded higher grain and straw yield (5226, 7892 kg ha^{-1}respectively). Significantly higher agronomic nitrogen use efficiency (22.19 kg grain kg^{-1} nitrogen) was recorded in treatment 100 per cent RDN through neem oil coated urea.Further, results from an incubation study showed that the rate of nitrogen release was spontaneous upto 60 days in the treatment 100 per cent RDN through neem oil coated urea.

June, 2016

(M. Hanumanthappa)
Major Advisor

5. Comparative Evaluation of the Pre Emergence Herbicides on Weed Dynamics in Maize (*Zea Mays* l.) and their Residual Effect on Succeeding Crop

PRADEEP, L. S.

ABSTRACT

A field experiment entitled "comparative evaluation of the pre -emergence herbicides on weed dynamics in maize (Zea *mays* L.) and their residual effect on succeeding crop**"** was conducted during *kharif* 2015 at College of Agriculture, University of Agricultural and Horticultural Sciences, Shivamogga. The herbicides included were saflufenacil + dimethenamid-P (Integrity 66.8 EC) @ 501, 668 and 835 g a.i. ha^{-1}, sole application of saflufenacil 70 WG @ 51, 68 and 85 g a.i. ha^{-1} , sole application of dimethenamid-P 72 EC @ 450, 600 and 750 g a.i. ha^{-1} and Atrazine 50 WP @ 1.25 kg a.i. ha^{-1}. In addition to package of practices, weed free check and untreated control were also included for comparison. The predominant weed flora observed in the experimental field were, *Cyperus rotundus, Cynadon dactylon*, *Eleusine indica*, *Digitaria sangunalis, Digitaria marginata*, *Commelina benghalensis, Ageratum conyzoides, Celosia argentia, Alternenthera sessilis, Borreria stricta and Acanthospermum hispidum.* Pre - emergence application of saflufenacil was found more effective against broad leaved weeds while, dimethenamid-P against the grass and sedges.

The combi- product of saflufenacil 68 g l^{-1} + dimethenamid-P 600 g l^{-1} EC (Integrity 66.8 EC) @ 668 g a. i. ha^{-1} acting as broad spectrum herbicide was found more efficient in controlling all types of weeds by recording highest weed control efficiency (72.63%) at 60 DAS in maize without having any phytotoxicity on maize as well as succeeding crop of green gram. The same treatment recorded higher nutrient uptake by the crop (74.07, 13.36 and 71.02 kg NPK ha^{-1}, respectively, at 60 DAS). Thus, from the study, it can be inferred that pre tank mixture of saflufenacil 68 g l^{-1} + dimethenamid-P 600 g l^{-1} EC (Integrity 66.8 EC) @ 668 g a. i. ha^{-1} can be used as pre - emergence safely in maize for better productivity (7420 kg ha^{-1}) and higher B: C ratio (2.91) and effective weed management.

June, 2016

(G. K. Girijesh)
Major Advisor

6. Assessment of Maize and Pole Bean Intercropping System under different Geometry, Sowing Time and Fertilizer Levels in Southern Transition Zone of Karnataka

AFROZA PATEL

ABSTRACT

A field experiment was conducted during *Kharif* 2015 at College of Agriculture, Navile, Shivamogga. The experiment was laid out in Randomized Complete Block Design with ten treatments replicated thrice. Treatments consisted of two spacing for maize crops (60 cm x 30 cm and 75/45 cm x 30 cm under paired row) in combination with two dates of sowing for pole bean (simultaneous sowing of both maize and pole bean and pole bean sowing 10 DAS of maize) and two doses of fertilizer for pole bean (100 and 50% of NPK) in intercropping system. Besides, sowing of maize and pole bean at their regular spacing under monocropping system. The maize hybrid used was CP818. The results revealed that, though the maize sole crop at 60 cm x 30 cm spacing recorded significantly higher growth and yield parameters.

Treatment under intercropping of maize + pole bean simultaneous sowing under paired row at 75/45 cm x 30 cm with application of 100 per cent NPK for pole bean gave higher maize equivalent yield (174.55 q ha^{-1}) with an yield advantage of 110 per cent, LER of 1.53 (53 % more land use efficiency), ATER of 1.39, with less competition ratio of 1.83 and higher monetary advantage of Rs. 71217 over sole cropping of maize. Hence, the above treatment found best over sole maize crop and other intercropping systems. Further, the same treatment earned the higher gross returns (Rs. 209464) and net returns (Rs.130331) with B:C ratio of 2.65 besides, maintaining the soil fertility with available nutrients of nitrogen (238.33 kg ha^{-1}), phosphorus (223.04 kg ha^{-1}) and potassium (327.29 kg ha^{-1}).

July, 2016

(H. K. Veeranna)
Major Advisor

Genetics and Plant Breeding

University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Genetics and Plant Breeding

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1. Studies on Genetic Variability for Grain Yield and its Component Traits in F_3 Population of Rice (*Oryza Sativa* L.)

POOJA B.

ABSTRACT

The present investigation was undertaken during kharif 2015 at the College of Agriculture, Shivamogga, Karnataka to study the variability parameters, correlation, path analysis and identification of superior segregants in F_3 generation of two crosses of rice *viz*., 'JGL-1798 X KHP-2 and 'KHP-2 X MO_4'.The descriptive statistical parameters viz., mean, range, skewness and kurtosis with respect to all the twelve quantitative characters in F_3 population of two crosses of rice were recorded. Out of two crosses the best performance is exhibited by KHP-2 X MO_4 in terms of range followed by JGL-1798 X KHP-2 for yield and its related traits. Platykurtic and positively skewed distribution recorded for most of the traits in both the crosses. The magnitude of PCV was more than GCV in general for most of the characters indicating that characters are invariably influenced by environment.

High heritability coupled with high genetic advance as per cent of mean is being observed for plant height, number of tillers, number of productive tillers, panicle length, number of spikelet per panicle, number of grains per panicle, grain yield per plant and harvest index indicating that the characters are controlled by additive gene action and can be transferred to next generation through selection. Grain yield per plant exhibited significant and positive association with important yield components like total tillers per plant, productive tillers per plant, spikelets per panicle, grains per panicle, spikelet fertility and harvest index. Path analysis in F_3 generation of both the crosses indicated maximum positive direct effect of productive tillers per plant, spikelet per panicle, grains per panicle and harvest index, panicle length on grain yield. Top ten superior segregants in desirable direction for grain yield, productive tillers per plant and grains per panicle were identified in both the crosses for advancing to next generations.

July, 2016

(B. M. Dushyantha Kumar)
Major Advisor

2. Studies on Genetic Variability Diversity and Stability in Advanced Breeding Lines of Rice (*Oryza Sativa* L.)

RASHMI K P

ABSTRACT

Rice is the staple food crop of India. It posses huge diversity of both wild and cultivated species. The present study was undertaken to evaluate twenty two advanced breeding lines in a Randomized complete block design with two replications during *kharif* 2015 at three locations *viz,* ZAHRS Mudigere, ZAHRS Bramhavara and College of Agriculture (CoA) Shivamogga for variability, diversity and stability for yield and its components. ANOVA revealed significant differences among all the advanced breeding lines for all the characters studied. High range of variation, PCV, GCV and high heritability coupled with high GAM was observed for number of tillers per plant, number of productive tillers per plant, number of spikelets per tillers, number of grains per panicle, grain yield (kg/ha), straw yield (kg/ha) and harvest index.

Days to maturity, straw yield (kg/ha) and harvest index had significant positive association with grain yield at phenotypic level. Straw yield (kg/ha) followed by harvest index had the highest positive direct effect on grain yield, whereas highest positive indirect effect on grain yield by the trait straw yield (kg/ha) via days to maturity. Using Mahalanobis' D^2 statistics, advanced breeding lines were grouped into five clusters, cluster I (18) consists highest number of advanced breeding lines. Highest intra cluster distance were recorded in the cluster I (3.48) and highest inter cluster distance between cluster III and IV based on cluster distance. Cluster mean analysis reveals that cluster I received the first rank. Number of spikelets per panicle and number of grains per panicle had highest contribution towards the genetic diversity. The advanced breeding line JB 15-2 is identified as the stable variety for grain yield in all the three locations, whereas JM 15-4 (Mudigere), JK2 15-7 (Bramhavara) and JK 15-1 (Shivamogga) are identified as stable lines for specific locations for grain yield.

June, 2016

(DushyanthaKumar. B. M.)
Major Advisor

3. Genetic Variability for Grain Yield and its Component Traits in F_2 Populations of Rice *(Oryza sativa L.)*

PRADEEP, P.

ABSTRACT

The present investigation in rice (*Oryza sativa* L.) was undertaken during *Kharif*, 2015 at AHRS, Kathalagere, to study variability parameters, character association and path analysis and identification of transgressive segregants in respect of grain yield and its component traits as well as blast reaction in F_2 population of 'BPT5204 × IET21075' and 'BPT5204 × IET21214' crosses. The distribution pattern of two F_2 populations indicated large number of genes with dominance based complementary interaction in the inheritance of total tillers per plant, number of panicles per plant, number of grains per panicle, grain yield per plant and L:B ratio in both crosses but duplicate type of interaction was noticed for days to 50 per cent flowering, panicle length, number of spikelets per panicle, spikelets fertility, test weight, grain length and grain breadth in 'BPT5204 × IET21075'.

Similarly for panicle length and harvest index in 'BPT5204 × IET21214'. GCV and PCV values were relatively higher with high heritability coupled with high genetic advance for total tillers per plant, productive tillers per plant, grains per panicle and grain yield per plant in both the crosses indicating additive gene action in their genetic control. Grain yield per plant was exhibited significant positive correlation with plant height, total tillers per plant, number of panicles per plant, panicle length, number of spikelets per panicle, number of grains per plant and spikelet fertility in both the crosses. Path analysis in F_2 generation of both crosses indicated the positive direct effect of total tillers per plant, number of panicles per plant, grains per panicle, panicle length and harvest index on grain yield. Superior desirable transgressive segregants were identified in both the crosses for advancing to next generation. The maximum plants showed resistance to leaf blast for disease reaction as compared to their parent under natural field condition in both crosses.

July, 2016

(Malleshappa, C.)
Major Advisor

4. Studies on Heterosis and Combining Ability in Okra (*Abelmoschus Esculentus* (L.) Moench)

DARSHINI, T. K

ABSTRACT

The present investigation was undertaken with the objective of estimatingheterosis and combining ability through line x tester mating design. The experiment was conducted in College of Agriculture, Shivamogga by involving nine lines and three testers as parents and their twenty seven F_1 hybrids, generated and evaluated during 2015-16. Heterosis was recorded for fruit and its fifteen component characters, the crosses which had significant heterosis over standard check areVarshaUpahar x KashiKiranthifor plant height and days to 50% flowering, 307-10-01 x Arka Anamikafor number of leaves, ParbhaniKranthix ZARS for internodal length, VarshaUpahar x ZARS for number of branches per plant, PusaMakhmali x ZARS for number of nodes on main stem,PhuleUtkarshix KashiKiranthi for stem diameter, Punjab Padmini x ZARS for fruit length, PusaMakhmali x KashiKiranthifor fruit Diameter,VRU-109x Arka Anamika for number of fruits per plant,Punjab Padmini x ZARS for average fruit weight per plant and for total fruit yield per plant was maximum in the hybrid VRU-109 x ArkaAanamika, followed by PhuleUtkarshi xKashiKiranthiwere these hybrids may be used for exploitation of hybrid vigour on commercial scale.

