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. Faunistic Studies on Termites (Isoptera) of Shivamogga District and Evaluation of New Insecticides

G.S. SATHISHA

ABSTRACT

A total of 25 termite species belonging to 11 genera, 6 subfamilies under two families *viz.*, Rhinotermitidae and Termitidae were recorded in Shivamogga district. Rhinotermitinae was represented by two subfamilies *viz.*, Coptotermetinae and Heterotermetinae. *Coptotermes ceylonicus* was the only one species under Coptotermetinae whereas, *Heterotermes indicola* and *H. malabaricus* two species under Heterotermetinae. Termitidae was the dominant family with 22 species which were belonging to nine genera and four subfamilies *viz.*, Amitermitinae, Macrotermitinae, Nasutitermitinae and Termitinae. Amitermitinae had four species, namely, *Eurytermes budda, Microcerotermes fletcheri, M. pakistanicus* and *Speculitermes sinhalensis.* Macrotermitinae had the highest number of species belonging (12) two genera, namely *Microtermes* and *Odontotermes*. *Microtermes* genus was with only one species *i.e., Microtermes obesi.*

The genus *Odontotermes* was represented by the highest number of species (11), namely, *O.adampurensis, O. anamallensis, O. assmuthi, O. bellahunisensis, O. bhagwathi, O. boveni, O. feae, O. horni, O. microdentatus, O. obesus* and *O. redemanni*. Nasutitermitinae was represented by four species, namely *Nasutitermes anamalaiensis, N. krishna, N. indicola* and *Trinervitermes biformis.* Termitinae subfamily was represented by two species, namely *Labiocapritermes distortus* and *Pericapritermes* sp.

Illustrated key was prepared for all the collected families, genera and species for easy and accurate identification based on the morphology of head and thorax of soldiers caste. The present study also revealed that the differences in the species composition and richness among three different habitats (Western Ghats (11 species and Shannon's index (H) - 1.56), semi-malnad (11 species and H - 1.37) maidan (4 species and H - 0.89). Among the different insecticides tested, lowest termite density was recorded in bifenthrin @ 2ml per litre upto 21 days after insecticide application in soil. The next best effective insecticides were imidacloprid @ 0.5ml and fipronil @ 2ml per litre.

June, 2015

(Kalleshwra Swamy, C. M)
Major Advisor

2. Evaluation of Different Intercrops, Organic Manures and Biopesticides against Stem Borers in Maize (*Zea Mays* L.)

KAVITAHEGDE

ABSTRACT

The present investigation was carried out against important maize stem borers, *Chilopartellus* (Swinhoe) and *Sesamiainferens* (Walker) at College of Agriculture, Shivamogga during *kharif*, 2014-15. The different intercropping systems *viz*., maize + cowpea, maize + field bean, maize + coriander, maize sole crop and different organic manures *viz*., FYM, neem cake, poultry manure and rice hull ash were evaluated against these stem borers in maize.

Among the different intercropping systems maize + cowpea (1:1) recorded lowest percentage of plants showing pinholes (12.80%), lowest number of pinholes per plant (19.60), lowest per cent dead hearts(5.65%) and cob damage (4.33%) with highest grain (48.53 q ha^{-1})and fodder yield (93.97 q ha^{-1}). Among the different organic manures neem cake @ 0.2 t ha^{-1} resulted in lowest percentage of plants showing pinholes (16.74%), lowest number of pinholes per plant (21.19), lowest per cent dead hearts (6.32%) and cob damage (4.70%) with highest grain (46.31 q ha^{-1}) and fodder yield (85.45 q ha^{-1}). Interaction effect between different combinations of intercropping systems and organic manures showed that maize intercropped with cowpea along with application of neem cake found superior among the treatments by recording lowest percentage of plants showing pinholes (6.71%), lowest number of pinholes per plant (12.91), lowest per cent dead hearts (3.34%) and cob damage (2.98%) with highest grain (53.40 q ha^{-1}) and fodder yield (97.86 q ha^{-1}).

Among the different bio pesticides and insecticides evaluated, seed treatment (2ml/kg of seed) and foliar application of chlorpyriphos (2ml/l) at 40 DAS recorded lowest damage in terms of percentage of plants showing pinholes (21.15%), per cent dead hearts (8.78%) and number of larvae per plant (2.57) with highest grain (30.47 q ha^{-1}) and fodder yield (42.06 q ha^{-1}).

June 2015

(M. Manjunatha)
Major Advisor

3. Aphid (APHIDIDAE: HOMOPTERA) Vectors of Potato Viruses and their Management

KUMARA, B. B.

ABSTRACT

Population dynamics of potato aphids was conducted during *Kharif* and *Rabi* of 2014-15 in potato fields of chikkamagaluru district. Five locations were selected during the study period at both the seasons. Among five locations Beekanahalli (location 3) has recorded highest aphid population on crop followed by Mugalavalli (location5) during *Kharif*. In *Rabi*, highest aphid population was recorded on crop in Lakshmipura II (location 3). Six species of aphids were trapped on sticky trap and four species on water traps during *kharif*. In *Rabi*, five species of aphids were trapped on sticky trap and four species on water traps. Aphids had positive correlation with minimum temperature and maximum temperature in almost all locations. The per cent PVY incidence was more in *Kharif* compared to *Rabi* in all the locations. The transmission efficiency of potato viruses by three aphid vectors (*M. persicae*, *A. gossypii* and *A. craccivora*) was studied. Efficiency was measured by single aphid inoculation following a single acquisition access period (AAP) and the number of plants showing symptoms to which the aphids could successfully transmit the virus. Single aphid inoculation studies for PVY indicated that *M. persicae* (66.66%) was significantly more efficient in transmitting PVY than *A. gossypii* (26.66%) and *A. craccivora* (16.66%). Settling behaviour of aphids was studied on healthy potato plant and PVY infected plants. On healthy plants, all the three species took more time to initiate the probe compared to PVY infected plants. *Myzus persicae* initiated probing earlier than other two species. Insecticides were evaluated against potato aphids and also virus incidence in two locations. In one location, thiomethoxam followed by imidacloprid and acephate were effective in controlling aphid population. PVY incidence was low in thiomethoxam treated plots compared to other insecticides. However, none of the insecticides were effective in educing PLRV incidence. In another location, imidacloprid, thiomethoxam and acetamiprid are found effective.

December, 2015

(Kalleshwaraswamy, C. M)

Major Advisor

4. Studies on the Population Density, Spatial Distribution and Management of Coconut Black Headed Caterpillar, *Opisina arenosella* (Walker) (Oecophoridae: Lepidoptera)

SHARANABASAPPA, M. KAMADAL

ABSTRACT

Studies on the population density, spatial distribution and management of coconut black headed caterpillar, Opisina arenosella (Walker) (Oecophoridae: Lepidoptera) were carried out in the two agro-climatic zones of Karnataka (Central dry zone, Chikkamagaluru district and Southern transition zone, Shivamogga district) during 2014-15. The study clearly showed that, at least in some months, there was a complete deviation from the discrete generation, particularly in the month of June and September 2014. With respect to spatial distribution of different life stages of O. arenosella indicated that, eggs were found to have aggregated distribution in a large infested patch. In most of the sampling periods, early, medium, later instar larval and pupal stages showed the aggregated distribution. Pre-oviposition period of field collected G. nephantidis was significantly lower (4.15L0.75 days) than lab reared G. nephantidis (4.80+0.77 days). Oviposition period of field collected G. nephantidis was significantly higher (15.2+1.36 days) than the lab reared G. nephantidis (14.35+0.99 days) at250 to 300 C. Progeny production was higher in field collected G. nephantidis (123.4+10.30 eggs) than the lab reared G. nephantidis (80.45+45 eggs). The sex ratio (female to male) in lab reared population was (1:0.12+0.02) and it was lesser as compare to field collected population of G. nephantidis (l:0.22t0.02). The field and laboratory evaluation of selected insecticides against O. arenosella, indicated that the highest per cent mortality was recorded in case of monocrotophos 36% SL (54.33%) and neemazal lo/o (29.26%) as compare with other insecticides inferred by the observation made after three days'of root feeding. The insecticides monocrotophos 36% SL, bifenthrin l0o/o EC, imidacloprid 17 .8% SL, neemazal 7%, and emarnectin benzoate 5oh SG gave significant reduction in larval population of O. arenosella after seven days, 14 and 2l days of root feeding as compared to only 10.9% reduction in untreated control.

December, 2015

(B. C. Hanumanthaswamy)
Major Advisor

5. **Studies on Mango Fruit Fly Species Composition, Evaluation of Traps and Screening of Varieties for Resistance**

LAVANYA, M. N

ABSTRACT

Studies on monitoring of mango fruit fly species, evaluation of different traps and screening of varieties for resistance was conducted at College of Agriculture, Shivamogga, farmer field Devabala, Shivamogga and Doddabbigere, Davanagere during 2014 to 2015. The population of *Bactrocera dorsalis* had two peaks from 23rd to 29th and 10th to 22nd SW and from 23rd to 33rd and 10 to 22nd SW at College of Agriculture, Shivamogga and Devabala, respectively. *Bactrocera correcta* had two peaks at both the locations *i.e.* 23rd to 33rd and 10 to 22nd SW. *Bactrocera zonata* also had two peaks from 23rd to 33rd and 10th to 22nd SW and 23rd to 32nd and 10th to 22nd SW at College of Agriculture, Shivamogga and Devabala, respectively. *Bactrocera versicolor* recorded during 23rd to 41st and 11th to 22nd SW and 23rd to 43rd and 12th to 22nd SW at College of Agriculture, Shivamogga and Devabala, respectively. *Bactrocera curcurbitae*, *Bactrocera tau* and *Bactrocera paraverebascifoliae* observed at College of Agriculture, Shivamogga and Devabala, Shivamogga where as *Bactrocera affinis* recorded only at Devabala, Shivamogga. At College of Agriculture, Shivamogga and Devabala, *Bactrocera dorsalis*, *Bactrocera correcta* and *Bactrocera zonata* had significant positive correlation with maximum, minimum temperature and wind speed whereas, *Bactrocera versicolor* showed significant positive correlation with rainfall and wind speed. In Saindura and Raspuri, *B. dorsalis* emerged to an extent of 100 per cent and 99.43 per cent from Alphanso. *B. correcta* was noticed to an extent of 0.58 per cent only in Alphanso. In all the three varieties *B. dorsalis* was male dominant with a sex ratio of 1: 0.63 to 1: 0.66 whereas, females were dominant in *B. correcta* with sex ratio of 1: 2.9. PCI trap recorded significantly higher number of fruit flies and followed by IIHR trap at College of Agriculture, Shivamogga and Devabala, Shivamogga. Wooden block lure trap proved to be ineffective by attracting significantly less number of fruit flies. Neelam variety resulted as resistant by recording least percentage of incidence. Highest percentage of incidence was recorded in Alphanso, Raspuri and Totapuri.

December, 2015

(Sharanabasappa)
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. Study on Technological Gap and Adoption Level of Improved Cultivation Practices by Arecanut Growers of Bhadra Command Area

DEEPIKA K. R.

ABSTRACT

A study on technological gap and adoption level of improved cultivation practices by arecanut growerswas carried out in Bhadra command area during 2014-15.The number of respondents selected for the study was 120.The data was collected by personal interview method.

Majority of arecanut growers were middle aged (60.00 %), 25.83 per cent of respondents studied uptomiddle school, 29.17 per cent had low farming experience in arecanut cultivation, 61.66 per cent of the respondents belonged to medium level of annual income category.Considerable percent of the respondents belonged to high innovativeness category, medium risk orientation, high economic motivation and high achievement motivation.Variables such as education, extension participation, innovativeness, mass media utilization and achievement motivation were negatively and significantly related withtechnological gap of arecanut growers.

45.84 per cent of the respondents belonged to medium category of technological gap. Nearly 47.50 per cent of arecanut growers belonged to medium adoption level category.Majority of arecanut growers expressed their training needs on the practices likeidentification of pests and diseases (83.40 %) , control of pests and diseases (95.80 %) , processing of arecanut (75.00%).Majority of the respondents expressed that non availability of labour at right time (76.67%), High incidence of pests and diseases (74.16 %) are the major constraints in arecanut cultivation.

June, 2015

(S. Chandra Naik)
Major Advisor

2. A Comparative Study on Men and Women Self-Help Groups in Shivamogga District

CHINMAYI, V.

ABSTRACT

Self help group is a group of people having a common goal of socio-economic sustainable development discussing their problems and resolving it through appropriate participation decision making. The study was conducted during the year 2015, in Shivamogga district. Main objective of the study was to compare the performance of men and women SHGs, the motivational factors in the formation of Self help groups,various activity undertaken by SHG members,relationship between personal and socio-economic characteristics with performance, suggestions and constraints faced by the members of SHG members.Total of 30 SHGs and 150 respondents were interviewed from three taluks of Shivamogga district.

The findings of the study revealed that, majority of respondents from men SHGs (57.33%) and women (58.67%) SHGs had medium level of social participation. Majority of the respondents from both men (36%) and women groups (37.33%) were having medium level of awareness about developmental programmes. Majority of the respondents from both men SHGs (40%) and women (38.67%) SHGs had medium level of extension participation. Majority of the respondents from both men (42.67%) and women(37.33%) had medium level of extension contact.

With respect to motivational factors, men were formed into self help groups to reduce financial problems (54.67%) and women groups are formed to increase the future savings (74.67%). Majority of both men(73.33%) and women(46.67%) self help groups belongs to medium performance level category. Major constraint faced by the both men (42.67%) and women (36%) respondents were lack of technical guidance. Majority of the respondents (80%) suggested that training programmes should be conducted based on the needs.