Combining ability analysis was carried out for fruit yield and its components in okra. Both general a combining ability (GCA) and specific combining ability (SCA) variances were highly significant for almost all the characters indicating the importance of both additive and non additive gene actions. Parents and F_1 hybrids differed significantly for general combining ability and specific combining ability effects for all the characters respectively.The highest gca effect for total fruit yield per plant recorded in Punjab Padmini.The highest significant positive sca effect was observed in the cross VRU-109 x Arka Anamika. Among the parentsPunjab Padmini, VRU-109, VarshaUpaharproved to be the good general combiner and VRU-109 x Arka Anamikawas the good specific combiner for most of the yield and yield attributing traits followed byPunjab Padmini x ZARS.

August, 2016

(Gangaprasad, S.)
Major Advisor

5. Genetic Investigation in Two F_2 Populations of Flue-Cured Virginia (FCV) Tobacco (*Nicotiana tabacum* L.)

SAMPURNA D

ABSTRACT

The present investigation was carried out to elucidate the information on genetic variability, heritability, genetic advance, character association and path analysis in two F_2 populations and three parental cultivars of Flue cured virgina (FCV) tobacco.Two F_2 populations of the crosses, TB-70 × TB-102 and TB-100 × TB-102 and three parental cultivars *viz*., TB-70, TB-100 and TB-102 were evaluated at ZAHRS, Shivamogga during *kharif* 2015. Observations were recorded on fifteen characters. Descriptive statistical parameters were estimated which revealed wider range values for all the characters. High PCV, GCV were observed for the traits like specific leaf weight, leaf area per plant and total sugars in both the crosses. High heritability estimates were observed for all the characters investigated.

The expected genetic gain expressed as per cent of mean was high for stem girth, chlorophyll content, specific leaf weight, number of leaves per plant, leaf area per plant and days to flowering in both the crosses. High heritability coupled with high genetic advance was noticed for stem girth, chlorophyll content, specific leaf weight, number of leaves per plant, leaf area per plant and days to flowering in both the crosses, indicating additive gene action in their genetic control. Correlation studies revealed significant correlation of green leaf yield with cured leaf yield followed by top grade equivalent, leaf area per plant and number of number of leaves per plant in both the crosses. The maximum possible direct effect on green leaf yield was exhibited by cured leaf yield in both the crosses. It can be concluded that selection of green leaf yield along with its component traits, particularly cured leaf yield, top grade equivalent, leaf area per plant and number of number of leaves per plant will be highly reliable for developing high yielding genotypes in further generations.

July, 2016

(H. D. Mohan Kumar)
Major Advisor

6. Variability and Genetic Divergence Studies for Yield and Yield Component Traits in Rice (*Oryza sativa* L.) Genotypes in Hill Zone

HARISH, D.

ABSTRACT

Rice (*Oryza sativa* L.) is one of the most important food crop grown worldwide. It is the staple food for half of the world's population, India being primary centre of origin it posses huge diversity of rice genotypes of both wild and cultivated. The present study was undertaken to evaluate 100 rice genotypes for variability and divergence studies for yield and its component traits and field screening of genotypes to blast disease according to IRRI scale. ANOVA revealed significant difference among the genotypes studied for all the characters except days to maturity. High range of variation, PCV, GCV and high heritability coupled with high GAM was observed for panicle length, number of spikelets per panicle and number of grains per panicle.

All the yield component traits except plant height, panicle length, per cent spikelet fertility and test weight exhibited significant association with grain yield at phenotypic level. Straw yield per plant followed by harvest index, number of grains per panicle and days to 50 per cent flowering had the highest positive direct effect on grain yield where as highest positive indirect effect on grain yield by the trait straw yield per plant via number of tillers per plant. Using Mahalanobis' D^2 statistics, genotypes were grouped into eleven clusters the cluster IX (20) consists of highest number of genotypes. Based on cluster distance, highest intra cluster distance were recorded in the cluster VII and highest inter cluster distance between cluster IX and XI. Cluster mean analysis reveals that cluster IX received the first rank. Among all the characters, grain yield per plant followed by days to 50 per cent flowering had highest contribution towards the genetic diversity. Rice genotypes screening to blast disease shows that the genotypes IET-25147, IET-24414 shows resistance to blast disease and the genotype IET-25147 had recorded the highest yield per plant.

June, 2016

(T. H. Gowda)
Major Advisor

7. Genetic Variability and Divergence Studies in Black Gram *(Vigna mungo* [L].Hepper*)*

BASAVARAJESHWARI B SAJJANAR

ABSTRACT

Black gram is the major pulse crop of India. It posses huge diversity of both wild and cultivated species. The present study was undertaken to evaluate sixty four germplasmlines in a simple lattice with two replications during *kharif, Rabi*, and *summer*for variability, diversity and stability for yield and its components. Analysis of variancerevealed that the treatment (genotypes) under the study differed significantly even at 1 *per cent* level of significance for all the character *viz*., plant height, pod length, number of primary branches, number of secondary branches, number of seeds per pod, number of cluster per pod, number of pods per plant, test weight, days to 50 per cent flowering and days to 50 per cent pod maturity.

ThehigherestimatesofPCVandGCV were observed among theaccessionsfor the characters, suggesting that these characters were under the influence of genetic control. Using Mahalanobis' D^2 statistics, germplasmlineswere grouped in 9 clusters, where in cluster I had highest number of genotypes. The highestintra cluster distances showed by clusterV and intra cluster distance was observed between cluster IV and V. Genotypes M-375 and M-39 had high mean values than the population mean, regression coefficient less than one and least deviation from regression for seed yield per plant indicating that their stability over wide range of environments. Genotypes like COBG-653,M-278 and M-147 were found stable for the seed yield during *kharif, rabi* and *summer* respectively.

July, 2016

(T. H. Gowda)
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. Investigations on Wilt Complex Incited by *Meloidogyne* and *Fusarium*in Gerbera under Protected Cultivation

SARITHA, A. G.

ABSTRACT

Gerbera (*Gerbera jamesonii*Hook) is very popular and widely used as a decorative garden plant or as cut flowers. The major constraint for the cultivation of Gerbera is due towilt complex incited by root knot nematode and *Fusariumoxysporum* f. sp. *gerberae*. The disease was noticed in all the surveyed locations of Shivamogga district during 2015-16. The severity ofwilt complex was more in Shivamogga taluk followed by Sagara and Hosanagara taluksand minimum disease incidence was recorded in Shikaripura taluk. The present surveyresults also indicated the high frequency of occurrence of both the pathogens from soil androot samples collected from Shivamogga taluk. Screening of different popular genotypes of gerbera against *M. incognita* and *F. oxysporum*f. sp. *gerberae*wilt complex showed that, thegenotype Goliathregistered leastnumber of galls, root- knot index and per cent disease incidence ascompared to other genotypes indicating its resistance against the wilt complex.Dana Ellen has showed susceptible reaction, while, Stanza and Balance werefound to be moderately resistant. The remaining genotypes *viz.*, Primrose and Shimmarwere found to be moderately susceptible.In the interaction studies, *M. incognita* was the most aggressivepathogen compared to *F. oxysporum*f. sp. *gerberae*. However, plants receiving *M. incognita* seven days prior to inoculation of *F.oxysporum*recorded least growthfollowed by simultaneous inoculation of *M. incognita* and *F. oxysporum*over untreated control.These results suggest that the nematode can predispose gerbera to infection by *F.oxysporum*and can aggravate the disease.Studies on integrated management of root-knot and wilt complex of gerbera under protected cultivation revealed that all the treatments registered increased plant growth parameters, reduced nematode parameters andper cent disease incidence ascompared to the untreated control. These plant growth parameters, nematode parameters andper cent disease incidence of gerbera in various treatments differed significantly.However, treatment with*Trichodermaharzianum* +*Paecilomyceslilacinus* + vermicompostwasfoundto be superior over other treatments followed by treatment with *T.harzianum* ‘and treatment with*P.lilacinus*.

June, 2016

(H. Ravindra)
Major Advisor

2. Investigations on Early Blight of Tomato Incited by *Alternaria Solani* (Ellis and Martin) Jones and Grout.

MAHANTESH BALAGAR

ABSTRACT

Tomato (*Lycopersicon esculentum* Mill.) is one of the most popular and widely grown vegetable crop of both tropics and subtropics of the world, belongs to the family Solanaceae. This crop is affected by several diseases among them Alternaria leaf blight is one of the most important disease caused by *Alternaria solani*. The disease severity was more in Nyamati village (Honnali taluk) of Davanagere district (47.25 %) and Kommanal village (Shivamogga taluk) of Shivamogga districts (42.50 %). *A. solani* was isolated from the leaf samples collected during survey of 2015-16. Cultural studies revealed that, the growth of the fungus was maximum on Potato dextrose Agar (88.90 mm) and maximum dry mycelial weight (493.00 mg) was observed in Potato dextrose broth. The optimum temperature for the growth of the fungus was ranged 25 ºC to 30 ºC. The maximum dry mycelial weight was obtained at pH 6.5 (690.17 mg) to 7.0 (649.83 mg).

In vitro evaluation of fungicides revealed that, 1000 ppm concentration of mancozeb (88.42 %), propiconazole (90.58 %) and carbendazim + mancozeb (88.07 %) maximum Per cent inhibition. Among the bio agents, *Trichoderma harzianum* UAHS-1 (80.36 %), UAHS-2 (78.33 %) and *Trichoderma viridae* GKVK (75.56 %) were found effective against *A.solani*. Among nine plant extracts evaluated against *A.solani*, Pongamia leaf extract (54.76 %) at 10 % concentration showed maximum inhibition of the pathogen. Screening of sixteen tomato genotypes against *A.solani*, under glass house conditions revealed that, only one genotype, Arka Rakshaka was found highly resistant and other seven were showed moderate resistance and remaining eight genotypes were found susceptible. The field evaluation of fungicides, bio agents and botanicals indicated that hexaconazole at 1 % and mancozeb at 0.2 % most effective in reducing the disease severity as well as in increasing the yield.

June, 2016

(C. Karegowda)
Major Advisor

3. Studies on Fusarium Wilt of Carnation Caused by *Fusarium oxysporum* f. sp. *dianthi* Snyder and Hans., under Polyhouse Condition

KAVITA TRIYAMBAK HEGDE

ABSTRACT

Carnation (*Dianthus caryophyllus* L.) is one of the most important cut flowers in the world. It belongs to the family Caryophyllaceae. Carnation is severely affected by wilt disease caused by *Fusarium oxysporum* f. sp. *dianthi* leading to death of plants. The pathogen was isolated from infected plant and on the basis of morphological and cultural characters the fungus was identified as *F. oxysporum* f. sp. *dianthi*. The fungus produced microconidia, macroconidia and chlamydospores. Maximum radial growth (90 mm) was recorded in PDA and maximum dry mycelial weight was recorded on Oat meal broth (441 mg). In sporulation studies, excellent sporulation was recorded in Czapek's Dox broth, at 30°C temperature and 6.0 pH. Further maximum conidial germination was observed in 2 % sucrose, 25^0C temperature and 6.0 pH. Screening of seven genotypes (Trinidad, Pingu, Amos, Loris, Vincidar, Hunza and Soto) were carried out in polyhouse, among seven none of the varieties were found immune or resistant or moderately resistant.

Under *in-vitro* evaluation of bio-agents *Trichoderma harzianum* (UAHS Shivamogga) found effective in reducing the mycelial growth (64.44%). Among the six plant extracts evaluated garlic extracts at 10% (91.11%) found effective in reducing the mycelial growth. Among the non systemic fungicides evaluated Chlorothalonil, Mancozeb found effective in inhibiting the growth of fungus at 1000ppm. Among systemic fungicides Carbendazim, Propiconazole and Difenconazole found effective in inhibiting the growth of fungus in all tested concentrations. 12 treatments were imposed in polyhouse condition against *F. oxysporum* f. sp. *dianthi*. Among 12 treatments Carbendazim at 30 DAP and Propiconazole at 30 DAP were found effective in reducing the wilt incidence and also helped to increase the yield (number of flowers).

June, 2016

(H. Narayanaswamy)
Major Advisor

4. Studies on Purple Blotch of Onion (*Allium cepa* L.) Caused by *Alternaria porri* (Ellis) Cifferi.

KAVITHA S. VEERAGHANTI

ABSTRACT

Onion (*Allium cepa*) is one of the important vegetable crop commercially grown across India. The production of bulbs and seeds is limited by various plant diseases. Among the diseases, one of the most serious disease is the purple blotch caused by *Alternaria porri* (Ellis) Cif. The disease causes extensive damage to bulbs and hinder seed production. Survey carried out during *kharif Rrabi* 2015 revealed that, the highest per cent disease index (68.50) was recorded in Sokke village of Chikkamagaluru district.Whereas, the lowest PDI was recorded in Burujanaroppa (18.33 %) village of Chitradurga district. *In-vitro* evaluation of nine different fungcides against *Alternaria porri* showed that, Mancozeb and Difenconazole was found effective with a per cent mean mycelia inhibition of 99.97 and 97.33 respectively at 1000ppm concentration.

However, *In-vitro* evaluation of five different plant extracts revealed that, highest per cent inhibition (99.73) was observed with Garlic clove extract at 10 % concentration. While Marigold leaf extract proved to be least inhibitor. Among the different bio-control agents tested against *Alternaria porri*, *Trichoderma harzianum* (UAHS, Shivamogga) recorded highest inhibition of mycelia growth (83.10 %). Among the genotypes screened, only one variety Arka Kalyan showed moderate resistant reaction and other varieties *viz*., Arka Lalima, Arka Pragati, Arka Kirthiman, and Arka Bindhu showed moderately susceptible reaction. Whereas, Arka Niketan, Arka Bhima, Satara Local and Bhima Super showed susceptible reaction. Field evaluation of fungicides, and bio-agents undertaken during *kharif* 2015 by giving five sprays at 15 days interval showed that, Difenconazole 25 EC (0.1 %) was effective in controlling the disease, among bio-agents, *Trichoderma harzianum* effectively controlled the disease along with higher yield.

June, 2016

(B. Gangadhara Naik)
Major Advisor

5. Studies on Powdery Mildew of Chilli Caused by *Leveillula taurica* (Lev.) Arn.

HAREESH, M. V.

ABSTRACT

Chilli (*Capsicum annum* L.), is an important commercial vegetable cum spice crop in India belongs to family Solanaceae. It is also called as red pepper and is grown throughout the world, under dry as well as irrigated conditions. India is a major producer, consumer and exporter of chilli. Chilli suffers from many diseases, among them powdery mildew caused by *Leveillula taurica* (Lev.) Arn. is major menace for chilli cultivation prevalent in chilli growing areas of Karnataka. Survey work revealed that, maximum disease severity was found in Chikmagaluru (PDI 43.16) followed by Davanagere (PDI 40.44) districts. Whereas, least severity was recorded in Shivamogga (PDI 36.07) district.

The simple regression model has good fit for *Rabi* 2015-16 prediction of powdery mildew. The correlation studies between disease incidence and weather parameters indicated a negative relationship with all the weather parameters. Disease progress increased gradually from the date of infection (49th MW) and maximum AUDPC value (589.71) was obtained during 4th MW of 2016. Maximum 'r' value (0.1531) was observed between 50th and 51st MW. Among the seventy chilli genotypes screened under field and polyhouse conditions, none of them were found resistant. Whereas, 25 genotypes under field condition and 10 genotypes under polyhouse condition showed moderately resistant reaction respectively and rest of the lines showed either susceptible or highly susceptible reactions against powdery mildew. Among twelve treatments, spraying of Myclobutanil at 0.1 per cent concentration was found to be effective in reducing disease severity (PDI 17.37) with increased yield of 12.72 q/ha.

June, 2016

(R. Ganesha Naik)
Major Advisor

6. Studies on Management of Foot Rot of Black Pepper (*Piper nigrum* L.) Caused by *Phytophthora capsici* Leonian.

LYDIA, M THOMAS

ABSTRACT

Black pepper (*Piper nigrum* L.), the King of Spices is one of the most important spice crops cultivated in India. The cultivation and production of black pepper is limited by many diseasesof which foot rot caused by *Phytophthora capsici* is the most important and serious disease.All parts of the plant are susceptible and prone to the infection at any stage of the crop creating huge losses of around 25-30%.The studies were conducted during 2015-16.The survey results revealed a maximum disease incidence of 65% in Mathodu village of Shivamogga taluk in Shivamogga district and 50% eachin Kabilaseathve and Boothanakkadu villages of Chickmagaluru and Mudigere taluks respectively in Chickmagaluru district. Least disease incidence (5.00%) was recorded in Thirthahalli and Koppa taluks of Shivamogga and Chickmagaluru districts respectively. The pathogenwas isolated from the infected vines and characterized and confirmed as *P. capsici* on the basis ofmorphological and culturalcharacters. Out of the eight different culture media tested on *P. capsici*, Oat meal agar, V8 Juice agar, Potato dextrose agar and Rye agar A supported maximum colony diameter of 90.00 mm.Among the three antagonists evaluated under *in vitro*condition, *Pseudomonas fluorescens* was foundmost effective in inhibiting the mycelial growth of *P. capsici*(56.39%).Among the ten systemic and non-systemic fungicides tested, the systemic fungicide Azoxystrobin showed maximum per cent mycelial inhibition of 82.18%atall the tested concentrations(250 ppm, 500 ppm and 1000 ppm). Integrated management of foot rot in field condition revealed that soil application of *T. harzianum* (50g vine^{-1}) and *P. fluorescens*(50g vine^{-1})along with neem cake (1000g vine^{-1}) was most effective in reducing the incidence of yellowing. Foliar infection was considerably reduced by spraying 0.3% Potassium phosphonate, followed by, spray of 1% Bordeaux mixture.

June, 2016

(B. Gangadhara Naik)
Major Advisor

7. Variability and Management of Anthracnose of Mango caused by *Colletotrichum gloeosporioides* (PENZ.) PENZ. and SACC.

SAYIPRATHAP, B. R.

ABSTRACT

Mango (MangiferaindicaL.) is commonly called as “King of fruits”. Anthracnose caused by Colletotrichum gloeosporioides (Penz.) Penz. and Sacc. is one of the most serious disease of mango. During the survey of 2015-16 under nurseries, maximum per cent disease index was recorded in Kolar (32.40 %) district and least was in Bengaluru Rural (21.52%) district. Among the ten isolates collected, higher radial growth was recorded in Cg-8 (88.83 mm) with medium white suppressed colony with good sporulation, whereas, least wasin Cg-7 (87.17 mm) with medium white raised colony with excellent sporulation on Potato Dextrose Agar. On Potato Dextrose Broth, maximum dry mycelial weight was recorded in Cg-1 (608.67 mg) and least was in Cg-3 (584.33 mg). Among six temperature levels, Cg-4 recorded maximum radial growth (88.00 mm) with good sporulation and least was in Cg-6 (85.67 mm) with moderate sporulation at 25°C. The maximum radial growth of 88.33 mm was recorded at continues 12 hours light and 12 hours of darkness in Cg-10 isolate with good sporulation, whereas, least was in Cg-3 (83.83 mm) with moderate sporulation. Among the different pH levels, pH-6 was found to be the best for fungus growth and maximum dry mycelial weight was recorded in Cg-10 (609.33 mg) and least was inCg-3 (582.00 mg) respectively.

Among the nutritional sources, maximum dry mycelial weight of 518.00 mg was recorded in dextrose as carbon source, 501.33 mg in potassium nitrate as nitrogen source and 490.00 mg in magnesium sulphate as sulphur source. Among eight bioagents, maximum inhibition of mycelial growth was recorded in Trichoderma viride-1 (69.78 %) whereas, least was inBacillus pumulis (44.91 %) respectively. Among ten plant extracts, pongamia seed extract recorded maximum inhibition (79.92%) of mycelial growth and least was in agarwood leaf extract (40.08%) at 20% concentration.In vitro evaluation of four non-systemic fungicides, maximum mycelial inhibitionwas recorded in propineb (59.83 %) while, least was in copper oxychloride (13.31 %) at 500 ppm. Among eleven different systemic and combi fungicides, maximum inhibition of mycelial growth was recorded in trifloxystrobin + tebuconazole (82.78 %) while, least was in carbendazim + mancozeb (37.01 %) at 200 ppm. In vivo evaluation of fungicides under nursery revealed that, minimum per cent disease index of 7.50 % was recorded in 0.05% spray of trifloxystrobin + tebuconazole with 76.72 % disease reduction over control, whereas, maximum disease severity was recorded in control (32.23%).

June, 2016

(Suresha D. Ekabote)
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. Status of Potassium in Soils under Paddy Land use Cover of Udupi District, Karnataka

LEELAVATI, C. CHANNAGOUDRA

ABSTRACT

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

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

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

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June, 2016

(H.M. Chidanandappa)
Major Advisor

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

KRISHNA, N. R.

ABSTRACT

The study was conducted during 2015-16 to know the soil fertility status of Nicchapura-2 micro-watershed in Harappanahalli taluk, Davanagere district which is 120 km away from UAHS, Shivamogga. Under this study six pedons were selected based on soil heterogeneity in micro-watershed area and soil samples were collected from different horizons and analyzed for physico-chemical properties. The results on soil texture indicated that varied from sandy clay to sandy clay loam and bulk density ranged from 1.31 to 1.43 Mg m^{-3}. The results revealed that the pH and OC was decreased with depth, available N, P_2O_5, K_2O, exchangeable Ca, Mg and available sulphur ranged from 96 to 262 kg ha^{-1}, 11 to 46 kg ha^{-1}, 101 to 396 kg ha^{-1}, 12.1 to 23.5 cmol(p^+)kg^{-1}, 1.60 to 10.3 coml(p^+)kg^{-1} and 1.03 to 8.21 mg kg^{-1}, respectively. Available nitrogen, phosphorus and sulphur are decreased with depth. However, potassium, exchangeable Ca, Mg increased with depth.

One hundred and three surface grid soil samples were collected and analyzed for their fertility status. The value of pH, EC, and OC ranged from 6.2 to 8.7, 0.11 to 0.84 dS m^{-1} and 3.1 to 5.6 g kg^{-1}, respectively. The available N, P_2O_5, K_2O, exchangeable Ca, Mg and available sulphur were ranged from 135 to 236 kg ha^{-1}, 10 to 34 kg ha^{-1}, 130 to 415 kg ha^{-1}, 8.1 to 38.1 cmol(p^+)kg^{-1}, 6.3 to 26.2 cmol(p^+)kg^{-1} and 6.3 to 12.1 mg kg^{-1}, respectively. Available micronutrients *viz*., iron, manganese, zinc and copper were ranged from 0.58 to 5.92 mg kg^{-1}, 0.60 to 10.3 mg kg^{-1}, 0.01 to 0.41 mg kg^{-1} and 0.06 to 4.81 mg kg^{-1} respectively. Available zinc and iron are found to be deficient, whereas, copper and manganese found sufficient in these soils of micro watershed. The fertility status of soils under micro watershed area collected grid wise and were mapped by GIS technique.