June, 2015

(BasavarajBeerannavar)
Major Advisor

3. Impact of Intercrops in Cashew Based Cropping System Followed by the Farmers of Shivamogga District of Karnataka State

AKSHATH, K. V.

ABSTRACT

The study was conducted in the year 2014-15 in Shivamogga district of Karnataka state with a sample size of randomly selected 120 farmers. The data was collected with the help of structured interview schedule. The socio-economic profile of the respondents in the study revealed that, majority of the respondents belong to young age group (50.00 %), high school education (41.67 %), medium family size category (41.67 %), small land holding category (40.83 %) and medium income level (81.17 %). Whereas, majority of the respondents had low mass media exposure (38.33 %), extension participation category (51.67 %), medium extension agency contact (50.83 %) and medium social participation category (45.83 %). With respect to the intercrops followed in Cashew majority of the farmers (61.67 %) adopted maize as the intercrop in cashew followed by paddy (16.67 %), pineapple (7.50 %) and ginger (6.67 %) in Cashew based cropping system.

The cultivation of intercrops in cashew provides the employment opportunity of an average of 25 man days per acre and it provides the average income of Rs. 53,086.62/- per acre. With respect to adoption level of cashew production technologies most of the farmers (38.33 %) were found in medium adoption category followed by low (35.83 %) and high adoption category (25.83 %). The variables like age, education, farming experience, social participation and extension participation had positive and significant relationship with adoption level at 0.01 levels. Whereas, extension agency contact had negative and significant relationship with adoption level. The major constraints faced by the cashew growers were lack of processing unit (90.96 %), incidence of pest and diseases (85.52 %) and price fluctuation in the market (76.86 %).

June, 2015

(B. Dhananjaya)
Major Advisor

4. Study on Entrepreneurial Behavior of Mango Growers of Karnataka

MANJUNATH

ABSTRACT

A study on entrepreneurial behaviour of mango growers was carried out in Kolar and Ramanagar districts of Karnataka stateduring 2014-15. The number of respondents selected for the study was 120. The data were collected by personal interview method.

The results showed thatmore than half (55.83%) of the respondents had medium entrepreneurial behavior. A majority of the respondents had medium level ofrisk orientation (63.33%), achievement motivation (59.17%), innovativeness (53.33%), decision making ability (52.00%), management orientation(50.00%),scientific orientation (45.83%) and economic motivation (42.50%). Majority of the mango growers (60.00%) were middle aged. 25.00 per cent of the respondents were educated up to high school, 61.66 per cent were had agriculture as main occupation, 32.50 per cent were belonged to small farmers category and 36.67 per cent were had medium experience in mango cultivation. Variables such as education, land holding, annual income, mass media exposure, extension participation and extension contact positively and significantly correlated with entrepreneurial behaviour of mango growers.

Nearly half (49.16%) of the respondents leased their orchard to the pre harvest contractors.Majority of the mango growers most needed training with respect to “marketing of mango and mango products”(37.00%) followed by “irrigation management in mango (33.33%), and entrepreneurial activities”(30.00%).The major constraints faced by mango growers were“lack of storage facility for fruits and processed products”(100%), followed by “fluctuation of prices in mangos” (100%)and “lack of knowledge on processing”(92.50%).

June, 2015

(K. Amaresh Kumar)
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. Growth Analysis, Yield and Quality of Guar Genotypes as Influenced by Planting Density

NANDINI, K.M.

ABSTRACT

A field experiment was conducted at University of Agricultural and Horticultural Sciences, Navile, Shivamogga during *kharif2014* onredsandy clay soil to study the growth analysis, yield and quality of guar genotypes as influenced by planting density. The experiment was laid out in factorial randomized complete block design with three replications. There were twelve treatment combinations comprised of four spacing (45cmx15cm, 30cmx15cm, 45cmx10cm and 30cmx10cm) and three genotypes (RGC-I003, RGC-936 and HG-365). Among the spacing, significantly higher grain yield (743.89 kgha^{-1}), stover yield (1629.94 kgha^{-1}),RUE (1.32Mjm"), HUE (1.53 x 10^{-2}), PTUE (2.29 x 1O^{-2}) and quality parameters like gum per cent (30.36), protein percent(30.94) andendosperm percent(33.49), viscosity (236.47 cps I) were recorded inplants grown at30cmx10cm.

Among thegenotypes, significantly higher total dry matter (23.38 g plant"), grain yield (898.18 kg ha^{-1}),stover yield (1931.39 kg ha-l),RUE (1.26 Mj m"), HUE (1.60 x 10^{-2}), PTUE (2.39 x 10^{-2}) and quality parameters like gum per cent (31.09), protein per cent (31.68) and endosperm per cent(33.96) viscosity RGC-I003 (245.75 CpS-I)were recorded with the RGC-I003. This could be due to genetic potentiality ofthegenotypes. The interaction of spacing and genotypes were found to be statistically non significant. Thefunctional growth models like Logistic, Gompertz and Richards shows the pattern of drymatter accumulation of guar genotypes atdifferent spacing.

May, 2015

(C J Sridhara)
Major Advisor

2. Studies on Performance of Traditional Paddy (*Oryza Sativa* L.) Varieties Under Different Nutrient Management Practices

GAGANDEEP, H.N.

ABSTRACT

A field experiment was conducted during 2014 atAHRS, Honnavile, UAHS, Shivamogga.The experiment was laid out in a Randomized Complete Block Design (Factorial concept) with four varieties and four different nutrient management practices with three replications. The cultivars usedwere Chinnaponni, Mysore mallige, Coimbatore sanna and JGL – 1798 and different nutrient sources were Rec. FYM + 100 % Rec. N equivalent through organics,100 % Rec. NPK through inorganics (100:50:50 NPK kg ha^{-1}), Rec. FYM + 50 % N equivalent through organics + 50 % NPK through inorganics (100:50:50 NPK kg ha^{-1}) and Rec. FYM + 100 % Rec. NPK through inorganics.

The results revealed that among the traditional paddy varieties Chinnaponni recorded higher plant height (76.1 cm), leaf area (914.0 cm^2 $hill^{-1}$), number of effective tillers (26.4 $hill^{-1}$), total dry matter accumulation (82.92 g $hill^{-1}$), grain yield (3610 kg ha^{-1}) and 1000-grain weight (22.2 g) compared to all traditional varieties. The high yielding paddy variety JGL-1798 recorded significantly higher plant height (81.6 cm), leaf area (919.9 cm^2 $hill^{-1}$), number of effective tillers (29.0 $hill^{-1}$) and total dry matter accumulation (91.48 g $hill^{-1}$), grain yield (4997 kg ha^{-1}) and 1000- grain weight (24.1 g) compared to all traditional varieties.

Among the different nutrient management practices Rec. FYM + 100 % Rec. N equivalent through organics recorded significantly taller plants (74.8 cm), leaf area (942.4 cm^2 $hill^{-1}$), number of effective tillers (26.3 $hill^{-1}$) and total dry matter accumulation (83.05 g $hill^{-1}$), grain yield (3580 kg ha^{-1}) and 1000- grain weight (22.2 g). However, it was on par with application of Rec. FYM + 100 % Rec. NPK through inorganics and Rec. FYM + 50 % N equivalent through organics + 50 % NPK through inorganics as compared to application of 100 % NPK through inorganics.

July, 2015

(C. Sunil)
Major Advisor

3. Effect of Zinc Application through Soil and Foliar Means on Biofortification of Zinc in Maize (*Zea Mays* L.)

SHIVANAND PATIL

ABSTRACT

A field experiment entitled 'Effect of zinc application through soil and foliar means on biofortification of zinc in maize (*Zea mays* L.)' was conducted at Agriculture College, Navile, UAHS, Shivamogga during *kharif* 2014. The experiment consisted of 12 treatments with three replication was laid out in randomized complete block design (RCBD). The treatments comprise of zinc fertilization through zinc enriched maize residue compost, FYM, soil and foliar means were compared with recommended dose of fertilizer alone and recommend package of practice.

Maize residue compost applied @ 7.5 t ha^{-1} enriched with 15 kg $ZnSO_4$ recorded significantly higher grain (60.9 q ha^{-1}) and stover yields (62.57 q ha^{-1}). The superiority of former treatment was traced back to the significant improvement in growth attributes *viz.*, plant height (172.63 cm), leaf area (45.57 dm^2), leaf area index (3.38), leaf area duration (113.84 days), total day matter production (326.38 g $plant^{-1}$) and crop growth rate (44.61 g m^{-2} day^{-1}) and yield attributes such as cob diameter (5.05 cm), test weight (31.51 g) and grain yield per plant (137.4 g). The significant improvement in growth and yield parameters with maize residue compost applied @ 7.5 t ha^{-1} enriched with 15 kg $ZnSO_4$ was due to higher total nutrient uptake (124.11, 24.87, 149.36 kg N, P_2O_5, K_2O and 451.51 g zinc ha^{-1}, respectively) by the crop.

The quality parameters of maize *viz.*, grain zinc content (46.67 mg kg^{-1}), soluble protein (5.39 mg g^{-1}), crude protein in grain (12.67 %) and protein yield (760.14 kg ha^{-1}) were also higher with application $ZnSo_4$ @ 15 kg ha^{-1} through enriched MRC (@ 7.5 t ha^{-1}).

July, 2015

(G. K. Girijesh)
Major Advisor

4. Effect of Integrated Nutrient Management on Growth and Yield of Aerobic Rice (*Oryza Sativa* L.)

KIRAN KUMAR

ABSTRACT

A field experiment was conducted during *Kharif* 2014 at agriculture and Horticulture Research Station (AHRS), Bavikere to know the combined effect of organic and inorganic fertilizers on growth and yield of aerobic rice.The experiment was laid out in a randomized complete block design (RCBD) with eleven treatments replicated thrice.

Application of RDF + Vermicompost + PSB + 25% Nitrogen through glyricidia recorded higher plant height (65.10 cm), number of leaves (103.32 plant^{-1}), leaf area (2323.60 cm^2 plant^{-1}), leaf area index (3.72), number of tillers (31.63 plant^{-1}), total dry matter accumulation (96.46 g plant^{-1}), grain yield (4241 kg ha^{-1}) and straw yield (5487 kg ha^{-1}) which was on par with the application of RDF + FYM + PSB + 25% Nitrogen through glyricidia grain yield (4111 kg ha^{-1}) straw yield of (5248 kg ha^{-1}), respectively.

Application of RDF + Vermicompost + PSB + 25% Nitrogen through Glyricidia resulted in higher total nitrogen, phosphorus and potassium uptake by aerobic rice (131.32, 26.95 and 113.07 kg ha^{-1}, respectively) which was on par with the application of RDF + FYM + PSB + 25% Nitrogen through glyricidia (125.54, 25.28 and 111.97 kg ha^{-1}, respectively). Lower uptake of nitrogen, phosphorus and potassium (86.93, 13.26 and 85.46 kg ha^{-1}, respectively) was observed with application recommended dose of fertilizer (RDF) alone.

The available nitrogen, phosphorus and potassium (272.62, 86.95 and 221.30 kg ha^{-1}, respectively) after the crop harvest were observed with the application of RDF + Vermicompost + PSB + 25% Nitrogen through glyricidia which was on par with application of RDF + FYM + PSB + 25% Nitrogen through glyricidia (271.30, 85.69, and 201.25 kg ha^{-1}, respectively). Lower available nitrogen, phosphorus and potassium (265.14, 76.81 and 164.82 kg ha^{-1}, respectively) were observed with application of recommended dose of fertilizer (RDF) alone.

July, 2015

(C. J. Sridhara)
Major Advisor

5. **Integrated Use of Conventional and Foliar Fertilizers with Effective Microbial Consortia on Productivity of Paddy (*Oryza Sativa* L.) in Southern Transition Zone (STZ) of Karnataka**

VISHWANATH PATIL

ABSTRACT

A field experiment was conducted during Kharif season of 2014 at Agronomy field unit, University of Agricultural and Horticultural Sciences, Navile, Shivamogga. The experiment was laid out in Randomized Complete Block Design with thirteen treatments replicated thrice. Treatments consisted of two levels of recommended dose of fertilizers (75 and 100%) supplemented with foliar fertilizers application *viz.*, 19:19:19 and 13:0:45 at different stages and bioinoculation of effective microbial consortia. The paddy variety used was JGL-1798.The results revealed that among the different treatments, application of 100 per cent recommended dose of NPK with one per cent each foliar spray of 19:19:19 and 13:0:45 at maximum tillering and grain filling stages, respectively with bioinoculation of effective microbial consortia (*Azospirillium* + *Bacillus megaterium* + *Frateuria aurantia*) recorded significantly higher plant height (98.13 cm), number of leaves (65.36), number of tillers (18.10), leaf area (1097.83 cm^2) and total dry matter production $hill^{-1}$ (61.28 g).

Yield contributing characters like number of productive tillers $hill^{-1}$ (16.10), panicle length (23.30 cm), panicle weight (3.58 g), 1000 grain weight (23.10 g) and number of filled grains $panicle^{-1}$ (151.33) were also significantly higher in the above said treatment with least chaffiness (4.99 %) which ultimately resulted in significantly higher grain (75.56q ha^{-1}) and straw yield of paddy (78.05 q ha^{-1}). The quantum of yield increase was 21.62 per cent as compared to recommended dose of NPK (62.13 q ha^{-1}). Nutrient uptake by the crop also registered similar trend as that of growth and yield parameters with statistically higher uptake of N (85.82 kg ha^{-1}), P_2O_5 (30.51 kg ha^{-1}) and K_2O (50.58 kg ha^{-1}). In terms of economics also, numerically higher gross returns (Rs. 110181.33 ha^{-1}), net returns (Rs. 79410.08 ha^{-1}) and B:C ratio of 2.58 is noticed in the same treatment.