August, 2016

(Parashuram Chandravamshi)
Major Advisor

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

ASHA SUBHASH SHETTAR

ABSTRACT

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

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

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

July, 2016

(K.T. Gurumurthy)
Major Advisor

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

BADKA AMRUTH

ABSTRACT

A field experiment was conducted at College of Agriculture, Shivamogga during *kharif* of 2015 in order to know the effect of phosphorus levels through integrated nutrient management (INM) packages on productivity of groundnut (*Arachis hypogaea* L.) and status of phosphorus in soil. The three levels of phosphorus *viz.*, 20, 30 and 50 kg P_2O_5 ha^{-1} as DAP were tried in a Randomized Complete Block Design (RCBD) with three replications and nine treatments. Results of the field experiment indicated that application of 75 % of 30 kg P_2O_5 ha^{-1} through CF + 25 % through FYM + Phosphorus Solubilising Bacteria (PSB) significantly increased the growth, yield and yield attributes and quality parameters of groundnut. Higher pod yield of groundnut (19.79 q ha^{-1}) was recorded due to treatment of 75 % of 30 kg P_2O_5 ha^{-1} through CF + 25 % through FYM + PSB.

The content and uptake of N, P, K, Ca, Mg and S by groundnut plant parts *viz.*, haulm, shell and kernel were highest in the treatment that received 75 % of 30 kg P_2O_5 ha^{-1} through CF + 25 % through FYM + PSB. The available phosphorus status in soil decreased as the crop maturity and lower status was recorded at harvest. However, the treatment T_9 supplied with high dose of P i.e. 75 % of 50 kg P_2O_5 ha^{-1} through CF + 25 % through FYM + PSB was recorded higher available P compared to other treatments. Higher values of Saloid-P, Al-P, Fe-P, Reductant Soluble -P, Occl-P and Total-P fractions were recorded except Organic-P in treatment T_7 supplied with 50 kg P_2O_5 ha^{-1}. Higher B: C ratio of 1: 2.82 was recorded in treatment T_6 supplied with 75 % of 30 kg P_2O_5 ha^{-1} through CF + 25 % through FYM + PSB.

August, 2016

(G. N. Thippeshappa)
Major Advisor

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

CHAITRA, B. K.

ABSTRACT

The study was conducted at UAHS, Shivamogga to know the distribution of secondary nutrients under different land use in Hebburu micro-watershed. Under different land use158 soil samples were collected grid-wise *viz.*, coconut, arecanut, onion, chilli, ragi, oilseed/pulse, uncultivable land and other horticultural land use wereanalysed for their fertility status. The texture of soils varied from sandy loam to sandy clay loam in texture. Results revealed that bulk density and particle density ranged from 1.09 to 1.88 and 1.80 to 2.87 Mg m^{-3}, respectively. The values of pH, electrical conductivity, organic carbon, cation exchange capacity, calcium carbonate equivalent and per cent base saturation ranged from 4.15 to 9.37, 0.01 to 3.07 dS m^{-1}, 0.60 to 9.60 g kg^{-1}, 0.20 to 128.60 g kg^{-1}, 6.31 to 135.80cmol (p^{+}) kg^{-1} and 31.57 to 99.35 per cent, respectively.

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

Twenty five soil samples collected from six pedons under different land use were analysed for different fractions of secondary nutrients.The exchangeable and total Ca increased with depth while water soluble Ca decreased with depth. The fractions of magnesium did not follow any trend with depth. The S fractions varied with a decreasing trend with depth of the profiles. Ca and Mg fractions showed positive and significant correlation with clay, pH, CEC and $CaCO_3$ and sulphur fractions showed positive and significant correlation with clay, PD, pH, OC and CEC.

July, 2016

(B. C. Dhananjaya)
Major Advisor

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

PURNANANDA CHIKKOPPAD

ABSTRACT

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

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

October, 2016

(L. B. Ashok)
Major Advisor

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

SUPRIYA, U. L.

ABSTRACT

An experiment was conducted on "Effect of subsurface fertigation on fertility status of soil under sugarcane crop cover" in selected villages of Davangere district, Karnataka during 2015 at College of Agriculture, Navile, University of Agricultural and Horticultural Sciences, Shivamogga. The ninety soil samples were collected from 0-15, 15-30, 30-45, 45-60 and 60-75 cm soil depth from six sub-surface sugarcane fertigated field (>2 years) of Arsapura and Yellebethuru villages of Davangere district. The collected soil samples were analysed for selected physical and chemical properties by adopting standard methods to know the depth wise distribution of sugarcane farms subjected to subsurface fertigation. The soil pH decreases with depth and were neutral to alkali in nature. The EC of the soil is < 1 dSm^{-1} and showed decreases with depth and depth wise decrease in trend of soil organic carbon was observed in all farms. The available and total nitrogen, phosphorus and potassium showed decreasing trend with depth under subsurface fertigated farms. The exchangeable calcium, magnesium and available sulphur increases with depth and higher at 45-60 cm and 60-75 cm and lower at 0-15 cm depth in farms studied. The water soluble potassium was higher at 0-15 cm and lower at 60-75 cm depth indicating decreasing trend with increasing depth in fertigated farms. The NO_3-N content varied with depth and was higher at 45-60 cm and lower at 0-15 cm depth. The NH_4-N varied with depth, but higher at 0-15 cm and lower at 45-60 cm and 60-75 cm depth in subsurface fertigated farms.

July, 2016

(Ganapathi)
Major Advisor

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

VIDYASHREE, M. S.

ABSTRACT

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

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

The surface soils recorded low to medium in available N, medium to highin available Pin all the land use systems. The available K content of surface soils of ragi, maize and barren land use systemswere showed low to high, whereas the arecanutland use systemregistered low to medium available K content. The status of NPK was decreased with depth of profile.

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

June, 2016

(G. N. Thippeshappa)
Major Advisor

Horticulture

Crop Improvement and Biotechnology

University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Crop Improvement and Biotechnology

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1. Genetic Diversity analysis in Tomato (*Solanum lycopersicon* L.) Germplasm

PRIYANKA, S. M

ABSTRACT

An investigation on "Genetic diversity analysis in tomato (*Solanum lycopersicon* L.) germplasm" was carried out in a Randomized Complete Block Design with two replications conducted at farmers's field nearby College of Horticulture, Mudigere during the year 2015-16. Analysis of variance revealed highly significant difference among the genotypes for all the characters studied. Genetic variability studies indicated that phenotypic coefficient of variation (PCV) was higher than genotypic coefficient of variation (GCV) for all the traits. High heritability (>60%) coupled with high genetic advance as per cent mean (>30%) was observed for days to 50 per cent flowering, plant height, number of primary and secondary branches, chlorophyll content, number of fruits per cluster, fruit weight, fruit diameter, total soluble solids, number of locules, pericarp thickness, lycopene content and ascorbic acid indicating the prevalence of additive gene action for these traits. Correlation studies showed that significant and positive association of number of fruit clusters per plant, fruit diameter, number of fruits per plant, fruit weight and number of fruits per cluster at both phenotypic and genotypic level. Path coefficient analysis revealed that direct effect on fruit yield through plant height, number of fruits per plant and fruit diameter. Based on Mahalanobis's D^2 analysis, thirty two genotypes of tomato were grouped into six clusters, fifteen genotypes were present in cluster V followed by cluster III consisting of nine genotypes, cluster I consisting of five genotypes and clusters II, IV and VI were solitary. Lycopene content followed by fruit weight contributed maximum towards genetic diversity. Molecular characterization of tomato genotypes was done using RAPD markers. Among primers screened, all the primers *viz.*, OPA-7, OPC-4, OPC-8, OPL-5, OPK-3 gave consistent banding patterns. Based on genetic diversity generated by dendrogram analysis, thirty two genotypes were grouped into ten clusters and it is evident that cluster I with two tomato accessions AR-17 and AR-19 appears to be the most diverse among the accessions, with lowest (63%) similarity value than rest of genotypes.

July, 2016

(D. Lakshmana)
Major Advisor

2. Genetic Variability and Character Association Studies in Ridge gourd (*Luffa acutangula* L.)

MANOJ, Y. B.

ABSTRACT

An experiment was carried out to assess the genetic variability, heritability, diversity and character association among different yield and yield traits of ridge gourd. Thirty five germplasm lines of ridge gourd were evaluated in a randomized block design with two replications at the College of Horticulture, Mudigere during 2015-16. Analysis of variance revealed that highly significant difference was observed among the genotypes for growth, yield and quality parameters indicating existence of greater variability among the lines. The values of phenotypic coefficient of variation was higher than genotypic coefficient of variation, but narrow range of differences indicated that most of the traits were least influenced by environment. High heritability (>60%) with high genetic advance (>20%) was observed for characters *viz*., sex ratio, days to first harvest, leaf area, leaf area index, chlorophyll content, fruit length, per cent fruit set, fruit weight, fruit yield per plant, fruit yield per hectare, rind thickness and flesh thickness indicating predominance of additive gene component. Thus, there is ample scope for improving these characters through direct selection. Fruit yield per plant had strong positive correlation with fruit weight, number of ridges per fruit, flesh thickness, per cent fruit set, fruit diameter and fruit length. High positive direct effect was recorded for traits *viz*., number of branches per plant, fruit length, fruit diameter, fruit set per cent, flesh thickness, number of ridges per fruit, fruit weight which are important characters to be accounted for gaining improvement in fruit yield per plant. Based on Mahalanobis's D^2 values, the thirty five germplasm lines were grouped into eight clusters. Cluster I was largest with eleven lines followed by cluster II with four germplasm lines. Among the traits studied flesh thickness (38.66 %), rind thickness (16.30 %), fruit weight (9.58 %) and number ridges per fruit (8.74 %) were contributed maximum to the total divergence. Genotypes Nimbegondi local-2 and Kanapur recorded higher yield and these can be utilized for further breeding progamme.

July, 2016

(D. Lakshmana)
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. Asseessment of Yield Loss and Management of Yellow Mite, *Polyphagotarsonemus latus* Banks on Bell pepper (*Capsicum annum* L.) under Protected Cultivation

ABSTRACT

An investigation was carried out on insect and mite pest complex, yield loss due to yellow mite, *Polyphagotarsonemus latus* (Banks) and management of yellow mite using newer molecules of acaricides. The experiments were carried out under naturally ventilated polyhouse condition during 2015-16 at Department of Entomology, College of Horticulture, Hiriyur, Chithradurga district, Karnataka, India. Seven insect and mite pests along with natural enemies belonging to six orders and six families were recorded on capsicum. They included yellow mite, *P. latus* (banks), thrips, *Scirtothrips dorsalis* (Hood), fruit borer, *Spodoptera litura* (Fabricius), mealy bug, *Phenacoccus peruvianus* (Granara), a grasshopper and the natural enemies like predatory mite, spiders and chrysopids, *Chrysoperla* sp. The crop loss due to yellow mite, *P. latus* in capsicum under protected cultivation was 29.78 per cent. The fruit yield recorded from treated and untreated plots was 5.34 kg/ 5m×3m plot and 3.75 kg/5m×3m plot, respectively. Among the selected acaricides, fenpyroximate 5 SC was effective against egg population at 3, 7 and 10 days after the first spray, second and third spray against egg population on capsicum under protected condition. Against active stages (nymph and adult), fenpyroximate 5 SC was effective at 3, 7 and 10 days after spray at first and third spray. The least effective acaricide was dicofol 18.5 EC. The order of efficacy of these acaricides against mite population was fenpyroximate 5 SC > diafenthiuron 50 WP > chlorofenapyr 10 EC > spiromesifen 22.9 SC > propargite 57 EC > fenazaquin 10 EC > dicofol 18.5 EC.

October, 2016

(Rajashekarappa. K.)

Major Advisor

2. Population Dynamics and Management of Brinjal Shoot and Fruit Borer, *Leucinodesorbonalis* Guenee (Lepidoptera: Crambidae) under Hill Zone of Karnataka

RASHMI, S

ABSTRACT

A study on population dynamics, tolerant varieties and integrated management approaches againstbrinjal shoot and fruit borer (BFSB) was conductedduring 2016 at College of Horticulture, Mudigere, Chikkamagaluru, Karnataka. The data on population dynamics of brinjal shoot and fruit borer indicated that highest shoot damage was noticed during thefourth week of March.The highest damage by BSFB on fruit was recorded during thethird week of April and so also thepeak larval activity wasnoticed during thethird week of April. Climatic variables like temperature and relative humidity had a significant influence on larval activityand shoot and fruit infestation. Natural enemies*viz.*coccinellids, spiders, syrphid flies and green lace wings were significantly dependent upon population of shoot and fruit borer. The brinjal genotypes, ArkaNidhi and ArkaNeelkantwere fairly resistant to brinjal shoot and fruit borer. The lowest per cent shoot and fruit infestation was inIC281112 and IC332508genotypes.Among the modules in integrated pest management practices, module I (maize as barrier crop; installation of pheromone traps at crop canopy; removal and prompt destruction of infested shoots and fruits from 30 DAT and scheduled spray of insecticides *viz*. profenophos, azardiractin, chlorantraniliprole, *Bacillus thuringiensis*, spinosadfrom 40 DAT) reduced the infestation ofshoot and fruit. The yield, net returns and C: B ratio was higherin module Ithan module II and module III.

June, 2016

(SuchithraKumari, M. H)
Major Advisor

3. Population Dynamics and Age Structure of Coffee Berry Borer, *Hypothenemus hampei* (Ferrari) (Coleoptera: Curculionidae: Scolytinae) in Robusta Coffee

KAVYA, M. A.

ABSTRACT

The research was carried out in three robusta coffee plantations of Mudigere and laboratory of Department of Entomology, College of Horticulture, Mudigere during 2013-14. The size of coffee berry increased from 7.14 to 11.80, 3.88 to 12.07 and 6.70 to 12.00 mm in estates of Bilagula, Phalguni and ZAHRS (Mudigere), respectively. The infestation of *Hypothenemus hampei* increased from July to December. The difference in size of infested and uninfested berries was significant in June, July and August; whereas the difference was narrow after October. *H. hampei* prefers bigger berries during initial phase of berry bearing period, later berries will mature to uniform in size. The density of adult *H. hampei* increased from June to harvesting of the coffee. Every infested berry was accommodated with only one female adult beetle from June to August or September. Immature stages of *H. hampei* were first noticed in September or October. All stages of *H. hampei* were observed from October onwards. The highest number of immature and adult *H. hampei* was observed in November and December. The distribution of *H. hampei* within infested coffee plants varied significantly across blocks of the estates. The spatial distribution pattern of *H. hampei* was aggregate or random at early phase of berry bearing season, later the distribution was uniform as berries mature. The adult male beetle was not noticed in berry sample collected for age structure study. As male adult beetle was not noticed till harvest (December) of robusta coffee, extra sample collected in December was stored to observe emergence of adults. Male adult beetle was first observed in this trial and male to female ratio was 1:13 per berry.

July, 2016

(Revanna Revannavar)
Major Advisor

4. Studies on the Seasonal Incidence and Management of Onion Thrips, *Thrips tabaci* (Lind.) (Thysonoptera: Thripidae)

Vinuthan, K. D.

ABSTRACT

Studies on the seasonal incidence of onion thrips, *Thrips tabaci* (Lind.) on onion during 2014-15 revealed that, thrips incidence was maximum per onion plant (10.13 thrips)in farmer's field of Dharmapura village followed by Nandihalli village (7.29 thrips).Thrips incidence was the least in Hosadurga village (4.28 thrips). Thrips incidence was high in ZAHRS, Babbur farm during *rabi-summer* with an average of 31.81 thrips per plant and population was peak(61.04 thrips/plant) on 8th march 2015. Thrips incidence was the least during *kharif-rabi* with an average 8.59 thrips/plant and the incidence was peak (27.16 thrips/plant) on 29th September 2014. Thrips population had a significant positive correlation with maximum temperature and significant negative correlation with rainfall and relative humidity in both the seasons. Among the twenty onion cultivars screened against thrips, Arka Pragati was moderately resistant to thrips attack withthe lowest thrips population (29.34 thrips/plant) followed by Arka Kalyan (32.12 thrips/plant) and Arka Niketan (34.10 thrips/plant). Whereas, Satara Garva was highly susceptible to thrips attack with the highest thrips population (79.38 thrips/plant) followed by Bellary Red (75.96 thrips/plant). Two times spray of acetamiprid caused maximum reduction in thrips population (96.33%) and higher bulb yield (21.37 t/ha) followed by imidacloprid (92.81 % and 19.47 t/ha, respectively) and fipronil (93.63 % and 18.92 t/ha, respectively). The thripsincidence was the highest in untreated control with onion yield 6.72 t/ha. The Cost: Benefit ratio was maximum in acetamiprid (2.01) treatment followed by imidacloprid (1.73) and fipronil (1.54).Thrips caused 68.55 per cent yield loss in untreated plot.

September, 2016

(K. Rajashekharappa)
Major Advisor

5. *Xylotrechusquadripes* Chevrolat (Coleoptera: Cerambycidae) in Arabica Coffee Plantations

PARASHURAM UDDAPPA MADIHALLI

ABSTRACT

The research was carried out at Mudremane coffee estate of Mudigere (Chikkamagaluru District) during 2013-14. Among 1 to 6 year old arabica coffee plants, the highest infestation (6.68% among blocks 13) of *Xylotrechus quadripes* was in 4 year old plants.The cumulative infestation increased from 0.63 to 34.22 per cent during the past (2008 to 2013)and the spatial distribution pattern of *X. quadripes*was aggregated. The probability of *X. quadripes* new infestation was higher around uprooted or infested coffee plant than around uninfested coffee plant. In the current year (2013-14), the highest infestation was 32.31 per cent, spatial distribution pattern of *X. quadripes* was random to aggregate and probability of the new infestation was higher around the infested plants than uninfested coffee plants. The highest number of shade plants irrespective of species (269) was recorded in A_6 block with infestation16.64 per cent, whereas the lowest number of shade plants (139) in A_{14} block with infestation31.41 per cent and these blocks represented 18 species of shade plants.The highest diversity of shade plants (24 species &Shannon-Wenner index 4.16) was noticed in block A_3 with 29.67 per cent infestation, whereas diversity of shade trees was the lowest (11 species &Shannon-Wenner index 2.02) in block A_{16} with 34.96 per cent infestation. The infestation of *X. quadripes* in always shaded and always open area (not shaded) was 9.44 and 74.37 per cent, respectively.

July, 2016

(RevannaRevannavar)
Major advisor

Floriculture and Landscape Architecture

University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Floriculture and Landscape Architecture

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1. Standardization of Biostimulants for Growth, Yield and Quality of Hrysanthemum (*Dendranthema grandiflora* Tzvelev.) under Protected Cultivation

PRUTHVI, P. HEGDE

ABSTRACT

In recent decades, flower growing pattern is evolving towards organic way. Hence, the study was conducted on "standardization of biostimulants for growth, yield and quality of chrysanthemum (*Dendranthema grandiflora* Tzvelev.) under protected cultivation" at Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, during 2015-16. The experiment was laid out in Randomized Complete Block Design with 25 treatments and replicated twice. The treatment Biovita @ 0.5 percent was found superior for all the growth parameters *viz.*, plant height (66.83 cm), number of leaves (82.95), stem diameter (7.30 mm), number of primary and secondary branches (8.7 and 25.9, respectively) total dry matter accumulation (53.45), leaf area (5269.91 cm^2), leaf area index (5.27), leaf area duration (123.08 days), CGR (107 mg/ m^2/ day), RGR(13.65 mg/ g/ day) and NAR(9.4 mg/ dm^2/ day) and biochemical parameter total chlorophyll content (5.07). It was statistically on par with Humicel plus @ 0.5 per cent and Formula 15 @ 0.5 per cent. Whereas, least vegetative parameters were registered in recommended dose of fertilizers.

Minimum days for first flowering and 50 per cent flowering were observed in foliar application of Biovita @ 0.5 percent. While, maximum duration of flowering (61.50 days) was recorded in Formula 15 @ 0.5 per cent. With respect to yield parameters maximum number of flowers was recorded in Biovita @ 0.5 per cent (92.15) with maximum yield per plant (424.09 g) and per square meter (4.05 Kg). The same treatment had high quality flowers with maximum flower size, weight and stalk length (6.70 cm , 5.06 g and 46.89 cm, respectively). Studies on vase life and shelf life proved that Biovita @ 0.5 per cent showed 7.5 days more longevity in tap water and 5.5 days more shelf life than control (15 days and 5.5 days, respectively). The treatment Biovita @ 0.5 per cent realized maximum net return of 3, 12, 411 in 560 m^2 area with a B:C ratio of 4.43 followed by Humicel plus @ 0.5 per cent (2, 99, 315; 4.25, respectively) and Formula 15 @ 0.5 per cent (2, 94, 031; 4.18, respectively) compared to control (1, 15, 609; 1.64, respectively).

June, 2016

(B. Hemla Naik)
Major Advisor

2. Morphological Characterization of Chrysanthemum (*Dendranthema grandiflora* Tzvelev) Genotypes under Central Dry Zone of Karnataka

BEERALINGAPPA

ABSTRACT

An investigation on "Morphological characterization of chrysanthemum (*Dendranthema grandiflora* Tzvelev) genotypes under central dry zone of Karnataka" was carried out in Randomized Complete Block Design with three replications at the experimental block of Department of Floriculture and Landscape Architecture, College of Horticulture, Hiriyur, Karnataka during 2015 - 2016.

Among the sixteen chrysanthemum genotypes, genotype Lakkundi recorded maximum plant height (69.87 cm) and stem girth (6.72 mm).The genotype Chandani recorded maximum number of primary (23.67) and secondary (36.80) branches per plant, number of leaves per plant (720.67), leaf area per plant (18718.33 cm^2), number of flowers per plant (692.40), flower yield per plant (830.49 g) as well as per hectare (41.01 t/ha). The genotype Marigold recorded minimum number of days for first flower appearance (77.33 days), 50 per cent of flowering (100.67 days), longest flowering duration (126.67 days), shelf life (9.70 days) and vase life (17.33 days). The genotype White Seventige exhibited maximum flower diameter (6.46 cm) and genotype Star Pink recorded highest individual flower weight (6.26 g).Flower yield per plant showed highly significant and positive correlation with leaf area, number of leaves per plant, number of flowers per plant and duration of flowering at both genotypic and phenotypic level.Flower yield per plant exhibited highly positive direct effect of path analysis with number of secondary branches per plant, leaf area, duration of flowering, number of flower per plant and flower weight at both genotypic and phenotypic level.The genotype Chandani realized maximum net returns and benefit cost (B: C) ratio.Among these screened chrysanthemum genotypes, genotype 'Chandani'was found superior over the rest of the genotypes with respect to growth, flowering, yield and quality parameters followed by 'Marigold', 'Vasanthika'and 'Arka Chandrika'were found promising for loose flower productionunder central dry zone of Karnataka.