July, 2015

(H. K. Veeranna)
Major Advisor

6. Effect of Liquid Fertilizers on Rainfed Hybrid Maize (*Zea mays* L.) in Southern Transition Zone of Karnataka

CHAITHANYA

ABSTRACT

A field experiment entitled Effect of liquid fertilizers on rainfed hybrid maize (*Zea mays* L.) in Southern Transition Zone of Karnataka was conducted during *Kharif* 2014 at Agricultural and Horticultural Research Station, Bavikere, UAHS, Shivamogga. On red clay loam soil which was low in available nitrogen, medium in available phosphorus and potassium. There were 11 treatment combination consisting of two water soluble fertilizers along with Package of practice *i.e.* (only RDF, 0.5 % 18:18:18, 1.0 % 18:18:18, 1.5 % 18:18:18, 0.5 % Multi-K, 1.0 % Multi-K, 1.5 % Multi-K, 1.0 % 18:18:18 + 0.5 % Multi-K, 1.0 % 18:18:18 + 1.0 % Multi-K and 1.0 % 18:18:18 + 1.5 % Multi-K) and two stages of foliar application of Water Soluble Fertilizers at 30 DAS and 60 DAS. The experiment was laid out in RCBD with replicated thrice.

The results revealed that Package of Practice + 18:18:18 @ 1.0 % + Multi-K @1.5 % recorded significantly higher plant height (218.7 cm), leaf area (62.8 cm^2 $plant^{-1}$),total dry weight (335 g $plant^{-1}$), cob length (18.5 cm), thousand grain weight (236 g), shelling percentage (82.9 %), number of grain per cob (435), grain rows per cob (12.9), grain weight per plant (179 g),Grain yield (83.99 q ha^{-1}), stover yield (183.38 t ha^{-1}) and harvest index (0.46) compared to other of treatments.Similarly, available nutrients (286.2, 30.4 and 191.8 N, P_2O_5 and K_2Okg ha^{-1},respectively) nutrient uptake (240.2, 299.4 and 307.8 kg ha^{-1} NPK, respectively), apparent crop recovery efficiency (12.32, 13.18 and 99.99 % NPK, respectively) and agronomic use efficiency (9.78, 18.64 and 18.69 % NPK, respectively) were higher besides higher gross return (Rs. 1,09,957.0 ha^{-1}). However, due to higher unit cost of WSF and higher ICBR (23.86) over control was recorded in POP +18:18:18 @ 1.0 % + Multi-K @ 0.5 %. It is also concluded that Package of Practice + 18:18:18 @ 1.0 % + Multi-K @1.5 % foliar application at 30 DAS and 45DAS found higher yield and returns.

July, 2015

(Narayana S. Mavarkar)
Major Advisor

7. Nutrient Management for Target Yield Concept in Rice under Transplanted Condition in Southern Transition Zone

HARI HARA MURTHY, N.

ABSTRACT

A field experiment was conducted during 2014 at Agricultural and Horticultural Research station, Bhavikere, UAHS, Shivamogga to study the effect of Nutrient management for target yield concept in rice under transplanted condition in southern transition zone. The experiment was laid out in a RCBD. (Factorial concept) with two genotypes and four different nutrient levels with three replications. The genotypes usedwere KRH-4 and JGL-1798 and different nutrient levels were RDF (100:50:50 kg NPK ha^{-1}), fertilizer requirement for target yield of 7.5 t ha^{-1},fertilizer requirement for target yield of 10 t ha^{-1},fertilizer requirement for target yield of 12.5 t ha^{-1}.

Among the genotypes, KRH-4 recorded higher plant height (107.13 cm), number of effective tillers (15.08 hill^{-1}), total dry matter accumulation (80.28 g hill^{-1}), straw yield (104.08 q ha^{-1}) and grain yield (82.42 q ha^{-1}) compared to JGL-1798. Among the nutrient levels, target yield of 12.5 t ha^{-1} recorded significantly higher plant height (110.50 cm), number of effective tillers (17.93 hill^{-1}) and total dry matter accumulation (84.50 g hill^{-1}), straw yield (118.71) and grain yield (97.13 kg ha^{-1}) than other nutrient levels.

Among the interactions, KRH-4 with target yield of 12.5 t ha^{-1} recorded significantly higher straw yield (122.0 q ha^{-1}) and grain yield (102.90 kg ha^{-1}) than other interactions.Similarly higher uptake of nitrogen (117.01 kg ha^{-1}), phosphorous (22.81 kg ha^{-1}) and potassium (104.50 kg ha^{-1}) was recorded in KRH-4. Among the nutrient levels, higher uptake of nitrogen (125.59 kg ha^{-1}), phosphorous (30.43 kg ha^{-1}) and potassium (116.45 kg ha^{-1}) was recorded in target yield of 12.5 t ha^{-1} than other nutrient levels. Higher cost of cultivation (Rs.37865 ha^{-1}) and net returns (Rs.104756 ha^{-1}) was seen in the treatment KRH-4 with target yield of 12.5 t ha^{-1}. However higher B: C ratio (2.95) was seen in KRH-4 with target yield of 10 t ha^{-1}.

July, 2015.

(Basavaraj Naik, T.)
Major Advisor

8. Effect of Integrated Nutrient Management on Growth and Yield of Rainfed Finger millet (*Eleusine coracana* (L.)*Gaertn*.)

THIMMAIAH, M.

ABSTRACT

A field experiment was conducted during 2014 at field unit of Agronomy department, UAHS, Shivamogga. The experiment was laid out in a Randomized Complete Block Design (RCBD) with twelve treatments having three replications. The treatments comprised of farm yard manure (FYM), frond compost and vermicompost combinations along with PGPR and recommended NPK tested against farmers practice and recommended NPK alone.

Among the different nutrient management practices, Recd. NPK+FYM at 7.5 t ha^{-1}+PGPR at 2 kg ha^{-1}+Vermicompost and Frond compost both at 3.75 t ha^{-1} as top dress at 25 DAT recorded significantly taller plants (145.27 cm), leaf area (1177.30 cm^2 $plant^{-1}$), number of tillers (4.07 $plant^{-1}$), total dry matter accumulation (59.13 g $plant^{-1}$), 1000 grain weight (3.76 g), grain yield (63.50 q ha^{-1}) and straw yield (86.67 q ha^{-1}) . It registered 119 and 87 per cent higher yield respectively over farmers practice and recd.NPK alone. It also recorded higher uptake of NPK in both grain and straw.

The nutrient use and agronomic use efficiency was found highest in Recd. NPK+FYM at 7.5 t ha^{-1}+PGPR at 2 kg ha^{-1}+Frond compost at 3.75 t ha^{-1} as top dress at 25 DAT. The highest available NPK and physiological use efficiency was recorded in Recd. NPK+FYM at 7.5 t ha^{-1}+PGPR at 2 kg ha^{-1}+Vermicompost at 3.75 t ha^{-1} as top dress at 25 DAT. The highest partial factor productivity was recorded in Recd. NPK+FYM at 7.5 t ha^{-1}+PGPR at 2 kg ha^{-1}. Similarly, higher net returns (Rs. 66,728 ha^{-1}) was recorded in recommended NPK + FYM at 7.5 t ha^{-1} + PGPR at 2 kg ha^{-1} + Frond compost at 3.75 t ha^{-1} as top dress at 25 DAT.

July, 2015

(M. Dinesh Kumar)
Major Advisor

Genetics and Plant Breeding

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

Department of Genetics and Plant Breeding

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1. Assessment of Genetic Variability, Diversity for Yield and Yield Components and Morphological Characterization of Traditional Rice (*Oryza sativa* L.) Genotypes

SRIDHAR T C

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, being primary centre of origin it posses huge diversity of rice genotypes of both wild and cultivated. The present study was undertaken to evaluate sixty four traditional rice genotypes for variability and diversity in yield and its components and morphologically characterise the genotypes according to DUS guidelines. ANOVA revealed significant difference among the genotypes studied for all the characters. High range of variation, PCV, GCV and high heritability coupled with high GAM was observed for number of tillers per plant, number of spikelets, grains per panicle, straw yield per plant, harvest index and grain yield per plant. Yield components such as plant height and test weight exhibited highly significant association with grain yield at phenotypic level. Days to maturity followed by harvest index and number of tillers per plant had the highest positive direct effect on grain yield. Using Mahalanobis' D^2 statistic, genotypes were grouped into fourteen clusters. Based on cluster distance, highest inter cluster distance between cluster X and XIV. Among all the characters, days to maturity followed by straw yield per plant had highest contribution towards the genetic diversity.

Morphological characterization inferred the existence of distinct and uniform genotypes for the characters specified for rice by DUS guidelines, *viz.*, anthocynin coloration, intensity and its distribution on coleoptile, basal leaf sheath, leaves, nodes, internodes and spikelets. Angular characters like attitude of flag leaf, culm and panicle. Grain characters *viz.*, awns, length, breadth, grain colour, and shape of both hulled and non hulled grains. Quantitative characters like days to flowering and maturity, length and breadth of leaf blade, plant height and test weight. Two genotypes (Naare kela and Navile sanna) were found entirely distinct by presence of multi spikelets per pedicel. This present study identified five promising genotypes viz., Kempakki, Navara, Chammpakali, Solari and Kaase bhai over check variety (Jyothi and JGL-1798) for yield and its components. Thus these local genotypes may be utilised in further crop improvement programme.

May, 2015

(Dushyantha kumar, B. M)
Major Advisor

2. Genetic Investigation of Yield and its Attributing Characters in Okra [*Abelmosches Esulentus* (L.) Moench]

ASHA. I. S

ABSTRACT

The genetic variability is the pre-requisite for any plant breeding programme. Forty nine Okra germplasm accessionswere evaluated in a simple lattice design with two replications during *kharif* 2014 at College of Agriculture, UAHS, Shivamogga. Data were collected on 13 quantitative traits and were subjected to variability, association and diversity studies. The results of the investigation revealed that, there were significant variation among the lines for yield and yield contributing traits. Broad sense heritability as well as expected GAM was higher for plant height, inter-nodal length, first flowering node, number of branches per plant, number of flowering nodes on main stem, fruit length, fruit diameter, number of fruits per plant, average fruit weight and fruit yield per plant.

Plant height, intermodal length, first flowering nodes, number of branches per plant, number of flowering nodes in main stem, fruit length, number of fruits per plant and average fruit weight had high significant positive association with fruit yield per plant. Direct and indirect association analysis revealed that number of fruits per plant had highest direct effect followed by average fruit weight on fruit yield per plant.

Based on Mahalonobis' D^2 values these genotypes were grouped into 8 clusters. Cluster I had maximum number of 35 genotypes followed by Cluster IV with 5 genotypes. Fruit diameter contributed maximum towards genetic divergence followed by number of flowering nodes on main stem. Pusa Makhmalli, EC 693224 and VRO-109 genotypes which are most diverse could be involved in hybridization among promising combinations to develop productive segregants.

May, 2015

(Ganga Prasad, S.)
Major Advisor

3. Assessment of Genetic Variability, Association and Diversity in French bean (*Phaseolus Vulgaris*L.)

BHAGANNA HARALAYYA

ABSTRACT

Success of any crop improvement programme depends on the extent of genetic variability present inthepopulation forthetraits forwhich the improvement isaimed at breeding. Thirty sixgermplasm collections were evaluated inasimple latticedesign with tworeplications during*summer* 2014atCollege of Agriculture, UAHS, Shivamogga. Data were collected on 13quantitative traits and were subjected tovariability, association and diversity studies.The genotypes revealed that high significant variability forallthetested characters such asgreen pod yield, plant height, number of primary branches, number of secondary branches, number of pods per plant, pod length, number of seeds per pod and 100seedweight. The high PCV and GCV values were recorded by number of pods per plant, plant height, number of secondary branches and test weight. Heritability inbroad sense and genetic advance asper cent mean were higher for plant height, number of primary branches, number ofsecondary branches, number ofpods per plant, number of seeds per pod, pod length and 100seedweight.

Association analys is revealed significant positive correlation of green pod yield with plant height, number of pods per plant, number of seeds per pod and pod length (cm). Positive direct effects were recorded by pod length, plant height, days to50 per cent flowering and flower to pod set rati oto green pod yield. The number of seeds per pod,number of pods per plant and plant height recorded high positive indirect effect with green pod yield. Based on D2 values thirty six genotypes were grouped into 6clusters. Cluster I was the biggest with19 genotypes followed by cluster VI and Cluster II&III. The maximum contribution for the diversity was observed in green pod yield followed by plant height. The genotypes like, IIHR-47, Arka Komal, IIHR-99, IIHR-90, IIHR-81A, IIHR-23 and IIHR-I03 are identified as high yielding and most diverse genotypes. These genotypes could be involved in hybridization among promising combinations to develop productive segregants.

May, 2015

(Ganga Prasad, S.)
Major Advisor

4. Studies on Genetic Variability in Eggplant (*Solanum Melongena* L.) Genotypes for Drought Tolerance and Yield

GOBU R

ABSTRACT

The present investigation was initiated by conducting a survey among eggplant growers of central dry zone (Zone-4) and southern transitional zone (Zone-7) of Karnataka to know their varietal preference and then a study was conducted in eggplant genotypes to assess the genetic variability for drought tolerance and yield under three experiments by imposing water stress at germination stage (73 genotypes), seedling stage (65 genotypes) and reproductive stage (62 genotypes). The survey results revealed that farmers in Zone-4 prefer local cultivars followed by private varieties/hybrids. Whereas in Zone-7, private varieties are more preferred than local cultivars. The analysis of variation revealed the existence of highly significant differences among the genotypes for all the traits recorded under moisture stressed and non-stressed condition. A high range of variation and high heritability coupled with high genetic advance was recorded for most of the traits.

The association studies revealed that fruit yield per plant showed significant positive association with plant height, number of fruits per plant, fruit circumference and average fruit weight. Path analysis revealed that average fruit weight had highest direct positive effect on fruit yield, while fruit circumference showed high indirect positive effect on fruit yield through average fruit weight. Based on Mahalanobis' D^2 analysis, the genotypes were grouped into 11 clusters. Based on cluster mean scoring, cluster II ranked first, which includes Punjab Barsati, IC104083, IVBL-9, Lal Gulab, IC90785, IC333527, Arka Abilash, IIHR-7and Arka Kranti. Out of twelve characters studied, number of primary branches per plant contributed maximum towards total genetic divergence.Based on the results of each experiment, better drought tolerant and susceptible genotypes for moisture stress at different growth stages were identified. The genotype, Jawahar Brinjal-69 has been identified as drought tolerant line at all the three stages *viz.*, germination, seedling and reproductive stage.

June, 2015

(Harish Babu B.N.)
Major Advisor

5. Genetic Divergence and Correlation Studies for Yield and Yield Traits in Rice (*Oryza Sativa* L.) Germplasm Lines

IRAPPA B MAMADAPUR

ABSTRACT

A field investigation was carried out involving 150 germplasm of rice at Zonal Agricultural and Horticultural Research Station, Mudigere, during *kharif* 2014, to assess genetic variability and divergence of different yield and yield contributing traits, to estimate correlation coefficients of yield attributes on yield and to estimate direct and indirect effects of yield attributes on yield. The analysis of variance revealed highly significant variability among the lines for different traits. The estimates of PCV and GCV were high for panicle exertion, number of spikelet's per panicle and number of grains per panicle.

The difference between PCV and GCV were less for these characters, indicated low environmental influence. The characters *viz*., plant height, panicle exertion, number of spikelet per panicle, number of grains per panicle, test weight, L/B ratio and grain yield per plant exhibited high heritability coupled with high predicted genetic advance as per cent of mean. The characters like days to 50 per cent flowering, days to maturity, plant height and test weight showed highly significant positive correlation with grain yield at both genotypic and phenotypic level. Plant height had highest positive direct effect on grain yield followed by number of grains per panicle and 1000-grain weight. In order to assess the divergence among 150 lines, Mahalanobis' D^2 statistics and Tocher method was applied.

The 150 lines were grouped into 8 clusters, where cluster III and IV were the largest containing fourteen and seventeen lines respectively,were the most divergent group with maximum inter-cluster distance (26389.99). Among the thirteen characters studied number of spikelet's per panicle and number of grains per panicle contributed most towards divergence. Nine different grain colour groups were observed among 150 germplasm lines. In the study 10 germplasm were found superior over two checks namely, Tunga and KHP-2 with respect to yield and yield characters.

June, 2015

(Lakshmana D)
Major Advisor

6. Assessment of Genetic Variability and Diversity Analysis for Yield and Yield Components in Traditional Rice (*Oryza Sativa* L.) Genotypes.

VIDYACHARAN D.N

ABSTRACT

Rice (*Oryza sativa*. L) is the prime, most essential and important food crop of the world. Land race plays an important role in the local food security and sustainable development in agriculture. The present study was undertaken to evaluate 100 traditional genotypes for variability and genetic divergence. The investigation was carried out at Agricultural and Horticultural Research Station (AHRS), Kathalagere. The crop for the present investigation was raised during *Kharif* of 2014.Genotypes were evaluated for extent of variability, character association, path analysis, genetic divergence for 12 traits and variability studies in 100 traditional rice genotypes for the reaction to blast disease. ANOVA revealed highly significant difference among the genotypes for all the quantitative traits. High PCV and GCV estimates for all the characters except days to 50 per cent flowering and days to maturity showed low values, High heritability and high genetic advance were recorded for all the 12 characters.

Yield component characters number of grains per panicle and test weight exhibited highly significant association with grain yield. Phenotypic path coefficient analysis revealed that Number of grains per panicle had the highest positive direct effect on grain yield. Using Mahalanobis' D^2 statistic, 100 traditional rice genotypes were grouped into twelve divergent clusters. Wide genetic variability was indicated by the intra and inter cluster distances. Based on cluster means, cluster XI ranked first. It was also found that among all the characters, Days to 50 per cent flowering had highest contribution towards the genetic diversity. Screening of the traditional rice genotypes for field resistance against leaf blast disease revealed that the disease has not been affected severely, compared with the Susceptible genotype Intan, in four out of 100 genotypes were resistant, 67 genotypes showed moderately resistant and 28 genotypes are moderately susceptible.

July, 2015

(T.H. Gowda)
Major Advisor

7. **"Genetic Variability, *Per Se* Performance and Combining Ability Study in Maize (*Zea Mays* L.)"**

REKHA

ABSTRACT

The present investigation was carried out to elucidate the information on genetic variability and diversity, character association and path analysis among the inbred lines, and to estimate the combining ability in forty five single cross hybrids.Forty three inbreed lines of maize were evaluated at ZAHRS, Shivamogga during *kharif* 2014, observations were recorded for twenty one characters. Analysis of variance revealed significant differences among all inbred lines. High PCV, GCV, high heritability coupled with high genetic advance was noticed for leaf area at 40 days after sowing, cob weight, grain yield per plant and 100 grain weight. Mahalanobis D^2 analysis revealed that 43 inbred lines were grouped into 10 clusters, indicating the presence of diversity. The maximum inter cluster distance was observed between clusters VI and X (838.65) and highest intra cluster distance was in cluster VI. Cob weight, leaf area index and days to 50 per cent brown husk maturity contributed more towards genetic divergence.

Correlation studies revealed significant association of grain yield with most of the characters under study. The maximum positive direct effect on grain yield was exhibited by cob weight followed by 100 grain weight, shelling percentage, cob length, cob girth and number of rows per cob. In the second experiment forty five hybrids were evaluated at ZAHRS, Shivamogga during late *rabi* 2014-15. The Observations were recorded for twenty one characters. There was higher dominance variance than additive variance for most of the characters. Among five females, 18704, 18832 and 18838were the best general combiners for all characters except number of rows per cob. Among nine testers 18328, 18337, 18342, 18627 and 18850 were the best general combiners for all characters. Out of forty five hybrids, hybrids18838x18850, 18838x18627, 18495x18337, 18838x18342 and 18495x18494 with desirable significant sca effects were identified as best hybrids in respect of grain yield.

June, 2015

(H. D. Mohan Kumar)
Major Advisor

8. Assessment of Genetic Variabilty and Diversity in Tomato (*Lycopersicon Esculentum* Mill.) Germplasm

SHWETA

ABSTRACT

Present investigation was carried out during Summer and Late *kharif* seasons of 2014 at College of Agriculture, University of Agricultural and Horticultural Sciences, Shivamogga to study the genetic variability, correlation, path coefficient analysis and genetic diversity for quantitative traits in tomato (***Lycopersicon esculentum* Mill.)** with 36 genotypes in randomized block design. Considerable amount of variability was noticed for the sixteen and nineteen quantitative characters in summer and late *kharif* seasons respectively as indicated by the analysis of variance. High GCV and PCV, high heritability with high genetic advance as per cent mean was observed for most of the yield attributing characters in both seasons.

Fruit yield per plant had highly significant positive association with fruit length, fruit equatorial diameter, fruit volume and average fruit weight in both summer and late *kharif* seasons and number. Similarly, path coefficient analysis revealed that number of clusters per plant, number of flowers per plant and average fruit weight had high direct and indirect effect on fruit yield per plant in both summer and late *kharif* seasons.

Apart from these fruit length, fruit volume, number of fruits per plant and Total soluble solids had high effect in late *kharif* season. Mahalanobis D^2 analysis revealed that thirty six genotypes are divided into seven groups in both seasons. In summer cluster-I (21genotypes) and in late *kharif* Cluster-II had highest number of genotypes. Fruit volume and lycopene content contributed more towards total genetic divergence in summer and late *kharif* seasons respectively. Maximum score was recorded by Cluster V with two genotypes (AR-50 and AR-14) and Cluster VI with single genotype respectively in both the seasons. It appears to be containing most potential genotypes and these can be utilized in further crop improvement programme.

June 2015

(Dhushyanthakumar B. M)
Major Advisor

9. Analysis of Genetic Divergence in Groundnut (*Arachis Hypogaea* L.) Genotypes

SANJEEVAKUMAR PATIL

ABSTRACT

The genetic variability is the pre-requisite for any plant breeding programme. Fourty nine groundnut genotypes accessions were evaluated in a Simple Lattice Design with two replications during *Kharif* 2014 at college of Agriculture, UAHS, Shivamogga. Data were collected on 15 quantitative traits and subjected to variability, association and diversity studies. The results of the investigation revealed that, there were significant variation among the genotypes for yield and yield contributing traits.

The high PCV and GCV values were recorded by secondary branches per plant, immature pods per plant, mature pods per plant, pod bearing nodes per plant and pod yield per plant. Broad sense heritability as well as expected GAM was higher for matured pods per plant, days to 50 per cent flowering, kernel weight per plant, 100 kernel weight, pod bearing nodes, immature pods per plant, plant height and secondary branches per plant. Association analysis revealed significant positive correlation of pod yield per plant with number of pod bearing nodes, number of matured pods per plant, kernel weight per plant and days to 50 per cent flowering. Positive direct effects were recorded by number of matured pods per plant, pod yield per plant, kernel weight per plant, 100 kernel weight, number of secondary branches and number of primary branches per plant.

Based on D^2 values fourty nine genotypes were grouped into fourteen clusters. Cluster I was the biggest with 21 genotypes followed by cluster IV, VI and III. The maximum contribution for the diversity was observed in pod yield per plant followed by days to 50 per cent flowering. The genotypes like GPBD-5, SB-$T_{1,}$ SB-T_{21} and VB-T_{35} are identified as high yielding and most diverse genotypes, the genotypes SB-T_1 and VB-T_{14} are identified as resistant to root knot nematode disease. These genotypes could be utilizing in hybridization among promising combinations to develop productive segregants.

August, 2015

(Shivanna. S)
Major Advisor

Plant Pathology

University of Agricultural and Horticultural Sciences, Shivamogga

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

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1. Studies on Anthracnose of French Bean (*Phaseolus Vulgaris* L.) Caused by *Colletotrichum lindemuthianum* (Sacc.Andmagn.) Scriber

BHAGAVATHI DEVI, D.

ABSTRACT

French bean (*Phaseolus vulgaris* L.)is also called as dwarf kidney bean where in immature bean pods are eaten as a 'vegetable' or as 'dry seeds' (Rajmah). It is an important food legume crop and provides an essential part of the daily diet. This crop is affected by several diseases among themAnthracnose is one of the mostimportant disease caused by *Colletotrichum lindemuthianum* (Sacc. & Magn.) Scriber. During the survey highest disease severity was recorded in Shivamogga district (26.2%) followed by Davangere district (15.03 %).The fungus collected from different locations were categorizedinto four groups*viz.*, *Cl*1,*Cl*-2, *Cl*-3 and *Cl*-4 based on their morphological characters.

Among them Hosanagaraisolate produced maximum radial growth (81.00 mm) followed by Savalanga (79.00 mm) isolate with brownish whitemycelial colony on Potato Dextrose Agar Medium. The results obtained during screening of various genotypes of French bean revealed that, among thirty one genotypes screening eight lines were resistant, ten were moderately resistant, seven were susceptible and six of the genotypes were found to be highly susceptible category. *In vitro* evaluation of fungicides revealed that,mancozeb inhibited cent per cent mycelial growth at 400 and 800 ppm. Among the systemic fungicides, azoxystrobin recorded cent per cent (100%) mycelial inhibition at all the concentrations of 50, 100, 200 and 400 ppm. Among the biocontrol agents, the maximum inhibition of *C. lindemuthianum* was observed in *T. harzianum* (72.44 %).Among fungicides and bio-agents tested under field conditions revealed that captan + azoxystrobin at 0.05 per cent, azoxystrobin alone spray at 0.05 per cent, were found to be the most effective chemicals in managing the disease which helps to increase in the yield of the crop.

June, 2015

(H. Narayana Swamy)
(Major advisor)

2. Studies on Epidemiology and Management of Coffee Leaf Rust Caused by *Hemileia vastatrix* (Berkeley and Broome)

SHRINIDHI BHARATHISHA NAVILEKAR

ABSTRACT

In India, coffee is cultivated as an important commercial crop which is cultivated in an area of 4,15,341 ha.The major disease threatening the coffee cultivation is leaf rust caused by *Hemileia vastatrix* (Berk. and Br.).The roving survey on coffee leaf rust carried out during November-December 2014 revealed that, the disease occurrence varied from moderate to severe infection with the disease severity ranging from 9.40 to 47.83 per cent. The highest mean disease severity was recorded in Kodagu district (22.44 PDI). However, the lowest disease severity of 13.82 PDI was observed in Shivamogga district. The epidemiological studies revealed that, lower disease severity was recorded during the month of April to June. Whereas, peak disease severity was recorded during the month of December 2014.