October, 2016

(Hemanth Kumar P.)
Major Advisor

3. Standardization of Balanced Nutrition and Bioinoculants on Growth, Yield and Quality of Chrysanthemum (*Dendranthema grandiflora* Tzvelev)

MAHANTESH BIRADAR

ABSTRACT

A field experiment was conducted to know the "Standardization of balanced nutrition and bio-inoculants on growth, yield and quality of chrysanthemum (*Dendranthema grandiflora* Tzvelev)" was carried out at Department of Floriculture and landscape architecture, College of Horticulture, Mudigere, during 2015-16. The experiment was laid out in randomized complete block design with 22 treatments replicated twice. Plants treated with *Bacillus megaterium* + *Bacillus mucilaginosus* + $MgSO_4$+ Micronutrient mixture (T_{22}) recorded significantly maximum plant height (69.50 cm), stem girth (8.46 mm),plant spread North-South and East-West (37.75 and 39.00),number of primary branches (32.00),secondary branches (28.75),tertiary branches (22.50),number of leaves (112.50),leaf area (9444.68 cm^2),leaf area index (4.66),dry matter of leaves (22.70 g),dry matter of shoots (16.05 g),dry matter of flowers (9.80 g),dry matter of roots (7.55 g),total dry matter (53.90 g) ,crop growth rate (1.07 g/m^2/day),relative growth rate (0.0137 g/g/day) , net assimilation rate (0.0094 g/dm^2/day),total chlorophyll (5.07 mg/g),days to first flower bud initiation (55.00 days), days to first flower opening (88.65 days), maximum flowering duration (132.65 days), Highest flower weight (6.27 g), diameter (7.25 cm), number of petals per flower (136.50), flowers per plant (100.00), flower yield (30.73 t/ha),sucker yield (3,35,000/ha) and its quality parameters like shelf life (15.25 days),vase life (22.00 days).Similarly *Bacillus megaterium* + *Bacillus mucilaginosus* + $MgSO_4$+ Micronutrient mixture (T_{22}) recorded significantly highest available N (247.50 kg/ha), P_2O_5 (225.00 kg/ha) and K_2O (285.25 kg/ha) in soil, respectively. The economic analysis clearly indicated that, application of *Bacillus megaterium* + *Bacillus mucilaginosus* + $MgSO_4$+ Micronutrient mixture (T_{22}) realized maximum net returns (Rs. 23,79,750/ha) and B: C ratio (9.1) for flower and sucker production, respectively.

June, 2016

(B. Hemla Naik)
Major Advisor

4. Influence of Micronutrients on Growth, Flowering and Corm Production of Gladiolus (*Gladiolus grandiflorus* L.) cv. Summer Sunshine

YASHAWANTH, D. R.

ABSTRACT

An investigation on "Influence of micronutrients on growth, flowering and corm production of gladiolus (*Gladiolus grandiflorus* L.) cv. Summer Sunshine" was carried out in Randomized Complete Block Design with two replications and twenty one treatments at the experimental block of the Floriculture and Landscape Architecture, College of Horticulture, Mudigere during the year 2015-16.

The results revealed that the plant height was maximum in treatment H_3BO_3 at 0.5 per cent (71.60 cm). Whereas the maximum leaf production per plant (9.50) was recorded in micronutrient mixture at 1.0 per cent. The days taken for bud initiation and first floret opening were found early in $ZnSO_4$ at 1.0 per cent + H_3BO_3 at 1.0 per cent (60.20 days and 70.00 days, respectively). Foliar application of H_3BO_3 at 0.5 per cent recorded maximum spike length (71.70 cm), rachis length (54.60 cm) and number of florets per spike (16.30) but vase life (11.50 days) was maximum with foliar application of micronutrient mixture at 1.0 per cent. Number of corms per plant (1.50) and number of cormels per plant (28.80) were maximum in $ZnSO_4$ at 1.0 per cent + H_3BO_3 at 1.0 per cent. Corm yield per hectare (11564.35 kg) was maximum in treatment H_3BO_3 at 0.5 per cent. Among the micronutrient treatments studied, better performance in terms of vegetative, flower yield and corm production was observed in treatment such as H_3BO_3 at 0.5 per cent followed by $ZnSO_4$ at 1.0 per cent + H_3BO_3 at 1.0 per cent and micronutrient mixture at 1.0 per cent. The maximum B: C ratio (2.57) was recorded in H_3BO_3 at 0.5 per cent treatment.

July, 2016

(S. Y. Chandrashekar)
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. Effects of Pruning and Growth Regulators on Yield and Quality of Bhagwa Variety of Pomegranate

BALAJI, K.

ABSTRACT

A field experiment was conducted at farmer's field at Kunikere village, Hiriyur taluk, Chitradurga district of Karnataka during 2015-16, to study the "Effects of pruning and growth regulators on yield and quality of Bhagwa variety of Pomegranate". The plants which received 20 cm pruning of shoots along with application of Ethrel 250 ppm and NAA 40 ppm recorded maximum shoot length (54.75 cm), maximum leaf area (9.35 cm^2) in plants pruned for 30 cm and in addition to Ethrel 250 ppm. The plants pruned for 30 cm with an application of NAA 40 ppm at new flush stage recorded 50 per cent flowering in 12.33 days. The same treatment produced maximum number of male (73.67) and hermaphrodite (73.00) flowers, and also took minimum days (35.00) for fruitset by recording highest yield per plant (17.27 kg/plant) and yield per hectare (23.31 t). However, the maximum values were recorded for fruit weight (312.07 g), fruit diameter (8.08 cm), fruit volume (270.87 ml), aril weight (130.04 g) and seed weight (4.84 g), while it was minimum in the case of number of seeds (303.67). The quality parameters such as total soluble solids (16.33 ^{0}B), reducing sugars (10.63%), non reducing sugars (1.75%) and total sugars (12.38%) were found highest, besides, the minimum titratable acidity (0.36%), minimum physiological loss in weight (27.40%), with highest shelf life (31.67 days). The present findings can be commercially used in making pomegranate production more profitable (1:4.44) by pruning for 30 cm and application of NAA 40 ppm in Bhagwa variety of pomegranate.

October, 2016

(P. Narayanaswamy)
Major Advisor

2. Studies on Integrated Nutrient Management in Pomegranate (cv. Bhagwa) Under Central Dry Zone of Karnataka

KIRANKUMAR, K. H.

ABSTRACT

A field experiment was conducted at farmer's field Somerhalli village, Hiriyur taluk Chitradurga district during 2015-16, entitled as "Studies on integrated nutrient management in pomegranate cv. Bhagwa under central dry zone of Karnataka" in Mrig bahar season. The experiment was laid out in randomized block design with 9 treatments comprising of inorganic, organic and biofertilizers, replicated thrice. The treatment containing 100% recommended dose of fertilizers (RDF) along with vermicompost (2 kg) + poultry manure (3.3 kg) + *Azospirillum* (13.61 g) + PSB (13.61 g) + KSB (13.61 g) recorded the highest leaf area (12.89 cm^2), shoot length (45.19 cm^2), fruit weight (292.67 g), number of fruits per tree (61.22), yield per tree (17.93 kg) and yield per hectare (16.46 tonnes). Yield was on par with the treatment 75% recommended dose of fertilizers (RDF) along with vermicompost (2 kg) + poultry manure (3.3 kg) + *Azospirillum* (13.61 g) + PSB (13.61 g) + KSB (13.61 g). Among biochemical parameters high TSS (15.30 ^{0}B), lower titratable acidity (0.33 %), higher TSS/TA ratio (46.48), reducing sugars (12.79 %) non-reducing sugars (1.65 %) and total sugars (14.39 %) along with better postharvest parameters like maximum fruit firmness (82.55 newton), lowest physiological loss in weight (12.88 %) maximum shelf life (28 days) and maximum cost benefit ratio (3.45) were recorded. whereas highest physiological loss in weight (18.92 %) and minimum shelf life (18.40 days) was recorded in control.Similar trend was also observed in the case of using inorganic fertilizers at the rate of 75% RDF with biofertilizers and organic manure thus with that of inorganic fertilizers at the rate of 100% RDF with biofertilizers and organic manure. Thus from the study it was observed that there was 25% savings on inorganic fertilizers.

August, 2016

(B. S. Shivakumara)
Major Advisor

3. **Evaluation of Different Genotypes for Growth, Yield and Quality of Strawberry (*Fragaria X ananassa* Duch.) Under Naturally Ventilated Polyhouse in Hill Zone of Karnataka**

MAHESHGOWDA, B. M.

ABSTRACT

An experiment was conducted to evaluate different genotypes of strawberry (*Fragaria X ananassa* Duch.) for growth, yield and quality in low cost polyhouse of the Department of Fruit Science, College of Horticulture, Mudigere, during 2015-16. The experiment was laid out in Randomized Complete Block Design with seven treatments replicated thrice. The maximum plant height (32.30 cm), number of leaves (30.40), plant spread North-South and East–West (48.47 cm and 53.93 cm respectively), leaf area (206.04 cm^2), leaf area index (6.95), total dry weight (29.04g), maximum total chlorophyll content (2.33 mg/g of fresh weight) was observed maximum in genotype Sabrina, while the Cristal accounted maximum runners per plant (10.70). The genotype Elyana took minimum number of days for flowering (53.37) whereas, genotype Sabrina took longest duration for flowering (69.80 days). The maximum number of flowers per plant (29.06), number of fruits per plant (22.36) and yield per plant (380.29 g) was recorded in genotype Sabrina. The maximum fruit weight (20.01 g), diameter (3.28 cm) and volume (24.37 cc) was recorded in genotype Fortuna. The fruit quality parameters like total soluble solids (11.53 °Brix) was maximum in Safari, the ascorbic acid content (73.30 mg/100g) was maximum in Sabrina, total sugars (7.50 %) was maximum in genotype Fortuna, sugars to acid ratio (12.20) was maximum in Elyana and minimum titratable acidity (0.50 %) was recorded in Fortuna. The genotype Fortuna resulted in maximum benefit cost ratio (2.56). Among different genotypes evaluated, the Sabrina genotype performed better for maximum growth and yield.

June, 2016

(Madaiah, D)
Major Advisor

4. Influence of Age and Months of Rangpur Lime Rootstock on Patch Budding in Coorg Mandarin (*Citrus reticulata* B.)

LATHA, M.