The mean minimum temperature had significant (P=0.01) negative correlation with disease incidence. Screening of varieties against coffee leaf rust revealed that, out of six *Coffeaarabica*genotypes, three genotypes (Sln 5b,Sln 9 and Sln13) were found to have resistance against *Hemileia vastatrix* (Berk. and Br.) whereas, Sln 3, Sln 6 and Sln 12 were found to be susceptible. The studies on variability of the pathogen indicated that, the isolates CHKM-1 and CHKM-2 were yellow in color remaining all the isolates were orange in color. All the isolates observed werereniform in shape and were echinulated. Evaluation of bacterial antagonists against *Hemileia vastatrix*(Berk. and Br.) under *in vitro* condition revealed that,treatment with *Bacillus subtilis* recorded less uredospore germination (20.03%) compared to *Pseudomonas fluorescens* (22.41%) at the higher concentrations (1 x 10^9cfu/ml) tested. Among the different fungicides used against coffee leaf rust, Thifluzamide 24 SC at 1 ml/litre concentration was found to be more effective in managing the disease and found on par with Bayleton at 1gm/litre and Oxycarboxin at1 gm/litre.

July, 2015

(H. Narayanaswamy)
Major Advisor

3. Studies on Pathogenicity and Management of Stem Rot of Tomato (*Lycopersicon Esculentum* Mill.) Caused by *Sclerotium Rolfsii* Sacc.

NANDASHREE, R.

ABSTRACT

Tomato (*Lycopersicon esculentum* Mill.) is one of the most popular and widely grown vegetable crops of both tropics and subtropics of the world, belonging to the family Solanaceae. Stem rot disease, caused by *Sclerotium rolfsii* has become severe threat for successful tomato production. The pathogen isolated from the stem of the diseased tomato plant was identified as *Sclerotium rolfsii* based on its mycelial and brown coloured sclerotial bodies formation in PDA media. The pathogenicity was confirmed by inoculating the pathogen on healthy plant under *in vivo*.During survey, maximum disease incidence of 27.5 per cent was recorded in Mallapura village of Shivamogga whereas, minimum disease incidence of 9.80 per cent was recorded in Karalahalli village of Davanagere district. Among the cultivars screened against *S. rolfsii*in sick pot, most of the cultivars showed highly susceptible reaction. Whereas fewof them showed moderately susceptible and resistant reaction. In case of inoculum density studies all the inoculum levels was found to cause disease in plants.

Maximum percent disease was recorded in the plants inoculated with 5 sclerotial bodies.Among the systemic fungicides, Hexaconazole was found to be effective in inhibitingmycelial growth of *Sclerotiumrolfsii*at all the concentrations (100, 150, 200 and 250 ppm) tested.combi products *viz.*, Avatar and Nativo were found effective at all the concentrations, whereas, the contact fungicide, Mancozeb was found to be effective only at higher concentrations(500 and 1000 ppm). Among the bio-agents, *Trichoderma harzianum* was found to be most effective in inhibiting mycelial growth of *S. rolfsii*. Among the plant extracts, *Azardirachta indica* both at 5 and 10 per cent concentration showed significant inhibition of mycelial growth of *Sclerotium rolfsii* under *in vitro* condition.Under field conditions, least incidence of the disease was observed withsoil application of enriched *P. fluorescens* + *T. harzianum* + Neem cake along with higher yield.

June 2015

(B. GangadharaNaik)
Major Advisor

4. Studies on Frog-eye Leaf Spot of FCV Tobacco (*Nicotianae tabacum*) Caused by *Cercospora nicotianae* ELL. and EVE.

PUNITKUMAR N D

ABSTRACT

Frog eye leaf spot is an important disease in tobacco both in nursery and main field. The severity of the disease was ranged from 8-32 PDI recorded during survey. The disease intensity was more in Belenahalli, Nandi and Palvanahally village of Chikamagaluru and Davanagere districts. The identity of the fungus was confirmed as *Cercospora nicotianae*. The fungus showed maximum growth on PDA on 18th day after incubation room temperature. The fungus which exhibited diversity with respect to cultural character like type of the growth, mycelial color and sporulation. The maximum growth was recorded on Oat meal agar, Host extract PDA, and Czapek's (dox) agar. The highest dry mycelia weight of the fungus was recorded at 20-300C *ith optimum pH of 5 to 6. Among carbon sources, fructose, dextrose and lactose, sered as best for growth of *C. nicotianae* and ammonium nitrate, ammonium chloride and potassium nitrate were better nitrogen source for *C. nicotianae* growth.

Among Systemic fungicides-Hexaconazole, Carbendizim, Propiconazole; nonsystemic fungicides Captan and Chlorothalonil and Combi-products like Nativo G and companion were showed superior in inhibiting the mycelia growth of the fungus under in vitro condition. The bio-efficacy of fungicides which performed well under in vitro condition were tested in vivo condition as well. Among them, lowest disease severity and maximum cured leaf yield were obtained by spraying of 0.1 o/o Carbendazim (26%o and 1616 kg/ha), Hexaconazole (29.15 o/o and l1l2 kg/ha) and Propiconazole (31.75 o/o and I l6l kg/ha) respectively over control. The C: B ratio and Top grade equivalent (TGE) was obtained in Carbendazim treated plot. Among 25 genotypes, FCR-26, FCJ-16, FCJ-19 and FCI-24 showed resistant reaction while other 2l genotypes showed susceptible reaction under field condition.

July, 2015

(C. Karegowda)
Major Advisor

5. Investigations on Sheath Rot of Paddy Incited by *Sarocladium oryzae* (Sawada) Gams and Hawkswoth

SHIVAPRAKASH V PATILHIREMATH

ABSTRACT

Rice (Oryza sativa L.) is the imporlant cereal crop grown throughout the world. It is staple food crop of 60 per cent of world's population. Rice suffers from many of the disease. Sheath rot of rice is prevailing in all rice growing countries worldwide in recent decades. The disease was noticed in all the surueyed locations of Shivamogga and Davanagere districts. This study revealed that highest per cent disease incidence (39.09) and highest per cent disease index (24.71) was recorded in Teerlhahalli taluk of Shivamogga district correspondingly, the lowest percent disease incidence (1.62) and lowest percent disease index (2.09) was recorded in Shikaripura taluk of Shivamogga district. The fungus on PDA produced white to pale orange mycelium, vefiicellate conidiophores with conidia single celled, hyaline and straight cylindrical. Pathogenicity of the fungus was done with single grain inserlion method with rice seeds incubated in fungal culture. The maximum dry mycelial weight of S. oryzae was observed after 24 days of incubation on PDB (293.27 mg). In case of solid media maximum radial growth of the fungus (8.70 cm) was recorded on oat meal agar whereas least on Sabouraud's dextrose agar (5.20 cm). However, among the liquid media maximum dry mycelial weight (368.67 mg) was recorded on oat meal broth and least weight on Sabouraud's dextrose broth (154.23 mg). Based on the colony diameter, maximum colony diameter (7.17 cm) was noticed in Balekatte isolate and least growth was observed in Harnkoppa isolate (5.40 cm). Out of twenty nine genotypes used for screening 6 genotyp es viz., Intan, Hemavathi, KHP- 9, KHP-10, KHP-11 and Sharavathi Showed resistant reaction. l0 genotypes showed moderately resistant reaction. The management of sheath rot using different fungicides and botanicals in vivo indicated that the spraying of propiconazole @ 0.1 per cent was significantly most effective and recorded higher yield followed by carbendazim @ 0.1 per cent. Marigold leaves applied (1 kg/m 2 area) plot was found to be least effective.

July, 2015

(H. Ravindra)
Major Advisor

6. Studies on Root-Knot and Wilt Complex in Black Pepper (*Piper Nigrum* L.) Caused by *Meloidogyne Incognita* (Kofoid And White) Chitwood and *Fusarium Solani* (Mart.) Sacc.

SOUMYA, D.M.

ABSTRACT

Black pepper (*Piper nigrum* L.) is the major spice crop in agricultural commodities of commerce and trade in India. The major constraint for the cultivation of black pepper is by root knot nematode and wilt complex diseases are severe one. The disease was noticed in all the surveyed locations of Shivamogga district during 2014-15. The severity of disease complex was more in Hosanagara taluk followed by Soraba and Thirtahalli taluk and minimum disease incidence was recorded in Shivamogga taluk. The present survey results also indicated that high frequency of occurrence of both the pathogens from soil and root samples collected from Hosanagara taluk. Pathogenecity of nematode was proved by using different inoculum levels under glass house condition. Inoculation of 10,000 juveniles per plant recorded least plant growth parameters and maximum number of galls (150.4), egg mass per plant (90.20) eggs per egg mass (352.20) and Root knot index (4.40). It was observed that, there was reduction in the plant growth as the inoculum density increased.

In the interaction studies, *Meloidogyne incognita* was the most aggressive pathogen compared to *Fusarium solani*. However, plants receiving *Meloidogyne incognita* seven days prior to inoculation of *Fusarium solani* recorded least growth and more disease incidence followed by simultaneous inoculation of *M. incognita* and *F. solani* over untreated control. These results indicate that the nematode can predispose black pepper to infection by *F. solani* and can aggrevate the disease. Nine black pepper varieties were considered for their resistant reaction against *M. incognita* and *F. solani* under field condition. Among nine varieties Panniyur-1 grafted on *Piper colubrinum* recorded least number of galls (0.00), RKI (1.00), nematode population (115.33) and *Fusarium* population (6.33) and showed higher resistance reaction against the disease complex. 'Pournami' showed resistant reaction against wilt complex whereas, 'Panchami' and 'Karimunda' varieties showed moderately resistant reaction.

July, 2015

(H. Ravindra)
Major Advisor

7. Studies on Stem Rot of Groundnut (*Arachis hypogaea*L.) caused by *Sclerotium rolfsii* Sacc.

SUNILKUMAR

ABSTRACT

Groundnut [*Arachis hypogaea*L.] is animportant oilseed crop of India andis cultivated in both tropical and sub tropical regions of the world. Stemrotof groundnut causedby *Sclerotiumrolfsii*Sacchas become a major constraint in groundnut production. Survey for stem rot disease incidence revealed that, maximum disease incidence (37.52%) was recorded inShivamogga, whereas least incidence (35.82%) was observed inDavanagere district. After isolation and characterization of pathogen isolates, the isolates were categorized into five group's*viz.*,SrS, SrH, SrHA, SrHRand SrSHbased on their location of occurrence. Among them,SrH isolates produced maximummycelialgrowth(80.00mm) and least was recorded by SrHAisolate (60.60mm) with white cottony growth on potato dextrose agar medium. During cultural studies, potato dextrose agar supported maximum mycelial growth of all the isolates both on solid as well as on liquid medium. Development ofsclerotial bodies per plate was ranged from 243.70 to 306.00, whereas sclerotial bodiescolour wasranged from light to dark brown.

Among the systemic fungicides,hexaconazole, propiconazole, difenconazole and combiproducts*viz.*, Avatar, Nativo and Companionwere found to inhibit the mycelial growth upto 100% at all the concentration tested,whereas amongthe contact fungicides,mancozeb was found to be effective only at higher concentrations (600 ppm). Among the bio-agents tested, *Trichoderma harzianum* was found to be most effective in inhibiting themycelialgrowth of *S.rolfsii*(63.81%). Among botanicals, Ageva*americana*extract was completely inhibitedthemycelial growth of *S.rolfsii*. Under field conditions, least disease incidence (13.43%)was observed in soil application of neem cake +*T. harzianum* with higher podyield(1438.16 kg/ha) followed by neemcake+*P.fluorescens* (13.81%) with a pod yield of 1397.74 kg/ha respectively.

June, 2015

(GaneshaNaik. R)
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. Impact of Organic Farming Practices on Micronutrient Status and Biological Properties of Soils

DENILA. D

ABSTRACT

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

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

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

June, 2015

(H.M Chidanandappa)
Major Advisor

2. Soil Properties as Influenced by Organic Farming Practices in Shivamogga District, Karnataka

BHARATH Y PATEEL

ABSTRACT

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

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

Organic farming increased the total N and available N in soil. The contents of inorganic N fractions of soil *viz*., NH_4^+-N and NO_3^--N as well as organic fractions *viz*., hydrolysable-N, hexamine-N, amino acid-N and total hydrolysable–N recorded higher in organically managed soils. Among them amino acid N was dominant fraction contributing to total N. All phosphorus fractions recorded higher in organically managed soils compared to inorganic farming soils. Al-P,Fe-P and Org-P were the major contributor to total P and recorded higher in organic farming soils in both Paddy and Arecanut growing soils compared to inorganically managed farms. The soils under organic farming recorded higher soil K fractions than the soils under conventional farming. Higher water soluble K, exchangeable K, lattice K was recorded in soils of organic farming over soils of conventional farming, but non exchangeable soil K content was found higher in inorganic farming farms.

July, 2015

(Ganapathi)
Major Advisor

3. Effect of Soil Salinity on Performance of Different Rice Varieties

NANDA G. S

ABSTRACT

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

July, 2015

(T. S. Vageesh)
Major Advisor

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

RUDRESH M D

ABSTRACT

A study was conducted at UAHS, Shivamogga to know the distribution of carbon pools in soils under different land use cover in Bhadravathi taluk of Shivamogga district, Karnataka. Soil samples were collected from major land use cover *viz.*, paddy, maize, sugarcane, arecanut, banana and forest cover. The results revealed that pH of different land use cover ranged from 4.72-6.82, BD ranged from 1.24-1.35 Mg m^{-3}, CEC ranged from 3.51-5.73 c mol (p^{+}) kg^{-1} and per cent $CaCO_3$ ranged from 0.80-3.77 per cent.

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

Among different land use cover E_4/E_6 values were lower than 5. Soils under paddy (4.68), arecanut (4.50) and forest (4.44) recorded higher humic acid and arecanut (4.34), maize (4.09) and sugarcane (3.98) soils recorded higher fulvic acid.

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

July, 2015

(B. C. Dhananjaya)
Major Advisor

Horticulture

Crop Improvement and Biotechnology

University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Crop Improvement & Biotechnology

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1. Genetic Analysis of Single Cross and Double Cross Hybrids for Yield and Quality Parameters in Tomato (*Solanum lycopersicum* mill.)

MAHANTESH L. P.

ABSTRACT

Genetic analysis of single cross and double cross hybrids for yield and quality parameters in tomato (*Solanum lycopersicum* Mill.) were undertaken during 2014-2015 at Department of Crop Improvement and Biotechnology, College of Horticulture, Mudigere. Forty five double cross hybrids were produced by crossing ten single cross hybrids following 10 x10 diallel mating design (excluding reciprocals). Association analysis revealed that total yield per plant was significantly and positively associated with number of primary branches, number of secondary branches, number of clusters per plant, number of fruits per cluster, average fruit weight and number of fruits per plant at both genotypic and phenotypic level and path analysis showed that number of clusters per plant had high direct effect on yield per plant. Maximum standard heterosis over which check for total yield per plant was observed in the cross DCH-43 followed by DCH-39. Variance due to parents versus hybrids was highly significant for number of secondary branches, average fruit weight (g), number of fruits per plant, fruit yield per plant (kg) and number of locules per fruit. In almost all the characters SCA variance was greater than GCA indicating the predominance of non-additive gene action. Among different parents, SCH-9, SCH-8 and SCH-10 were good combiner in desirable direction. Two major double cross hybrids DCH-43 followed by DCH-39 showed significant sca effects in desirable direction for yield per plant. With regard to general performance of single cross hybrids in hill zone of Karnataka SCH-9 (1.36 kg) was better performing single cross hybrid for yield per plant and among the double crosses the DCH-43 showed higher yield (1.8 kg) per plant.

June, 2015

(Narayanaswamy, M)
Major Advisor

Entomology

University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Entomology

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1. Studies on Toxicity of Selected insecticides against Whitefly, *Trialeurode svaporariorum* (Westwood) (Hemiptera: Aleyrodidae) on Tomato

SACHIN U. S.

ABSTRACT

All the farmers surveyed in 10 major vegetable growing villages of Chikkamagaluru taluk were literates having education up to college or technical education. However, education level of farmers did not influence decision making with respect to farm operations including use of pesticides. The farmers used 25 insecticides and three acaricides on vegetable crops to combat insect and mite pests. Among selected insecticides, thiamethoxam 25% WG was effective against adult whitefly population at one, five, seven and ten DAS followed by cyantraniliprole 10% OD at one and five DAS and triazophos 40% EC at seven and ten DAS during first spray on tomato under field conditions. While after the second spray, cyantraniliprole 10% OD emerged as the best insecticide over all other treatments at one, five and ten DAS followed by imidacloprid 17.8% SL at five, seven and ten DAS and triazophos 40% EC at one, seven and ten DAS. Further, per cent leaf curl was least in cyantraniliprole treated plots. The residual toxicity of imidachloprid, triazophos, thiamethoxam, cyantraniliprole, azadirhactin, fipronil and buprofezin was high up to sixth day after treatment against adult whitefly under laboratory condition which decreased from eighth DAT. While the residual toxicity of acephate and emamectin benzoate decreased from sixth and that of spinosad decreased from fourth day itself. The relative toxicity of selected insecticides under laboratory conditions revealed that imidachloprid, thiamethoxam and cyantraniliprole caused 100 per cent mortality four days after treatment. While fipronil 80% WG, recorded 100 per cent mortality five days after treatment and was followed by emamectin benzoate 5% SG at sixth, acephate 75% SP at seventh, azadirhactin 10000 ppm at eighth and triazophos 40% EC, spinosad 480% SC and buprofezin 25% SC at eleventh day after treatment.

June, 2015

(Suchithra Kumari M. H.)
Major Advisor

2. Cerambycidae Fauna in Plantation and Fruit Crop Ecosystems of Western Ghats in Karnataka

SANGAMESH, R. HIREMATH

ABSTRACT

Studies conducted on Cerambycidae fauna in plantation and fruit crop ecosystems of Western Ghats in Karnataka revealed a total of 76 species in 59 genera. Three families of the Cerambycoid complex *viz.* Cerambycidae, Disteniidae and Vesperidaewere represented in Western Ghats of Karnataka.The family Cerambycidaewas represented by four subfamilies *viz*. Prioninae (8 genera and 10 species), Lepturinae (1 species), Cerambycinae (19 genera and 27 species) and Lamiinae (29 genera and 36 species). The subfamily Lamiinaewas the most speciose group found in the present study.The family Disteniidae with an unconfirmed species and Vesperidae with a species of an uncertain generic placement (*Philus globulicollis*Thomson) represented the Cerambycoid families in Western Ghats of Karnataka. Of the 76 species collected, 3 were new records to India (*Nepiodes terminalis*(Gahan), *Neoplocaederus consocius*(Pascoe)and *Paraleprodera* p. nr *javanica*) 11 were new records to south India and 22 were new records to Karnataka. A total of 13 new host plant records for the long-horned beetles collected in the present study were documented. Among the Cerambycidae fauna collected, members belonging to the subfamily Cerambycinae and Lamiinae are considered as pestiferous in their larval stage. *Chelidonium cinctum* (Guérin-Méneville), *Neoplocaederusferrugineus* (Linnaeus), *Xylotrechus quadripes*Chevrolat, *Batoceraru fomaculata* (Degeer) and *Stheni asgrisator* (Fabricius) included in the present study are well known persistent pests on fruits and plantation crops.A checklist of the species documented in the present study along with the diagnostic characters and illustrated key for their identification were provided.

June, 2015

(Revanna Revannavar)
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. Characterization of Gladiolus (*Gladiolus hybridus* L.) Genotypes through Morphological and Molecular Markers

RASHMI R.

ABSTRACT

An investigation on "Characterization of gladiolus (*Gladiolus hybridus* L.) genotypes through morphological and molecular markers"was carried out in Randomized Complete Block Design with three replications at the experimental block of Floriculture and Landscape Architecture, College ofHorticulture, Mudigere during the year 2014-15. Analysis of variance revealed high significant difference among all the genotypes for all the characters studied. High heritability(>75%) coupled with high genetic advance over mean(>30%) was observed for duration of flowering, spike length, rachis length, number of spikes per plant, number of florets per spike, weight of spike, number of corms per plant and diameter of corm indicating the prevalence of additive gene action for these traits. Correlation studies showed highly significant and positive association of number of spikes per plant with plant height, leaf area, spike length, rachis length, vase life, number of corms and diameter of corms both at genotypic and phenotypic level.Path coefficient analysis revealed that plant height, days taken for spike initiation, rachis length, number of florets per spike, number of corms and diameter of corm had direct positive effect on number of spikes per plant. Based on Mahalanobis D^2 analysis twenty genotypes of gladiolus were grouped into five clusters. Diameter of corm (40.53%) followed by weight of spike and weight of corm (13.68%) contributed maximum towards genetic diversity. Molecular characterization of gladiolus genotypes was done using SRAP markers. Among twenty five primer combinations screened, thirteen primer combinations gave consistent banding patterns. The primer combination of Me3 + Em3 produced highest polymorphism. On comparing the genetic diversity as revealed by the Dendrogram, twenty genotypes resulted in to two clusters and it was evident that Shobha was identified quite distinct genotype.

June, 2015

(S. Y. Chandrashekar)
Major Advisor

2. Performance of Carnation (*Dianthus caryophyllus* L.) Genotypes Under Naturally Ventilated Polyhouse in Transitional Zone of Karnataka

SHIVAMURTHY, C. K.

ABSTRACT

An investigation on performance of carnation genotypes under transitional zone of Karnataka was carried out in Randomized Block design in farmer polyhouse at Abbalagere, Shivamogga, during the period from September 2014 – February 2015. The cultivars *viz*., Cares, Nebula, Trinidad, Amos, Lories, Turbo, Geoli and Pingue were taken for the study. Hence, the presentstudy was conducted to identify the suitable carnation genotypes with respectto yield, quality of cut flowers and vase life.

Among the eight genotypes studied there were wide and highlysignificant variations observed in performance with respect to growth,floral, cut flower yield and quality parameters. The cv. Lories producedmaximum number of quality cut flowers (14.67) and was found to besignificantly superior over others. Pingue and Geoli were nextsuperior types. Lories produced the longest stalk length (96.00 cm),the highest flower weight (11.53 g) with maximum number of petals (116.67) including maximum vase life (11.00 days) whereas stalk girth (6.02 mm) was morein Cares followed by Lories and Geoli. The genotype Lories (127.67 days), Geoli (132.00 days) and Pingue(137.00 days) were early in flowering. Most of the morphologicalparameters *viz.*, plant height (110.37 cm), number of shoots (7.73),internodes per plant (108.67) and number of leaves (217.33), leaf length (17.93 cm), leaf area (1836.73 cm^2), dry matterproduction (88.17 g) and total chlorophyll content (1.33 mg/g) were found superior in cv. Lories followed by Trinidad, Pingue and Geoli.The genotype 'Lories' realized the maximum net return and B:C ratio (4,37,182.00:3.17) in 560m^2area followed by Pingue (3,32,644.00: 2.41) and Geoli (2,80,116.00: 2.03, respectively) compared to othergenotypes studied.In the vase life study cultivar Lories showed maximum days of fresh look appearance under tap water.

July, 2015

(B. Hemla Naik)
Major Advisor

3. Genetic Variability Studies for Growth, Yield and Quality Traits of Dahlia (*Dahlia variabilis* L.) Under Hill Zone of Karnataka

MANJULA, B. S.

ABSTRACT

An experiment was carried out to study the performance of twenty five genotypes of dahlia for genetic variability, heritability, correlation and path analysis at the department of FLA, College of Horticulture, Mudigere during Dec 2014 - April 2015. The superior performance with respect to growth as well as yield attributes was recorded by the genotypes Sourav (3,25,925 flowers per hectare), Saraladevi (2,95,184 flowers per hectare) while the genotype Joyal Singh showed minimum. Analysis of variance revealed highly significant difference among the genotypes for growth, flowering, yield and quality parameters. High heritability with high genetic advance was observed for plant height at 60 and 90 DAT, number of branches at 30,60 and 90 DAT, stem girth at 30 DAT, leaf length at it's peak stage of growth, leaf width at it's peak stage of growth, stalk length, number of days taken to first flowering, number of days taken to 50 per cent flowering, number of days taken for complete flowering, number of flowers per plant, number of tubers per plant, number of flowers per hectare, flower weight, tuber weight, flower diameter, number of petals per flower and vase life, indicating predominance of additive gene component. Thus, there is ample scope for improving these characters through direct selection. Number of flowers per hectare had strong positive correlation with plant height at 120 DAT, number of branches per plant at 120 DAT, internodal length at 120 DAT, duration of the crop, flower weight, flower diameter, stalk length, tuber number, tuber weight and vase life. Direct effect of path analysis for flower yield was recorded highest for plant height at 120 DAT, number of days taken to first flowering, flower weight, stalk length, tuber number, tuber weight and vase life.

June, 2015

(Nataraj, S. K.)
Major Advisor

4. Performance of Rose Cultivars Under Naturally Ventilated Polyhouse in Hill Zone of Karnataka

SHIVAPRASAD, S. G.

ABSTRACT

An investigation on performance of rose cultivars under naturally ventilated polyhouse in hill zone of Karnataka was carried out in Randomized Complete Block Design at the experimental block of Floriculture and Landscape Architecture, College of Horticulture, Mudigere during the 2014-15. The cultivars *viz*., Grand Gala, Noblesse, Corvetti, First Red, Gold Strike, Shakira, Arka Swadesh, Konfetti, Tineke and Tajmahal were taken for study. Among different rose cultivars, Grand Gala recorded maximum plant height (97.43 cm). While, Shakira recorded maximum number of shoots per plant (3.70). In case of quality and yield attributes, Grand Gala took minimum daysfor first flower bud initiation and flower harvest (16.30 and 36.24 days, respectively). Maximum stalk length (66.75 cm), stalk girth (0.96 cm), flower bud diameter (3.91 cm) and vase life (9.22 days) were also observed in Grand Gala. Tineke recorded maximum flower diameter and number of petals per flower (8.68 cm and 37.37, respectively). Tajmahal was found to be high yielder with respect to number of flowers per plant (3.58) and flowers per square meter (39.41) per month. Correlation studies revealed that, number of flowers per plant showed significant and positive correlation with number of shoots per plant, flower diameter, days to first flower bud initiation and first to harvest. Occurrence of powdery mildew was less in Tajmahal and Arka Swadesh, whereas mites incidence was less in Tajmahal. The incidence of black spot and thrips were less in First Red and Konfetti respectively. Highest benefit cost ratio was recorded in Tajmahal (3.55). Among the rose cultivars studied, the cultivars Tajmahal, Shakira and Arka Swadesh were found to be superior for cultivation under naturally ventilated polyhouse in hill zone of Karnataka.

June, 2015

(Nataraj, S. K.)
Major Advisor

5. Response of Marigold (*Tagetes erecta* L.) Cv. Double Orange to Liquid formulations of Em Consortia with Graded Levels of NPK

RAVI, C. H.