ABSTRACT

Coorg mandarin is gaining popularity for its planting material in nurseries. Therefore necessary to produce genuine planting materials within short span of time with good quality budded plants by using different aged rootstock with different months of budding. Hence, the study was conducted on "Influence of age and months of Rangpur lime rootstock on patch budding in Coorg mandarin (*Citrus reticulata* B.)" at Department of Fruit science, College of Horticulture, Mudigere, during 2015-16 in low cost polyhouse. The experiment was laid out in Factorial Complete Randomized Design with 20 treatments and replicated three times with two factors *i.e.*, age of rootstocks and month of budding. The observations were considered for evaluating the suitability of the age of rootstock and months of budding. The observations on number of days taken for initiation, 50 and 100 per cent bud sprouting, number of bud sprouts, sprout length, sprout girth, diameter of budlings, number of leaves per budlings, length of the leaves, leaf area index, bud vigour index, stionic ratio, per cent bud success and survival percentage were recorded. In general, these observations were found maximum on twelve months old rootstock with October month budding. *i.e.*, twelve months old rootstock with October month budding took minimum number of days for sprout initiation (21.14 days). The maximum bud sprout height, sprout girth, number of leaves and bud vigour index at 60 days after budding (19.06 cm, 4.60 cm, 21.20 and 1182.94, respectively), and 90 days after budding (26.04 cm, 6.62 cm, 26.99 and 1434.74, respectively), were recorded in twelve months old rootstock with October month budding. While, the per cent bud success and survival percentage of budlings at 120 days after budding (98.85 and 98.85 %), was also recorded in the above treatment combinations.

July, 2016

(B. S. Shivakumar)
Major advisor

5. **Effect of High Density Planting and Nutrition on Growth, Yield and Quality of Tissue Culture Banana (*Musa paradisiaca* L.) cv. Grand Naine under Transitional Zone of Karnataka.**

PUTTANNA, C

ABSRTACT

A field experiment was carried out to study the effect of high density planting and nutrition on growth, yield and quality of tissue culture banana(*Musa paradisiaca*L.) cv. Grand Naine under transitional zone of Karnataka in the experimental plot of College of Agriculture, Navule, Shivamogga during the year 2015-16. The different doses of nutrients along with different planting systems were tried during this study. The results revealed that the plants provided with 75% recommended dose of nutrients along with double suckers per hill (T_5) recorded the maximum plant height (178.00 cm), pseudostem girth (64.75 cm) at the time of shooting, whereas, plants provided with 100% recommended dose of nutrients along with single sucker per hill (T_{10}) recorded the maximum leaf area (8.74 m^2) and number of functional leaves (13.96) and minimum light interception (68.74%) at the time of shooting. The early shooting (227.75 days) and early maturation of bunches (103.22 days) was observed in the plants supplied with 100% recommended dose of nutrients along with single sucker per hill (T_{10}). The per cent light interception was found to be higher (86.68 %) in high densityplanting systems in comparison with conventional planting system (68.74 %) at all stages of crop growth. The maximum banana yield of 152.94 t/ha and benefit cost ratio of 1:3.01 was obtained in plants of double suckers per hill along with 75 % recommended dose of nutrients (T_5). Among the different treatments, application of 75% recommended dose of nutrients along with double suckers per hill (T_5) was found to be profitable under transitional zone of Karnataka.

October, 2016

(D. Thippesha)
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. Morphological Characterization and Propgation Studies in *Embelia ribes* Burm f. - an Endangered Medicinal Plant

SHRUTHI A M

ABSTRACT

An experiment was carried out to study the propagation of *Embelia ribes* Burm f. at the Department of Plantation, Spices, Medicinal and Aromatic crops, College of Horticulture, Mudigere, during the year 2015-16. The work was initiated to standardize the seed and vegetative propagation, tissue culture protocol and morphological characterization of this important RET medicinal plant. Among the different germination inducing treatments, the seeds treated with gibberellic acid at 750 ppm showed higher germination rate (2.07) and seedling vigour (2258.13). Per cent germination (65.33%) was maximum seeds treated with H_2SO_4 2% + GA_3 750 ppm. In vegetative propagation, stem cuttings treated with IBA 2000 ppm recorded maximum sprouting percentage (36.00) and rooting percentage (36.00) at 120 days after planting. For tissue culture, nodal segments were used as explant and among various combinations, satisfactory results were obtained in terms of number of shoots and number of leaves by using a combination of TDZ (2.0mg/l)+ Kin (1.0 mg/l).

To study the morphology, 5 accessions of *E. ribes* Burm f. maintained at Field Gene Bank, Division of Plant Genetic Resources, Indian Institute of Horticultural Research (IIHR), Bangaluru were studied for 14 quantitative morphological characters. High genetic advance over mean coupled with high heritability was observed in characters like fruit yield per plant (98.50%), leaf width (56.31%), leaf area (10.54%), leaf length (16.47%), fruit diameter (39.44%) and plant height (39.53%). Correlation study revealed that plant height, leaf length, leaf width and fruit length had significant positive correlation with seed yield per plant. In path analysis, leaf length, leaf width, leaf area, fruit diameter and seed length had high positive direct effects on yield per plant.

July, 2016

(Raviraja Shetty, G)
Major Advisor

2. Evaluation of Velvet Bean (*Mucuna pruriens* L.) Genotypes for Growth, Yield and Quality in Rubber Plantation Under Hill Zone of Karnataka

BASAVARAJ HADAPAD

ABSTRACT

A field experiment was carried out to assess the performance of velvet bean genotypes for growth, yield and quality in rubber plantation under hill zone of Karnataka in the experimental block of Zonal Agricultural and Horticultural Research Station, Mudigere during *rabi* 2015-16. A Randomized Complete Block Design experiment was laid with eleven treatments replicated thrice. The genotypes *viz*., IIHR Selection-2, IIHR Selection-3, IIHR Selection-8, IIHR Selection-10, Arka Ashwini, Arka Dhanvantari, IC 369144, IC 385926, IC 395193, IC 471876 and Tarikere local were taken for the study. Among velvet bean genotypes, Arka Dhanvantari recorded the maximum vine length (294.13 cm), number of branches (5.60) per plant, number of trifoliate leaves (93.57) per plant and leaf area (18740.73 cm^2) per plant. The days to first (54.00) and 50 per cent flowering (62.00) were minimum in Arka Ashwini and maximum in the genotype Arka Dhanvantari (119.93 and 137.00, respectively). The maximum number of inflorescence per plant (9.13), number of bunches per plant (4.87), number of pods per bunch (5.07) and pod yield (154.69 g $plant^{-1}$) was produced in the genotype Arka Dhanvantari. Seed yield per plant (82.37 g) and per hectare (3050.86 kg) was maximum in the genotype Arka Dhanvantari and it was on par with IIHR Selection-2 (2906.17 kg ha^{-1}). The alkaloid L-DOPA content (3.74 %) and its yield (114.17 kg ha^{-1}) was found to be maximum in Arka Dhanvantari. The maximum total fresh biomass (388.03 g $plant^{-1}$) and total dry matter production (112.36 g $plant^{-1}$) was recorded in genotype Arka Dhanvantari. The number of root nodules (13.53 per plant) and increased nitrogen content (33.33 kg ha^{-1}) in soil was recorded maximum in the genotype IIHR Selection-2. Among the velvet bean genotypes studied, the genotypes Arka Dhanvantari and IIHR Selection-2 were performed better in rubber plantation under hill zone of Karnataka.

July, 2016

(Ravi, C. S.)
Major Advisor

3. Studies on Genetic Variability in Chilli (*CAPSICUM ANNUUM* L.) Germplasm Under Central Dry Zone of Karnataka

MONISHA, S.

ABSTRACT

An experiment was undertaken to evaluate 24 chilli genotypes in Randomized Complete Block Design with three replications to study genetic variability, correlation, path analysis and genetic divergence at College of Horticulture, Hiriyur during 2015- 2016 under central dry zone of Karnataka. Significant difference was observed among accessions for all the characters under study. G-4 recorded the maximum plant height at harvest (102.53 cm), number of fruits per plant (410.20), fruit yield per plant (200.2 g), fruit yield per plot (2.11 kg) and fruit yield per hectare (2.93 t). The maximum ascorbic acid, oleoresin and capsaicin were recorded in Jayanthi (142.90 mg/100gm), Arka Lohit (18.56%) and LCA 334 (0.58 %) respectively. A high heritability coupled with high genetic advance over mean was recorded for most of the traits indicating the predominance of additive gene action for these traits. Fruit yield per plant showed significant positive association with plant height at harvest, number of branches per plant, plant spread, days taken for ripening, number of fruits per plant, fruit yield per plot, ascorbic acid, oleoresin and capsaicin. Path analysis revealed that number of fruits per plant had highest direct positive effect on fruit yield followed by fruit diameter at pedicel attachment. The chilli genotypes were grouped into three clusters. Among them, cluster I consists of maximum number of genotypes. The characters *viz.*, oleoresin followed by fruit to seed ratio, ascorbic acid, number of seeds per fruit, number of fruits per plant, days taken for ripening, fruit weight, yield per plant and yield per plot contributed maximum towards total genetic divergence. Genotypes G-4, LCA 334, DCA-59, Jayanthi, Chilli Japani Longi were found promising for central dry zone of Karnataka.

October, 2016

(H. Chandrappa)
Major Advisor

4. Genetic Variability and Correlation Studies in Bird's Eye Chilli (*Capsicum frutescens* L.)

VAISHNAVI, B.A.

THESIS ABSTRACT

Bird's eye chilli (*Capsicum frutescens* L.) accessions collected from different georaphical regions were evaluated to study the genetic variabilty, correlation, path analysis and genetic divergence at College of Horticulture, Mudigere during 2015-16. Significant diference was observed among accessions for all the charcaters under study. Accession 26 recorded significantly higher plant height (94.23 cm), number of primary branches per plant (8.05) and fruit yield (855.97 g/ plant and 20.71 q/ha). Accession 30 recorded highest vitamin-C (159.05 mg/100g) and oleoresin content (11.36 %). Capsaicin content (1.86 %) was maximum in Acc.15, whereas Acc.27 recorded maximum capsanthin content (436.05 Colour units). High heritability coupled with genetic advance over mean were observed for most of the growth, yield as well as quality characters that indicated predominance of additive gene action for these traits. Correlation studies indicated positive association of fruit yield (q/ha) with plant height, number of primary branches per plant, plant spread, total number of fruits per plant, fruit length, width and dry weight of 100 fruits at both genotypic and phenotypic levels. Path analysis revealed that positive direct effects on fruit yield was from days to first flowering, number of fruits per plant and fruit yield per plant suggesting that these parameters may be considered as prime traits during selection to fetch higher yield. The accessions were grouped into six clusters. Among the clusters cluster VI consisted maximum number (14) of accessions. The characters such as dry weight of 100 fruits (36.67 %) followed by weight of seeds per fruit (14.13 %) and oleoresin content (8.03 %) contributed maximum to the total genetic diversity. Accession 26, Acc.15, Acc.30 and Acc.27 were identified as best performing accessions from the study.