ABSTRACT

A field experiment was conducted to know the response of Marigold (*Tagetes erecta* L.) cv. Double Orange to liquid formulations of EM consortia with graded levels ofNPK at the experimental block of Horticulture Department, College of Agriculture, Shivamogga during 2014-15. The experiment was laid out in randomized complete block design with 15 treatments replicated thrice. Plants treated with 100% RDF+*Azotobacter* recorded significantly maximum plant height (104.81 cm), stem girth (1.37 cm) and number of leaves (308.80). Application of 75% RD'N'+*Azotobacter*+ 100 % RD'P' and 'K' reported maximum flowering duration (71.17 days). However, the highest flower weight (8.37 g), diameter (8.04 cm), number of petals per flower (323.12), flowers per plant (91.34), flower yield (12.70 t/ha), petal meal yield (1156.40 kg/ha) and xanthophyll yield (48.61 kg/ha) were recorded with the application of 75% RDF + *Azotobacter* + *Bacillus megaterium*+ *Frateuriaaurantia*. Whereas, 100% RDF + *Azotobacter* + *Bacillus megaterium* recorded higher seed yield (514.52 kg/ha) and its quality parameters. The highest plant N (1.40 %), P_2O_5 (0.97 %) and K_2O (2.91%) contents were observed with 75 % RDF + *Azotobacter* + *Bacillus megaterium*+ *Frateuriaaurantia*, 100 % RDF + *Azotobacter* + *Bacillus megaterium* and 100 % RDF + *Bacillus megaterium*+ *Frateuriaaurentia*, respectively. Similarly, 100 % RDF + *Azotobacter*, 100 % RDF + *Azotobacter* + *Bacillus megaterium*+ *Frateuriaaurantia* and 75 % RD'N' and 'K' + *Azotobacter* + *Frateuriaaurantia*recorded significantly highest available N (229.46 kg/ha), P_2O_5 (157.05 kg/ha) and K_2O (247.52 kg/ha) in soil, respectively. The economic analysis clearly indicated that, application of 75 % RDF + *Azotobacter* + *Bacillus megaterium*+ *Frateuriaaurantia* realized maximum net returns (Rs. 2,12,402, 6,19,498 and 4,62,222/ha) and B: C ratio (5.11, 3.91 and 11.11) for flower, xanthophyll and seed yield, respectively.

June, 2015

(B. Hemla Naik)
Major Advisor

6. Evaluation of Gaillardia *(Gaillardia pulchella* Foug.) Genotypes Under Hill Zone of Karnataka

N. ARULMANI

ABSTRACT

An investigation was carried out to evaluate genotypes of gaillardia (*Gaillardia pulchella* Foug.) for growth, flowering, yield, quality and genetic traits at experimental block of Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, Karnataka during the period from October 2014 to April 2015. Among eight genotypes studied, DGC-2 recorded maximum plant height (58.38 cm), number of branches per plant (14.17), number of leaves per plant (642.40), stem girth (22.85 mm), dry weight of plant (40.64 g), flower yield per plant (348.94 g) and vase life (7.06 days). The maximum plant spread both at E-W (53.29 cm) and N-S (51.35 cm) direction, leaf area (6046.68 cm^2) and whorls per flower (8.00) was found in genotype AGC-1. The genotype DGC-2 recorded minimum days for first flower appearance (48.00), 50 percent flowering (78.00) and maximum duration of flowering (146.67 days). The days taken for full bloom (4.33), seed setting (52.67) and shelf life (14.43 hr) of flowers were superior in genotype SGC-2. The genotype DGC-1 had recorded maximum number of flowers per plant (131.60) and flower yield per hectare (22.17 t/ha). The genotype SGC-1 exhibited maximum flower diameter (3.73 cm), flower weight (7.67 g) and seed yield per plant (17.12 g) as well as per hectare (1027.19 kg). The estimates on phenotypic coefficient of variation (PCV) were more than genotypic coefficient of variation (GCV) for all characters. High heritability estimates associated with high genetic advance (over mean) was noticed for most of the traits studied. The maximum B:C ratio was recorded in the genotype DGC-1 (1:3.32).

June, 2015

(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. Effect of Growth Regulators on Yield and Quality Parameters of Guava Under Hill Zone of Karnataka

RAJESH, S.

ABSTRACT

The field investigation was carried out during the year 2014-15 at an existing guava plot (C block of ZAHRS Mudigere) of variety Sardar (L-49) in Mudigere taluk of Chikmagalur district, Karnataka state to study the "Effect of growth regulators on yield and quality parameters of guava under hill zone of Karnataka". The experiment was laid out in randomized block design with 13 treatments and 3 replications. Among the different treatments the foliar application of GA_3 150 ppm + NAA 300 ppm recorded the highest fruit volume (147.67 ml), fruit length (6.45 cm), fruit diameter (6.59 cm), weight of fruit (152.33 g), pulp weight (147.70 g), pulp per cent (96.96), number of fruits per tree (378.00), yield per tree (57.63 kg)and yield per hectare (23.05 tonnes) whereas, the quality parameters like TSS (11.79 ^{0}Brix), ascorbic acid (143.99 mg/100 g pulp), titratable acidity (0.37 %), TSS : acid ratio (31.96), reducing sugar (4.23 %), non-reducing (2.67 %) and total sugars (6.89 %) while, minimum yield (41.00 kg) and yield parameters were recorded in control. The foliar application of GA_3 100 ppm + NAA 200 ppm recorded lowest number of seeds per fruit (244.33) and seed weight per fruit (4.38 g), while maximum number of seeds per fruit (321.67) and seed weight per fruit (5.36g) was recorded in control. The application of CCC 750 ppm has registered better quality parameters such as lowest physiological loss in weight (6.59 %) and maximum shelf life (11.67 days), whereas highest physiological loss in weight (10.16 %) and minimum shelf life (7.00 days) was recorded in control.

May, 2015

(K. S. Sheshagiri)
Major Advisor

2. Effect of Age and Curing of Scion on Success Rate of Softwood Grafting in Sapota (*Achras Zapota* L.)

PULI TANUJA

ABSTRACT

The present investigation entitled "Effect of age and curing of scion on success rate of softwood grafting in sapota (*Achras zapota* L.)" was conducted in low cost poly house at College of Horticulture, Mudigere during the year 2014-15. The experiments were carried out with different treatment combinations in Randomized Block Design with appropriate replications. For the study, four age group scions *i.e*., 3, 6, 9 and 12 months aged with 2, 4, 6, 8 and 10 days cured scions were selected for carrying out grafting in low cost polyhouse.

The results revealed that age and curing of the scions greatly influenced the per cent grafting success and final establishment of the grafts. It is very evident from the study that out of four different age groups the relatively younger scions of 3 months age gave maximum per cent graft success at 30 (50.00%), 60(42.50%) and 90(37.50%) day after grafting with maximum survival percentage (87.00). Similarly in the second experiment, among the six treatments of curing, 10 days cured scions registered maximum per cent graft success at 30 (68.75%), 60(65.00%) and 90(62.50%) days after grafting with maximum survival percentage (84.00). The interaction effect of the age and curing of scion revealed that maximum per cent graft success at 30 (66.66%), 60 (65.33%) and 90(64.00%) days after grafting and maximum survival percentage (80.88) were also registered with 3 months age old scion which was cured for 10 days. Hence, softwood grafting can be carried out successfully with younger scions with 10 days curing to achieve maximum success in low cost polyhouse under Mudigere conditions. In general, these observations were found maximum on younger scions with 10 days cured scions.

May, 2015

(D. Thippesha)
Major Advisor

3. Induction of Flowering to Increase the Fruit Set with More Number of Hermaphrodite Flowers in Bhagwa Variety of Pomegranate (*Punica Granatum* L.)

VIDYA V. ANAWAL

ABSTRACT

The field investigations were carried out during 2014-15 in the farmers field at Hosayalanadu village, Hiriyur taluk, Chitradurga district of Karnataka to study the "Induction of flowering to increase the fruit set with more number of hermaphrodite flowers in Bhagwa variety of pomegranate (*Punica granatum* L.)". The plants which received ethrel 250 ppm at new flesh stage recorded minimum duration for 50 per cent (12.67 days) and 100 per cent flowering (30.44 days) and also produced maximum number of productive hermaphrodite flowers (68.33) followed by minimum number of intermediate flowers (25.22) which are unproductive. The application of NAA 100 ppm recorded maximum size of the flowers in terms of length and diameter in hermaphrodite flowers (5.58 cm, 1.66 cm respectively), intermediate (4.58 cm, 1.45 cm respectively) and male (4.55 cm, 1.47 cm respectively) flowers. The application of GA_3 30 ppm resulted in maximum number of male flowers (75.66). Hence, it is not considered as a better treatment. Application of NAA 40 ppm at full bloom stage registered minimum days taken for fruit set (37.55 days) and recorded maximum number of fruits (62.44/plant), yield per plant (16.45 kg/plant) and yield per hectare (15232.70kg). However, fruit length (8.66 cm), fruit diameter (8.71 cm), fruit weight (262.23 g), fruit volume (255.44 ml), aril weight (188.90 g), aril per cent (72.03), minimum number of seeds (269.60) and seed weight (3.09 g) were also recorded. The quality parameters such as total soluble solids (16.76˚B), reducing sugars (13.83%), non-reducing sugars (1.75%) and total sugars (15.58%) were found highest, besides, the minimum physiological loss in weight (26.17%), with highest shelf life (29.00 days). The present findings can be commercially used in making pomegranate production more profitable (1:3.90) by the application of Ethrel 250 ppm and NAA 40 ppm in Bhagwa variety of pomegranate.

June, 2015

(P. Narayanaswamy)
Major Advisor

4. Effect of Plant Growth Regulators on Yield and Quality of Sapota (*Achraszapota*l.) through Crop Regulation Under Hill Zone of Karnataka

KAVYASHREE, N.

ABSTRACT

The field investigation was carried out during the year 2013-14 in the fruit orchard, Zonal Agricultural and Horticultural Research Station, Mudigere, Chikmagalur district of Karnataka, to study the "Effect of plant growth regulators on yield and quality of sapota (*Achraszapota*L.) through crop regulation under hill zone of Karnataka". The experiment was laid out in randomized block design with 10 treatments and 3 replications. Plant growth regulators like NAA (250, 300 and 350 ppm), 2, 4-D (40, 50 and 60 ppm) and Ethephon (350, 400 and 450 ppm) at varied concentrations were sprayed at pea nut stage.

The maximum fruit weight (110.23 g), fruit length (6.07 cm), fruit diameter (58.30 mm), volume of fruit (106.87 ml), pulp weight (99.35 g), pulp percentage (90.23 %), yield per tree (108.47 kg), yield per hectare (10.85 t) and extended shelf life (10.58 days) with minimum physiological loss in weight (6.10 %, 8.11 % and 10.22 % at 3, 6 and 9 days during storage respectively), less number of seeds per fruit (1.53) and seed weight per fruit (1.72 g) were recorded in the trees sprayed with NAA at 350ppm. Whereas, maximum per cent of thinning (35.30 %) with minimum number of mummified fruits (40.10) was recorded in the treatment with foliar application of ethephon at 450ppm. Similarly, the quality parameters like total soluble solids (19.75 ˚Brix), reducing sugars (9.12 %), non reducing sugar (6.96 %) and total sugars (15.97 %) were also found to be maximum when sprayed with ethephon at 450ppm.

May, 2015

(B. HemlaNaik)
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. Studies on Genetic Variability and Tissue Culture in *Decalepis Hamiltonii* Wight. & Arn. : An Endemic Threatened Medicinal Plant

PRANAY KUMAR

ABSTRACT

An investigation was taken up to study the morphological characters, *in-vitro* propagation, *in-vitro* conservation and genetic fidelity assessment of the *in-vitro* raised plants of *Decalepis hamiltonii* Wight. & Arn. at Division of Plant Genetic Resources, Indian Institute of Horticultural Research (IIHR), Hessarghatta, Bangalore during 2014-2015.

Morphological characterization of six accessions of *D. hamiltonii* was studied. The genotypic and phenotypic coefficients of variations were high for characters *viz*., pedicel length, fruit length and petiole length. High genetic advance over mean coupled with high heritability was observed in characters like petiole length (93.13%), fruit length (87.43%), fruit yield (80.63%) and leaf length (72.44%). Correlation study revealed that petiole length, pedicel length and fruit diameter had significant positive correlation with yield per plant.According to path analysis, leaf width, petiole length and fruit length had high positive direct effects on yield per plant. Plant height, leaf length, pedicel length, fruit diameter, thickness of pericarp and thickness of mesocarp had negative direct effects on yield. Among various combinations used in tissue culture, BA (0.886 mg/l) +2ip (0.24 mg/l) treatment significantly influenced for increase in shoot length, number of shoots, number of leaves and survival per cent.

Genetic fidelity assessment of *in-vitro* raised plants of *D. hamiltonii* revealed that micropropagated plants were similar to mother plant indicating no genetic variation in *in-vitro* raised plants.

July, 2015

(RavirajaShetty. G,)
Major Advisor

2. Propagation Studies in *Celastrus Paniculatus*willd.- An Endangered Medicinal Plant

POOJITHA, K. G.

ABSTRACT

An experiment was carried out to study the propagation of *Celastrus paniculatus*Willd. at the Department of Plantation, Spices, Medicinal and Aromatic crops, College of Horticulture, Mudigere, during the year 2013-14. The work was initiated to standardize the seedand vegetative propagation techniques and morphological characterization of this important RET medicinal plant.Among the different germination inducing treatments, the seeds treated withgibberellins at 400 ppm showed higher germination percentage (62.67) germination rate (0.78) and seedling vigour (2082.74). In vegetative propagation, stem cuttings treated with IBA 2000 ppm recorded maximum sprouting percentage (98.66) and rooting percentage (74.25) 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 BAP (4.44µm) + Kn (0. 2.32 µm).

To study the morphology, 6 accessions of*C. paniculatus*Willd. maintained at Field Gene Bank, Division of Plant Genetic Resources, Indian Institute of Horticultural Research (IIHR), Bangalore were studied for 9 quantitative morphological characters. High genetic advance over mean coupled with high heritability was observed in characters like seed yield per plant (97.90%), leaf width (96.30%), leaf area (95.30%), leaf length (89.60%), fruit diameter (89.60%) and plant height (87.80%). 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.

May, 2015

(Raviraja Shetty, G)
Major Advisor

3. Standardization of Sowing Dates and Stage of Pinching for Growth, Yield and Quality of Fenugreek (*Trigonellafoenum - Graecum*l.) Under Hill Zone of Karnataka

HEENA KAUSER

ABSTRACT

The study was conducted to standardize the optimum date of sowing and stage of pinching in fenugreek at College of Horticulture, Mudigere, UAHS, Shivamogga during 2014-15. The experiment consisted of five dates of sowing (1st October, 15th October, 1st November, 15th November and 1st December) and three levels of pinching (Pinching at 25 days after sowing (DAS), Pinching at 35 DAS and No pinching) which were assessed in all possible combinations for growth, yield and quality. Among the treatments sowing on 15th October and pinching at 35 DAS recorded maximum plant spread, number of branches per plant, dry matter production of leaves, stem, pods, seeds, total dry matter production, AGR, CGR, RGR, NAR, number of pods per plant, length of pod, fresh weight of pod, number of seeds per pod, weight of seeds per pod, seed yield, harvest index, 1000 seed weight, total chlorophyll content in leaves and protein content in seeds, whereas, maximum plant height was recorded in 1st November sown crop and in the non-pinched plants. Interaction effect of sowing dates and stage of pinching were found significant. The treatment D_3P_3 (Sowing on 1st November + No pinching) recorded significantly maximum plant height (48.24 cm), while D_2P_2 (Sowing on 15th October + Pinching at 35 DAS) registered significantly maximum number of branches per plant (12.06), plant spread (51.62 cm^2), total dry matter production (2.00 g/plant), number of pods per plant (13.80), number of seeds per pod (13.60), seed yield (3.44 g/plant and 1148.11 kg/ha), harvest index (29.16 %), total chlorophyll (3.25 g/mg), crude protein content in seeds (5.08 %) and benefit cost ratio (2.62:1) compared to other treatment combinations. The incidence of pest and diseases was found to be least in the 15th October sown crop.

June, 2015

(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. Genetic Variability Studies in Brinjal (*Solanum Melongena* L.) Under Hill Zone of Karnataka

IBAAD, M.H

ABSTRACT

An investigation on genetic variability studies in brinjal was carried out in randomized complete block design in the experimental block of Vegetable Science, College of Horticulture, Mudigere during 2014. Significant differences among genotypes were observed for all the characters under study. High heritability (>60 %) in association with high genetic advance over mean (> 20 %) was observed for number of primary branches, plant spread from east to west, plant spread from north to south, stem girth, leaf area, days to first flowering, days to fifty per cent flowering, number of flowers per cluster, number of clusters per plant, number of fruits per cluster, fruit diameter, fruit length, days taken for first picking, yield per plant, yield per plot, yield per hectare and total chlorophyll content. Therefore, additive component is predominant here. Thus, there is ample scope for improving these characters through direct selection. Total yield per plant was positively and significantly associated with yield per plot, plant height, number of primary branches, plant spread from north to south, stem girth, days to first flowering, days to fifty per cent flowering, number of clusters per plant, fruit diameter and days to first picking. Path analysis revealed that highest positive direct effects on total yield per plant was shown by number of primary branches at 90 DAT (1.2478) followed by number of clusters per plant (0.5123), days to fifty per cent flowering (0.5091), number of fruits per cluster (0.4825) and fruit diameter (0.4292). By following Mahalanobis D^2 analysis, 28 genotypes of brinjal were grouped into five clusters. Days taken for first picking (31.75%) followed by pedicel length (15.08 %) and yield per plant (14.02 %) contributed maximum to the total genetic diversity. Results of screening for shoot and fruit borer revealed that Arka Neelkant and IC354597 were found fairly resistant to shoot and fruit borer infestation.

May, 2015 (V. Srinivasa)

Major Advisor

2. Effect of Plant Geometry and Growth Regulators on Growth, Root and Seed Yield Of Radish (*Raphanussativus* L.) Cv. Pusachetki

SHRUTHI, H.T.

ABSTRACT

The study was conducted to find out the optimum spacing and growth regulators levels in radish cv. PusaChetkiin open field condition at department of Vegetable Science, College of Horticulture, Mudigere, during 2014-15. The experiment consists of two levels of spacing (45 × 45 cm and 30 × 30 cm) and two levels of growth regulators($GA_3$and NAA) each at two concentration (200 ppm and 250 ppm) with control in all possible combinations were assessed for vegetative, root and seed characters. Among the different spacings, S_2 (45 × 45 cm) and among the different growth regulators levels, G_2 (GA_3 250 ppm) recorded maximum plant height, number of leaves per plant, leaf length, leaf width, spread of plant, number of branches per plant, stem diameter, fresh weight of leaves, stem and root, leaf area,chlorophyll content, absolute growth rate, dry matter accumulation in different plant parts like leaves, stem and roots, root length and root girth, number of siliqua per plant, number of seeds per pod, pod weight, length of pod and the same treatment also recorded maximum seed quality parameters. The maximum root and seed yield were obtained under closer spacing (30 × 30 cm) and GA_3 250 ppm. Interactions of spacing and growth regulators levels were found significant with respect to morphological, root and seed quality parameters. The treatment combination S_2G_2 (45 × 45 cm + GA_3 250 ppm) recorded significantly higher values with respect to plant height (85.53 cm), root length (36.80 cm), number of siliqua per plant (264.00),germination percentage (93.33 %) and the same treatment combination also recorded maximum benefit cost ratio (1.70) compared to other treatment combinations.

May, 2015

(V. Srinivasa)
Major advisor

3. Genetic Divergence and Character Association in Chilli (*CapsicumAnnuum* L.) Germplasm

MAMATHA, A

ABSTRACT

An experiment was undertaken to evaluate forty chilli genotypes in a Randomized Complete Block Design with two replications to study the genetic variability, heritability, correlation, path analysis and genetic divergence in the experimental block of Vegetable Science, College of Horticulture, Mudigere during 2013 to 2014. The analysis of variance revealed highly significant difference among the genotypes for growth and yield parameters. High heritability in association with high genetic advance over mean was observed for number of fruits per plant, fruit diameter, fruit length, pedicel length, fruit weight, fruit yield per plant, fruit yield per plot and fruit yield/ha, indicating predominance of additive gene component. Thus, there is ample scope for improving these characters through direct selection. Fruit yield per plant was positively and significantly associated with plant height at 60 DAT and 90 DAT, number of branches at 60 DAT and 90 DAT (Days After Transplanting), number of fruits per plant and fruit weight.

Path analysis revealed that highest positive direct effects on fruit yield per plant was shown by days to first harvest (0.7624), number of fruits per plant (0.2331), fruit weight (0.1745) and fruit yield per hectare (0.6765). By following Mahalanobis D^2 analysis, the genotypes of chilli were grouped into eight clusters. Among them, Cluster I (15) and II (13) consists of maximum number of genotypes. The characters viz., fruit weight (40.38%) followed by fruit diameter (28.46%), number of fruits per plant (12.31%) and days to first harvest (10.77%) contributed maximum to the total genetic diversity. Genotypes, DCC – 69, DCC – 134, DCC – 135, DCC – 164 and DCC – 167 are found promising for hill zone of Karnataka.

June, 2015

(Devaraju)
Major Advisor

4. Genetic Variability Studies in Cluster Bean (*Cyamopsis Tetragonoloba* L.)

REVATI GOUDAR

ABSTRACT

Cluster bean genotypes collected from different regions of Karnataka were evaluated in Randomized Complete Block Design with two replications to study the genetic variability, correlation, path analysis and genetic divergence at Department of vegetable science, College of Horticulture, Mudigere during summer season of 2014-15. Analysis of variance revealed that high significant difference among genotypes were observed for all characters taken for study. High heritability coupled with genetic advance over mean was observed for most of growth characters *viz.*, number of vegetable and dry pods per plant, number of clusters per plant and number of pods per cluster which indicated predominance of additive gene action for these traits. Correlation studies indicated positive association of pod yield per plant with pod yield per plot, number of dry pods per plant, dry pod yield per plant, seed yield per plant at both genotypic and phenotypic levels. Path analysis showed that yield per plant exhibited positive direct effect (0.934) and had strong positive association with yield per plot (rG=0.999) suggesting that these parameters may be considered as prime traits during selection to fetch higher yield. The genetic divergence studies using Mahalanobis D^2 statistics grouped eighteen genotypes of cluster bean into three groups. The maximum intra cluster distance was observed in cluster I indicated that genotypes are having diverse genetic architecture.The intercluster distance was high between cluster I and III, this indicated wide range of variability among clusters. Dry pod yield per plant (29.41%) followed by number of dry pods per plant (24.18%) and seed yield per plant (16.99 %) contributed maximum towards genetic diversity.

June, 2015

(V. Srinivasa)
Major Advisor

5. Evaluation of French Bean (*Phaseolus vulgaris* L.) Genotypes Under Hill Zone of Karnataka

HEENA, M. S.

ABSTRACT

An investigation on evaluation of French bean (*Phaseolus vulgaris* L.) genotypes under hill zone of Karnatakawas carried out in randomized block design with three replications in the experimental block at department of Vegetable Science, College of Horticulture, Mudigere, Karnataka during 2014. The genotypes*viz*., Mridula, Arka Komal, Selection-9, Arka Suvidha, Arka Anoop, Arka Bold, Powel, Sunil, Jyothi, Nandi, Arka Sharath and Anuradha were used.Among the twelvegenotypesmaximum per cent of germination was observed in Selection-9 (98.81%) and Jyothi (98.60%).Arka Anoopperformed better for most of the characters like plant height (45.33cm),number of primary branches (9.00), number of cluster per plant (10.06), number of pods per plant (44.33), pod length (17.00 cm), pod yield per plant (82.00 g), pod yield per plot(5.90 kg / plot) andpod yield per hectare (18.26 t / ha). Arka Komal and Arka Suvidha were the early flowering genotypes.Correlation studies revealed highly significant and positive association of pod yield per plant with most of the characters *viz*., number of pods per plant, number of primary branches per plant, plant height, number of secondary branches per plant, number of clusters per plant, pod length and pod circumference. Path analysis revealed that number of primary branches per plant at 45 days after sowing, number of pods per plant and pod circumference were the most influencing traits on pod yield perplant.Highest net profit and benefit to cost ratio was obtained from Arka Anoop (3.63:1) followed by Arka Suvidha (3.48:1) and these two genotypes performed better under hill zone of Karnataka.

June, 2015

(Devaraju)
Major Advisor

Forestry

Silviculture and Agroforestry

University of Agricultural and Horticultural Sciences, Shivamogga

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

1. Impact of Moisture Status and Shade Tree Management on Performance of Coffee Based Agroforestry

CHONDAMMA M P

ABSTRACT

Coffee based agroforestry systems cover one third of the land area in Kodagu district and accounts to one third of the total Indian coffee production. Coffee is grown under the shade of diverse trees under multi-strata agroforestry systems and hence the shade trees play a major role in biodiversity conservation and ecosystem services. The present study on impact of moisture status and shade tree management on performance of coffee based agroforestry, has generated information on the performance of coffee grown under different management and moisture regimes. The study was carried out in coffee plantations of Kodagu district with three management practices *viz.*, conventional with native shade, organic with native shade and *Grevillea robusta* management practices. Impact of moisture status and shade tree management on different growth performance of coffee plants and Chlorophyll content of leaf was assessed. The results revealed that there was no significant influence of moisture stress and shade tree regimes on different parameters during the study period. But however it was observed that the per cent retention of berries were higher in moisture stress coffee plants than the control, hence the yield being higher in moisture stress coffee plants. The *Grevillea robuta* shade managementhad higher retention of berries; hence the yield was higher than conventional with native shade and organic with native shade. This could be mainly due to the higher rainfall during the study period, which favoured higher yields under moisture stress conditions.

Key words**:** Coffee based Agroforestry, Moisture stress, Shade tree, *Grevillea robusta*

June, 2015

(N. A. Prakash)
Major Advisor

2. Effect of Shade Trees on Bee Pollination Services in *Coffea Canephora*pierre Ex A. Fr.

ABSTRACT

The region of Kodagu, Central Western Ghats, South India, is dominated by coffee plantation comprising diverse native shade trees. The current study investigates the impact of shade trees within the coffee plantation on bee abundance and pollination success in coffee. The study was carried in 25 coffee plantations by considering three different management regime *viz.*, coffee under native shade with organic, native shade with conventional and *Grevillea robusta* (Silver Oak) shade with conventional management system. The results revealed that bee abundance in coffee did not differ significantly between management regimes, but irrespective of management regime bee abundance in coffee increased significantly with the density of bee pollinated co-flowering shade trees and also differed significantly between irrigated and rainfed coffee plantations.

Comparatively irrigated plantation had higher bee abundance. An interaction effect of bee abundance at coffee and flowering initiation (irrigated/rainfed) showed significant positive effect on pollen tube development in coffee. It was found that initial fruit set in coffee reduced significantly with the density of Silver Oak trees. The results suggest planting important bee foraging shade trees which helps in attracting bee into coffee plantations. Flowering initiation by irrigation is a good option to enhance bee abundance. However planting Silver Oak has several advantages to farmers and hence the study suggests the farmers to plant Silver Oak along the fence and retain the diverse native shade trees in the center of the plantation which helps in conserving bees and other insect diversity.

(C.G. Kushalappa)
Major Advisor

June, 2015