August, 2016

(Bhoomika, H.R.)
Major Advisor

Vegetable Science

University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Vegetable Science

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1. Evaluation of Potato (*Solanum tuberosum* L.) Genotypes Under Hill Zone of Karnataka

LAVANYA, K. S

ABSTRACT

A field study on performance of potato genotypes under hill zone of Karnataka was carried out at the Department of Vegetable Science, College of Horticulture, Mudigere, Karnataka during the year 2015. The experiment was laid out by adopting randomized block design with four replications. Nine genotypes were TT7006, TT7007, TT7010, TT7011, C-28, MCIP-9-1, MCIP-9-11, Kufri Surya and Kufri Jyoti were procured from International potato centre and used for the study. Among genotypes evaluated, maximum tuber sprout percentage was observed in Kufri Jyoti (100) followed by TT7011 (98.75) and TT7010 (96.66). The genotype TT7011 performed better for most of the characters like number of tubers per plant (4.43), number of tubers per plot (266.80), total tuber yield per plot (18.98 kg), total tuber yield per hectare (26.36 t), marketable yield per plant (169.6g), marketable yield per plot (10.21 kg), marketable yield per hectare (14.18 t), dry matter (19.88 %) and total sugars (2.55 %). Genotype TT7010 recorded maximum number of stems (4.58), total tuber yield per plant (360.19 g), tuber diameter (6.13 cm) and which was found to be significantly superior over other genotypes. Correlation studies revealed that highly significant and positive association of total tuber yield per plot with marketable yield per plot, number of tubers per plant, dry matter and number of stems. Path analysis revealed that, numbers of tubers per plant, marketable yield per plot, number of stems and tuber weight were the most influencing traits on total tuber yield per plot. Thus these characters deserve greater weightage during selection. Highest net profit and benefit to cost ratio was obtained from TT7011 (2.14:1) followed by TT7010 (2.10:1) and these two genotypes performed better at Mudigere under hill zone of Karnataka.

June, 2016

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2. Heterosis and Combining Ability Studies in Bell Pepper (*Capsicum annuum* L.)

PRAVEEN YADAHALLI

ABSTRACT

A field experiment was conducted to study the heterosis and combining ability for yield and quality traits in bell pepper (*Capsicum annuum* L.). The experiment was conducted at Department of Vegetable Science, College of Horticulture Mudigere. Thirty F_1 hybrids were produced by crossing six parents in complete diallel mating design with reciprocals. Variance due to parents, hybrids, F_1 and reciprocals were highly significant for all the characters. In case of interaction of F_1 vs. reciprocals except plant height at 30DAT, number of primary branches and number of locules per fruit and in case of interaction of parents vs. hybrids except number of secondary branches, yield per plant and number of locules per fruit all characters showed significant differences. The diallel analysis revealed that no single parent was 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 Yolo Wonder x California Wonder (26.91 %) followed by California Wonder x Yolo Wonder (15.90 %). In most of the characters SCA variance was greater than GCA variance. Among the parents, Yolo Wonder was good general combiner followed by California Wonder and Arka Mohini. Among the hybrids California Wonder x Yolo Wonder, Arka Mohini x Soaln Bharpur and Arka Mohini x California Wonder crosses had significant SCA effect for yield per plant. California Wonder x Yolo Wonder and Arka Mohini x Yelavigi Collection were good cross combinations for ascorbic acid content whereas, Arka Mohini x Yolo Wonder was good cross combination for shelf life. The present study reveals that heterosis breeding is useful for improvement of bell pepper crop.

July, 2016

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Major Advisor

3. Line × Tester Analysis in Brinjal (*Solanum melongena* L.) Under Hill Zone of karnataka

ASHOKA M C

ABSTRACT

The present investigation on line × tester analysis in brinjal (*Solanum melongena* L.) under hill zone of Karnataka was carried out at the Department of Vegetable Science, College of Horticulture, Mudigere, during *Kharif* and *Rabi* season of the year 2015-16. Twenty seven F_1 hybrids were produced by crossing 9 lines with 3 testers by using line × tester design and they were evaluated along with parents in RCBD with two replications. The mean sum of squares due to various sources of variation showed significant differences for almost all the characters studied. The magnitude of heterosis over the standard check (Arka Anand) was high in the desirable direction for days to 50 per cent flowering (-31.40 %), fruit length (37.99 %), fruit diameter (64.78 %), number of fruits per plant (57.63 %), average fruit weight (212.28 %) and yield per plant (87.37 %). The cross IC354140 × Shyamala exhibited maximum significant positive standard heterosis (87.40 %) for yield per hectare followed by Pusa Kranti × Arka Shirish (66.02 %), Arka Neelkanth × Arka Shirish (61.43 %), IC332508 × PPL (47.76 %), IC332508 × Shyamala (41.79 %), Arka Nidhi × Shyamala (41.07 %), IC332508 × Arka Shirish (24.94 %), L-3266 × PPL (22.12 %) and L-3266 × Shyamala (20.38 %). The cross IC354140 × Shyamala exhibited the maximum significant desirable positive *sca* effect for most of the characters studied along with yield per hectare. Among the 12 parents, Pusa Kranti, IC397557, IC332508, IC281112, Arka Shirish and Shyamala were identified as good general combiners for over all characters studied. The predominance of *sca* variance over *gca* variance for most of the studied traits indicated the predominance of non additive gene action. The present study revealed that heterosis breeding is useful for the improvement of brinjal crop through exploitation of additive or non additive gene action.

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Forestry

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

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1. Selection of Candidate Plus Clumps of *Dendrocalamus brandisii* (Munro) Kurz. in Kodagu district

ABSTRACT

An investigation on *Dendrocalamus brandisii* was carried out to select Candidate Plus Clumps (CPC) and assess the variation in phenotypical and wood characters among three different rainfall zones in Kodagu. Growth parameters were divided into clump parameters and culm parameters, clump parameters such as clump height and clump girth demonstrated higher values in high rainfall zone followed by medium rainfall zone and least was found at low rainfall zone. Whereas, average number of culms found to be utmost at high rainfall zone. Culm length which was found to be maximum at high rainfall zone and minimum at low rainfall zone. Rest of culm parameters were recorded at three different portions viz., bottom, middle and top. Culm girth and internodal length all showed higher value at high rainfall zone for bottom portion of the culm.

Whereas, for middle and top portion of the culm the values varied in different rainfall zones. Wood parameters such as culm wall thickness, modulus of rupture (MOR), modulus of elasticity (MOE), wood moisture content (MC) and specific gravity (SG). Culm wall thickness followed a linear trend that is, culm wall thickness decreased with the increase in height. Both MOR and MOE exhibited higher values for bottom and middle portion at high rainfall zone. With respect to MC, at all three portions of culm highest values were found in high rainfall zone. Whereas, SG values were found to behighest in low rainfall zone and least at high rainfall zone. CPC were identified using index selection method developed, each trait of candidate clumps was assigned score based on its phenotypic performance based on this two plus clumps from each rainfall zones were selected.

(N.M. Poonacha)
Major Advisor

June, 2016

2. Studies on Seed and Vegetative Propagation Techniques in *Melia dubia* CAV.

VARSHA K JAYANANDAN

ABSTRACT

The gap between demand and supply of wood is a problematic situation prevailing in the global market which needs an urgent attention. Identification of tree species, indigenous to the country, which satisfies different market requirements and establishment of industrial plantations could be the best possible measures for resolving the problem. *Melia dubia* Cav. or Malabar neem wood is a fast growing tree species which has demand in the plywood and pulpwood industries. Poor seed germination is one of the hurdles for the production of quality planting stock for large scale planting. An effort was made to study the effect of storage and pre-sowing seed treatments on seed germination and to develop macropropagation techniques for the species using stem cuttings. Ripe fruits were collected from seedling seed orchard and were stored in plastic containers for seven storage periods after de-pulping and drying. The seeds were subjected to nine pre-sowing seed treatments at the end of each storage period. It was revealed that the seeds stored for one year gave better germination than other storage period. Among all the pre-sowing treatments, relatively higher germination was found for the seeds exposed to microwave radiation for 10 minutes over different storage periods except 12 month storage period. Soaking of seeds in cow dung slurry for 96 hours had higher germination (6.41%) among all the pre-sowing seed treatments after 12 months of storage. It is prudent to mention that all the pre-sowing seed treatments did not considerably improve the seed germination which could be linked to the presence of combined dormancy. Study on macropropagation through stem cuttings collected from healthy trees revealed that treating stem cuttings with 4000 ppm IBA resulted in better success (27.15 %) and more promising than propagation through seeds.

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Major Advisor

June, 2016

3. Studies on Distribution, Natural Regeneration and Seed Propagation in *Chrysophyllum roxburghii* G.Don.

Poornesh, K.A

ABSTRACT

*Chrysophyllumroxburghii*belongs to family Sapotaceace, commonly called as 'Kappale' or 'Hannale' and 'Pallehpann' in Kodava language.It grows as a tree up to 30 m (100 ft.) tall, with a trunk diameter of up to 40 cm and its habitat is lowland forests from sea-level up to 700 m (2,300 ft.). Thisis acanopy trees in wet evergreen forests. The fruits of this species have been found to possess nutritionally rich components. The fruits are used to prepare salads, jams and jellies. The fruits can be eaten raw and are also used in medicine preparations**.**

The present investigation on distribution, natural regeneration and seed propagation in *Chrysophyllumroxburghii*was carried out in both natural forest and sacred groves of Kodagu. The results revealed that the distribution was restricted to evergreen and semi evergreen patches of the study locations in Kodagu. When the regeneration pattern is considered the more regenerateswere observed in class I and Class II compared to class III and Class IV. Natural regeneration shows reverse J curve, this indicates the natural regeneration is good. Among multiple regenerates the seedlings attaining the pole stage is very minimum, it may be due to various biotic and abiotic pressures.

Viability of seeds was reduced with increased storage period, the germination per cent was seen to be dropping as the storage period increased. Theresults on pre sowing treatment revealedthat seeds sown without any treatment and seeds treated with cold water is performing better than other pre sowing treatments. Acid treatment and hot water treatments showed very poor germination. Number of days taken for initial germination had direct effect on the seedling parameters like the number of leaves, collar diameter and height of seedlings and the recorded valueswere higher with the early germination.

June, 2016

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4. Variability Studies in *Dalbergia latifolia* Roxb.

NAVEEN R

ABSTRACT

Dalbergia latifolia Roxb. (commonly known Rose wood) is one of the most valuable timbers of the world with its rich purple brown to deep purple colour used for decoratives. Tree to tree variability is especially wide, with differences within species, often being strongly influenced by environmental and genetical factors. Because of its diverse utility, limited distribution and overexploitation, the population of rose wood is shrinking. Identification of variation existing in the natural population of *D. latifolia* could help in identifying the individuals with most desirable traits. The present investigation was carried out to study the variation in growth and wood traits in natural populations of *D. latifolia* and further to assess the growth performance of half sib progenies at nursery stage. Based on the natural population, various locations were identified in districts of Karnataka *viz.*, Belagavi, Uttar Kannada, Shivamogga, Chikmagaluru, Hassan, Kodagu, Mysuru and Chamrajanagar districts.The results revealed the existence of considerablevariation between the trees in different regions and within the region in all growth traits (height, diameter at breast height, clear bole height, basal area, and volume) and wood parameter (basic density, moisture content, oven dry specific gravity, fresh specific gravity and wood colour).

Among the different wood traits, basic density of individual trees in the entire study site varied from 0.45 g/cc to 1.05 g/cc. Wood colour of different trees varied from very light colour (purple grey) to very dark colour (Deep purple brown).Seed parameters like weight of 100 seeds were found to be significant different from different location.Average seed weight of individual trees varied from 2.79 g to 7.41 g. Seed germination of different seedlots varied from 0 per cent to 22.22 per cent. Seedling traits such as height and collar diameter varied significantly. Average height of seedling of different seedlots varied from 1.17 cm to 12.07 cm and mean collar diameter of seedlings of different seedlots varied from 0.25mm to 2.13mm. The Seedling survival rate of different seedlots varied from 3.84 per cent to 100 per cent. Heritability values of different traits were low to moderate.Significant relationship between seed weight and height of seedling was observed (0.31).Seedling height and collar diameter of seedlings had significant positive correlation with seed germination (r=0.78) and seedling survival(r=0.78) at nursery.

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June, 2016